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3D-BASIS-TABS: Version 2.0 Computer Program for Nonlinear Dynamic Analysis of Three Dimensional Base Isolated Structures

by

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The program 3D-BASIS-TABS has been developed using computational modules in *3D-BASIS—developed at the State University of New York at Buffalo, and ETABS—developed by the University of California at Berkeley.* The program 3D-BASIS-TABS has been developed, for research purposes, with financial support from National Center for Earthquake Engineering Research, Center for Infrastructure Research and Development, University of Buffalo, and University of Missouri - Columbia. The following *DISCLAIMER OF WARRANTY* applies to the use of computer program 3D-BASIS-TABS and the associated subroutines (including routines from 3D-BASIS and ETABS).

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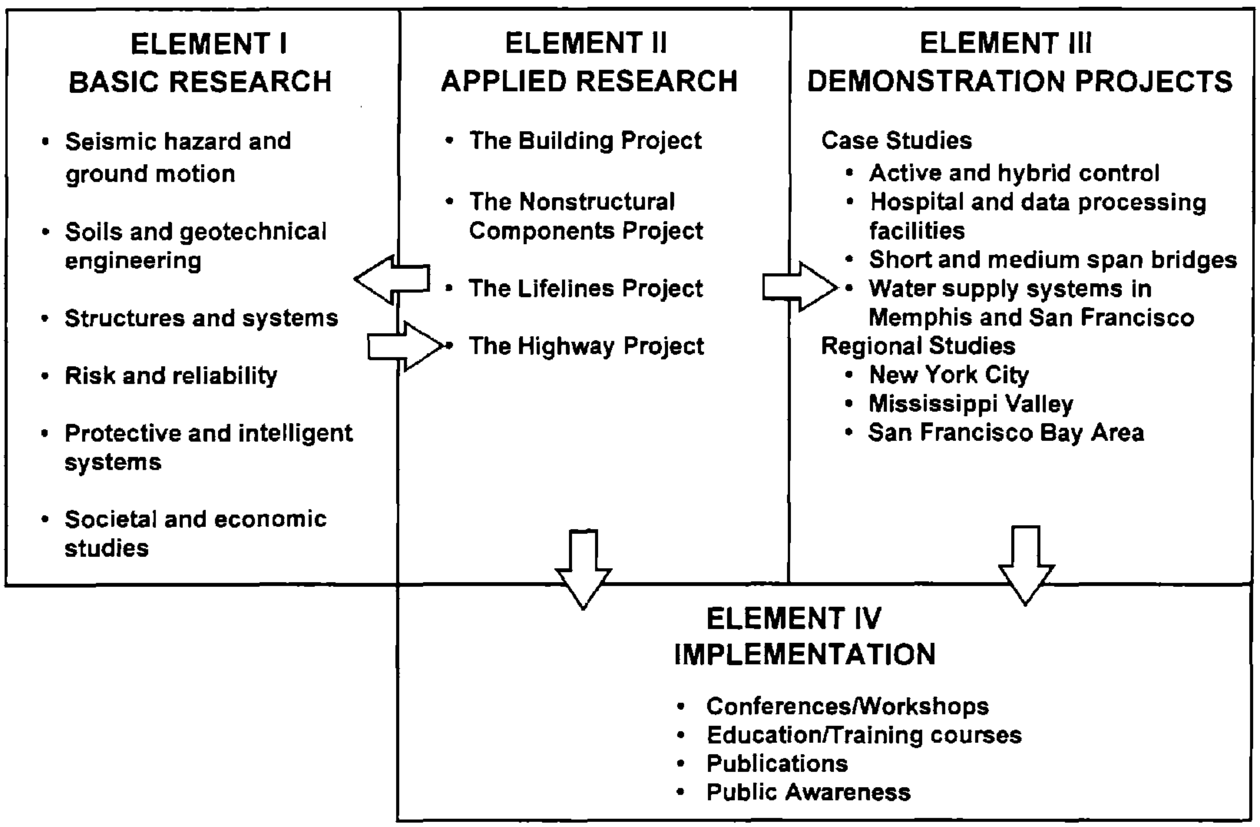
PREFACE

The National Center for Earthquake Engineering Research (NCEER) was established to expand and disseminate knowledge about earthquakes, improve earthquake-resistant design, and implement seismic hazard mitigation procedures to minimize loss of lives and property. The emphasis is on structures in the eastern and central United States and lifelines throughout the country that are found in zones of low, moderate, and high seismicity.

NCEER's research and implementation plan in years six through ten (1991-1996) comprises four interlocked elements, as shown in the figure below. Element I, Basic Research, is carried out to support projects in the Applied Research area. Element II, Applied Research, is the major focus of work for years six through ten. Element III, Demonstration Projects, have been planned to support Applied Research projects, and will be either case studies or regional studies. Element IV, Implementation, will result from activity in the four Applied Research projects, and from Demonstration Projects.



Research in the **Building Project** focuses on the evaluation and retrofit of buildings in regions of moderate seismicity. Emphasis is on lightly reinforced concrete buildings, steel semi-rigid frames, and masonry walls or infills. The research involves small- and medium-scale shake table tests and full-scale component tests at several institutions. In a parallel effort, analytical models and computer programs are being developed to aid in the prediction of the response of these buildings to various types of ground motion.

Two of the short-term products of the **Building Project** will be a monograph on the evaluation of lightly reinforced concrete buildings and a state-of-the-art report on unreinforced masonry.

The **protective and intelligent systems program** constitutes one of the important areas of research in the **Building Project**. Current tasks include the following:

1. Evaluate the performance of full-scale active bracing and active mass dampers already in place in terms of performance, power requirements, maintenance, reliability and cost.
2. Compare passive and active control strategies in terms of structural type, degree of effectiveness, cost and long-term reliability.
3. Perform fundamental studies of hybrid control.
4. Develop and test hybrid control systems.

The new computer program documented in this report, 3D-BASIS-TABS, Version 2.0, is an enhanced version of 3D-BASIS-TABS and 3D-BASIS which are special purpose programs developed by NCEER for nonlinear dynamic analysis of three-dimensional base isolated structure (see reports NCEER-93-0011 and NCEER-91-0005). One limitation associated with the use of 3D-BASIS is that the superstructure member forces cannot be computed - since no data regarding individual members is specified by the user in this version. 3D-BASIS-TABS overcomes this limitation by computing superstructure member forces, after the completion of the nonlinear time history analysis, followed by output of peak member forces, which can be used for the design of members. This report briefly describes the development of 3D-BASIS-TABS and the enhancements from Version 1.0 (NCEER Report 93-0011), which include addition of new isolation elements for modeling nonlinear dampers, special sliding friction bearings, improvement of other hysteretic elements, additional verification, several new example problems, new input/output format, and updated user's manual.

ABSTRACT

The computer program 3D-BASIS-TABS is a special purpose program developed for nonlinear dynamic analysis of three-dimensional base isolated structures. The program can analyze base isolated structures with linear superstructure and nonlinear isolation system. 3D-BASIS-TABS has three options for modeling the linear superstructure (i) option 1 -- three-dimensional shear building representation, in which case the global stiffness matrix of the superstructure is assembled internally by the program using story stiffnesses, specified by the user, followed by the dynamic analysis; (ii) option 2 -- full three-dimensional representation, in which case beam, column, shear wall and bracing elements of the superstructure are modeled explicitly, followed by assembly of the global stiffness matrix, condensation, dynamic analysis, and recovery of internal forces in structural elements by backsubstitution; (iii) option 3 -- three-dimensional representation, in which case the dynamic characteristics of the superstructure, such as frequencies and mode shapes, specified by the user, are used to compute the superstructure stiffness matrix, followed by dynamic analysis. The isolation system is modeled by representing the force-displacement relationship of each individual isolator explicitly. The aforementioned approach for options 1 and 3 yields accurate global response results; however, the disadvantage is that superstructure member forces cannot be computed, since no data is available for individual members (this is the principle disadvantage of the previous version 3D-BASIS). Option 2 in 3D-BASIS-TABS overcomes the aforementioned shortcoming by computing superstructure member forces, after the completion of the nonlinear time history analysis, followed by output of peak member forces, which can be used for the design of members.

This report describes the development of computer program 3D-BASIS-TABS Version 2.0. The new program is an enhanced version of 3D-BASIS-TABS. The report should be viewed as a continuation and addition to previous reports NCEER-93-0011 and NCEER-91-0005. The enhancements that have been made include (i) addition of new isolation

elements; (ii) models of nonlinear dampers and other hysteretic elements; (iii) additional verification; (iv) addition of several new example problems; (v) new input/output format for easier usage; (vi) updated user's manual.

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SECTION 1

INTRODUCTION

A class of computer programs have been developed by the authors to provide comprehensive analysis capabilities for nonlinear dynamic analysis of three-dimensional base isolated structures, which are, 3D-BASIS (Nagarajaiah et al. 1991a;1991b), 3D-BASIS-M (Tsopelas et al. 1991;1994), and 3D-BASIS-TABS (Nagarajaiah et al. 1993c). The newest of the class is computer program 3D-BASIS-TABS Version 2.0 described in this report.

Computer programs 3D-BASIS have been specifically developed for analysis of base isolated structures with linear superstructure and nonlinear elastomeric and/or sliding isolation systems. Salient features of 3D-BASIS programs which make them specially suitable for analysis of base isolated structures with different isolation systems are as follows:

(1) Capability to analyze isolation systems that are a combination of elastomeric and sliding isolation systems;

(2) Unified model capable of representing the biaxial behavior of either elastomeric or sliding bearings and other isolation devices;

(3) Capability to capture the highly nonlinear behavior of sliding isolation systems in plane motion;

(4) Pseudo-force solution algorithm for accurate and efficient solution of stiff differential equations that arise in sliding systems due to stick-slip behavior;

(5) Solution algorithm with the accuracy of predictor-corrector methods and efficiency suitable for analyzing large base isolated structures;

(6) Capability to model multistory base isolated buildings and capture the lateral-torsional behavior under bidirectional earthquake motion;

(7) Simplicity of input requirements and execution on both main and microcomputers.

With the above mentioned capabilities 3D-BASIS programs have become increasingly popular amongst both researchers and practising engineers leading to several applications (i) preliminary studies in preparation for shake table tests at SUNY-Buffalo and UC-Berkeley; (ii) evaluation of the important effects of nonlinear biaxial interaction between orthogonal lateral forces in isolation bearings, on the response of base isolated structures, by Nagarajaiah et al. (1990) and by Mokha et al. (1993); (iii) simulation of shake table test results using measured properties of the structure and the isolation system (Nagarajaiah et al. 1992); (iv) study of lateral torsional response of base isolated structures (Nagarajaiah et al. 1993a;1993b); (v) evaluation of SEAOC code provisions for base isolated structures (Constantinou et al. 1993, Theodossiou et al. 1991, Winters et al. 1993); (vi) analysis of new base isolated buildings and existing buildings to be retrofitted using base isolation (Amin et al. 1993, Asher et al. 1993, Button et al. 1993, Cho et al. 1993); (vi) post-earthquake evaluation studies of existing base isolated buildings in seismically active areas such as the region of San-Andreas fault (Clark et al. 1993).

The computer program 3D-BASIS-TABS is a special purpose program developed for nonlinear dynamic analysis of three-dimensional base isolated structures. The program can analyze base isolated structures with linear superstructure and nonlinear isolation system. 3D-BASIS-TABS has three options for modeling the linear superstructure (i) option 1 -- three-dimensional shear building representation, in which case the global stiffness matrix of the superstructure is assembled internally by the program using story stiffnesses, specified by the user, followed by the dynamic analysis; (ii) option 2 -- full three dimensional representation, in which case beam, column, shear wall and bracing elements of the superstructure are modeled explicitly, followed by assembly of the global stiffness matrix, condensation, dynamic analysis, and recovery of internal forces in structural elements by backsubstitution; (iii) option 3 -- three-dimensional representation, in which case the dynamic characteristics of the superstructure, such as frequencies and mode shapes, specified by the user, are used to compute the superstructure stiffness matrix, followed by dynamic analysis. The isolation system is modeled by representing the force-displacement relationship of each individual isolator explicitly. The aforementioned approach for options 1 and 3 yields accurate global response results; however, the disadvantage is that superstructure member forces cannot be computed, since no data is available for individual members (this is the principal disadvantage of the previous version 3D-BASIS). Option 2 in 3D-BASIS-TABS overcomes the aforementioned shortcoming by computing superstructure member forces, after the completion of the non-linear time history analysis, followed by output of peak member forces, which can be used for the design of members.

This report describes the development of computer program 3D-BASIS-TABS Version 2.0. The new program is an enhanced version of 3D-BASIS-TABS. The enhancements that have been made include (i) addition of new isolation elements and models for nonlinear dampers and nonlinear bearings; (ii) additional verifications; (iii) several new example problems; (iv) new input/output format for easier usage; (v) updated user's manual.

The input format for the superstructure in 3D-BASIS-TABS has been retained in the same format as in ETABS to facilitate usage. It is to be noted that the aforementioned beam, column, shear wall and bracing elements, substructure condensation, global assembly, and backsubstitution procedures are adopted from the computer program ETABS (Wilson et al. 1975).

SECTION 2

3D-BASIS-TABS

A complete description of computer program 3D-BASIS-TABS has been presented by Nagarajaiah et al. (1993c); however, for the sake completeness a brief description of the structural model and the solution algorithm is presented in this section. The major steps involved in the assembly of the structural model and the solution algorithm are presented in the Flowchart 2.1. The detailed description of each step is described in the following sub-sections.

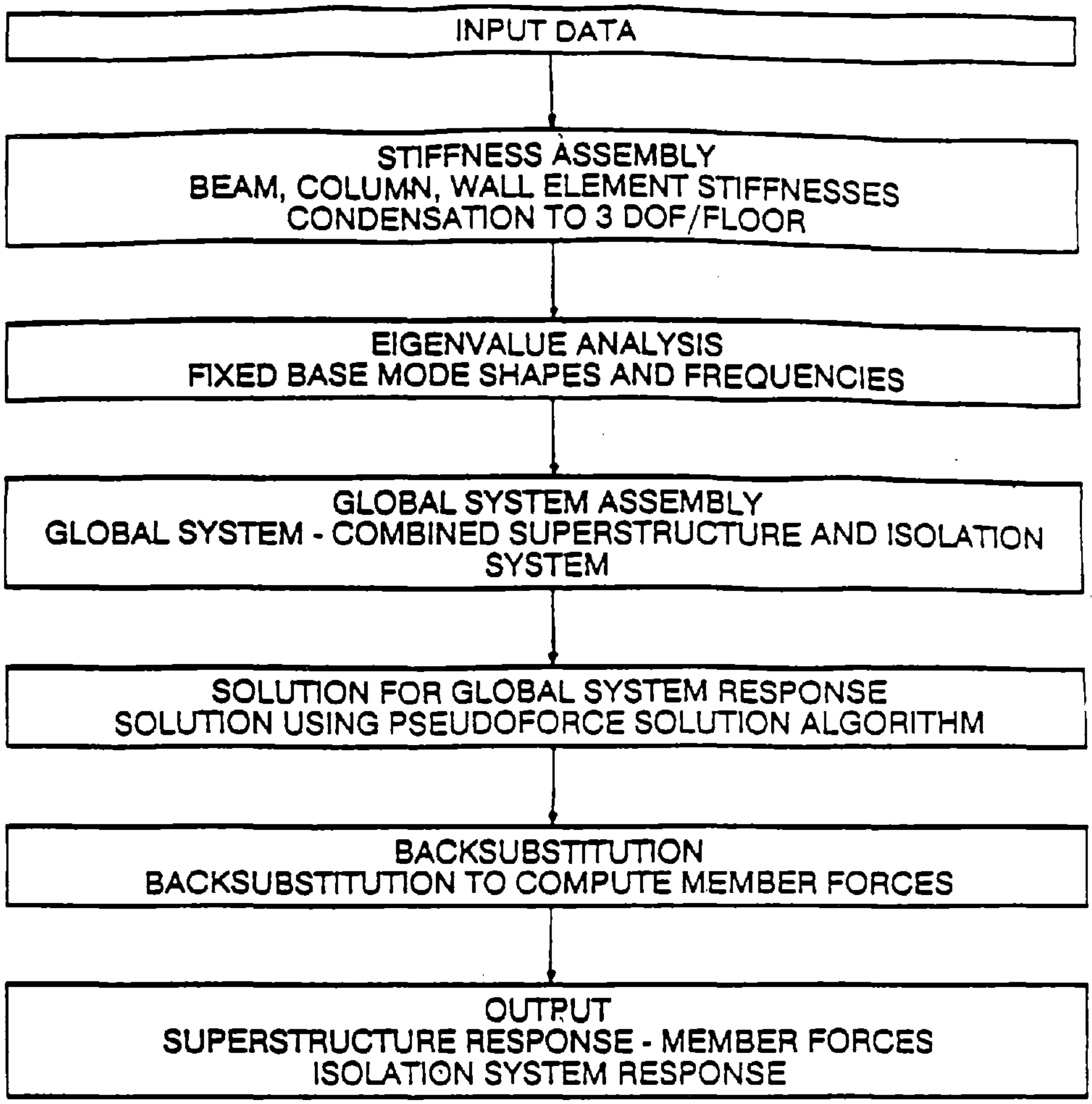
2.1 INPUT DATA

The input format has been retained in the same format as in ETABS to facilitate usage (since many designers are familiar with the superstructure input requirements for ETABS). The data in the form of beam, column, shear wall, and bracing member properties, connectivity, etc., need to be input. In addition the isolation system data in the form of isolator properties, connectivity, etc., need to be input. The data needed for the dynamic analysis also has to be input. The user's manual in APPENDIX A specifies the data input requirements.

2.2 SUPERSTRUCTURE STIFFNESS ASSEMBLY

The superstructure is assumed to be remain elastic at all times. Coupled lateral-torsional response is accounted for by maintaining three degrees of freedom per floor, i.e., two translational and one rotational degree of freedom attached to the center of mass. The base and floors are assumed to be rigid diaphragms.

3D-BASIS-TABS is designed to include three options for modeling the superstructure; option 1 for 3D-shear building, in which case story stiffnesses are to be input; option 2 for full 3D-building, in which case member properties for beam, column, etc., are to be input, for detailed member by member representation of the superstructure; option 3 for full 3D-building, in which case eigenvalues/eigenvectors are to be input. If option 1 or 3 is used, member forces are not output, as no data for representing individual members is available.



FLOW CHART OF MAJOR STEPS IN 3D-BASIS-TABS

In option 1, the superstructure of the three-dimensional shear building is represented by a global stiffness matrix assembled using story stiffnesses specified by the user. The global displacement coordinate system consists of three degrees of freedom at the center of mass of the floors. It is assumed that the center of mass of all the floors lie on a common vertical axis; floors and beams are rigid; walls and columns are inextensible.

In option 2, the procedure for assembly of the global stiffness matrix from ETABS (Wilson et al. 1975) is adopted. The procedure involves (i) formulation of the lateral stiffness matrix of each frame, which is treated as separate substructure with an associated frame displacement coordinate system; (ii) assembly of the global stiffness matrix, using the frame substructure stiffness transformed to the global displacement coordinate system, with the assumption that all frame substructures are connected at each floor level by a diaphragm which is rigid in its own plane. Each joint in the structure is modeled with six degrees of freedom. Within each frame joint three degrees of freedom (two translations and one rotation in the floor plane) are transformed, using the rigid floor diaphragm assumption, to the frame displacement coordinate system at that floor level. The remaining three frame joint degrees of freedom are eliminated by static condensation. The condensed frame substructure stiffness is transformed to the global displacement coordinate system and added to the global structural stiffness. The global displacement coordinate system consists of three degrees of freedom at the center of mass of the floors. The position of the center of mass may vary from floor to floor; hence, the mass matrix, required for dynamic analysis, will be a diagonal matrix --which simplifies the eigenvalue analysis. The global stiffness matrix of the superstructure, in the fixed base condition, is used for eigenvalue analysis.

In option 3, the superstructure of the three-dimensional building is represented by a global stiffness matrix, assembled using the dynamic characteristics, such as frequencies and mode shapes specified by the user (minimum of three modes of vibration, with the global displacement coordinate system of three degrees of freedom at the center of mass of the floors, to be specified). Implicit in this approach is that the axial deformation of columns, bending and shear deformation of column and beam members, and arbitrary location of the center of mass, are accounted for by the condensed dynamic characteristics.

2.3 EIGENVALUE ANALYSIS

The eigenvalue analysis is performed to determine the eigenvalues and eigenvectors, i.e., frequencies and mode shapes in the fixed base condition using the global stiffness matrix. The frequencies and mode shapes are used in the global system assembly of the superstructure and the isolation system. The frequencies and mode shapes obtained correspond to the global coordinate system with three degrees of freedom at the center of mass of the floors.

2.4 ISOLATION SYSTEM MODELING

The isolation system is modeled with spatial distribution and explicit nonlinear force-displacement characteristics of individual isolation devices. The isolation devices are considered rigid in the vertical direction and individual devices are assumed to have negligible resistance to torsion.

The following are the elements available for modeling the behavior of an isolation system (i) linear elastic element --spring; (ii) linear viscous element --damper; (iii) hysteretic element for elastomeric bearings and steel dampers; (iv) hysteretic element for sliding bearings; (v) nonlinear damper element --a new element for modeling damping devices; (vi friction pendulum (FPS) element; (vii) new biaxial element for sliding.

2.4.1 Linear Elastic Element

The linear elastic element can be used to approximately simulate the behavior of elastomeric bearings along with the viscous element. All linear elastic devices of the isolation system specified are combined, internally by the program, in global elements at the center of mass of the base, having the combined properties of all the elastic devices, with the translational stiffnesses, K_x and K_y and the rotational stiffness, K_r.

2.4.2 Linear Viscous Element

The linear viscous element can be used to simulate the viscous properties of the isolation devices. All linear viscous devices are combined, internally by the program, in global viscous elements at the center of mass of the base, having the combined properties of all the viscous devices, with the translational damping coefficients C_x and C_y and rotational damping coefficient C_T.

2.4.3 Model for Biaxial Isolation Elements

At a bearing undergoing plane motion with displacement components U_x and U_y and velocity components $\dot{U}_x$ and $\dot{U}_y$ in the X and Y directions, lateral forces develop and these forces exhibit biaxial interaction. In addition a torsional moment develops at the bearing. The contribution of this torsional moment to the total torque exerted to the structure supported by several bearings is insignificant.

The direction of the resultant force at the bearing opposes the direction of the motion given by:

$$\theta = \tan^{-1}\left(\frac{\dot{U}_y}{\dot{U}_x}\right) \tag{2.1}$$

The model presented herein accounts for the direction and magnitude of the resultant hysteretic force.

The model for biaxial interaction is based on the following set of equations proposed by Park, Wen and Ang (1986):

$$\begin{Bmatrix} \dot{Z}_x Y \\ \dot{Z}_y Y \end{Bmatrix} = \begin{Bmatrix} A\dot{U}_x \\ A\dot{U}_y \end{Bmatrix} - \begin{pmatrix} Z_x^2(\gamma Sign(\dot{U}_x Z_x) + \beta) & Z_x Z_y(\gamma Sign(\dot{U}_y Z_y) + \beta) \\ Z_x Z_y(\gamma Sign(\dot{U}_x Z_x) + \beta) & Z_y^2(\gamma Sign(\dot{U}_y Z_y) + \beta) \end{pmatrix} \begin{Bmatrix} \dot{U}_x \\ \dot{U}_y \end{Bmatrix} \tag{2.2}$$

in which, Z_x and Z_y are hysteretic dimensionless quantities, Y is the yield displacement, A, γ and β are dimensionless quantities that control the shape of the hysteresis loop. The values of $A = 1$, $\gamma = 0.9$ and $\beta = 0.1$ are used in this report. When yielding commences, Eq. 2.2 has the following solution, provided that $A/(\beta + \gamma) = 1$:

$$Z_x = \cos\theta, \quad Z_y = \sin\theta \tag{2.3}$$

Z_x and Z_y are bounded by values ± 1 and account for the direction and biaxial interaction of hysteretic forces. The interaction curve given by Eq. 2.2 is circular.

2.4.3.1 Biaxial Model for Sliding Bearings

For a sliding bearing, the mobilized forces are described by the equations (Constantinou et al. 1990):

$$F_x = \mu_s W Z_x, \quad F_y = \mu_s W Z_y \tag{2.4}$$

in which, W is the vertical load carried by the bearing and μ_s is the coefficient of sliding friction which depends on the value of bearing pressure, angle θ and the instantaneous velocity of sliding $\dot{U}$:

$$\dot{U} = (\dot{U}_x^2 + \dot{U}_y^2)^{1/2} \tag{2.5}$$

Z_x and Z_y, given by Eq. 2.2, are bounded by the values ± 1, account for the conditions of separation and reattachment (instead of a signum function) and also account for the direction and biaxial interaction of frictional forces.

The coefficient of sliding friction is modeled by the following equation (Constantinou et al. 1990):

$$\mu_s = f_{max} - (f_{max} - f_{min}) \quad \exp(-a|\dot{U}|) \tag{2.6}$$

in which, f_{max} is the maximum value of the coefficient of friction and f_{min} is the minimum (at $\dot{U} \sim 0$) value of the coefficient of friction. f_{max}, f_{min} and α may be, in general, functions of bearing pressure and angle θ.

2.4.3.2 Biaxial Model for Elastomeric Bearings and Steel Dampers

For a elastomeric bearing, the mobilized forces are described by the equations:

$$F_x = \alpha \frac{F^y}{Y} U_x + (1-\alpha) F^y Z_x, \quad F_y = \alpha \frac{F^y}{Y} U_y + (1-\alpha) F^y Z_y \tag{2.7}$$

in which, α is the postyielding to preyielding stiffness ratio, F^y is the yield force and Y is the yield displacement. Z_x and Z_y, given by Eq. 2.2 account for the direction and biaxial interaction of hysteretic forces.

2.4.4 Model for Uniaxial Isolation Elements

The biaxial interaction can be neglected when the off-diagonal elements of the matrix in Eq 2.2 are replaced by zeros. This results in a uniaxial model with two either frictional or bilinear independent elements in the two orthogonal directions. Eq. 2.2 collapses to the uniaxial model governed by the following equation (Wen 1976):

$$\dot{Z} Y = A\dot{U} - |Z|^{\eta} (\gamma Sgn(\dot{U} Z) + \beta) \dot{U} \tag{2.8}$$

where $\eta = 2$ in the biaxial case and this parameter controls the transition from elastic range to the post yielding range. The value of this parameter can be increased to achieve near-bilinear behavior rather than smooth bilinear behavior. The interaction curve in the uniaxial case is effectively square. In the case of uniaxial sliding element the velocity used for calculation of the coefficient of friction from Eq. 2.6 is either $\dot{U}_x$ or $\dot{U}_y$.

2.4.5 Nonlinear Damping Element

Many physical systems exhibit nonlinear damping mechanisms such as Coulomb damping, viscous damping, orifice damping, and velocity raised to power p damping. Several fluid viscous damping and friction damping devices have been proposed. The nonlinear damping force of such devices can be described as being proportional to the the power p of relative velocity across the damper:

$$F_d = \left(\sum_{i=1}^{n} F_{oi} + C_i |\dot{U}|^{p_i} \right) Sgn(\dot{U}) \tag{2.9}$$

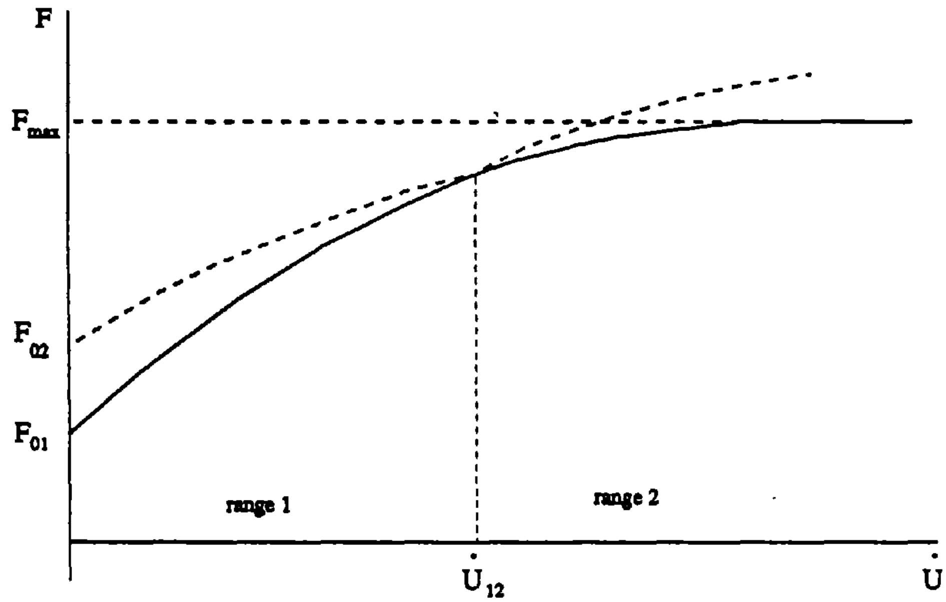


Fig. 2.0 Force-Velocity Function for Nonlinear Viscous Damper

where F_{oi} is an offset constant for stage i, the damping coefficient C_i and the exponent p_i may have any positive value. The signum function $Sgn(\dot{U})$ accounts for the phase between the damping force F_d and the relative velocity $\dot{U}$, and n is the number of stages (maximum 2). The applications of such generalized formulation of the damping force are demonstrated as follows:

Coulomb damping ($p_i = 0$)

$$F_d = C_i Sgn(\dot{U}) \tag{2.10}$$

Linear viscous damping ($p_i = 1$)

$$F_d = C_i |\dot{U}| Sgn(\dot{U}) \tag{2.11}$$

Nonlinear viscous damping ($p_i = 2$)

$$F_d = C_i |\dot{U}|^2 Sgn(\dot{U}) \tag{2.12}$$

where C_i for $p_i = 0$ is the magnitude of the Coulomb damping force, C_i for $p_i = 1$ is the coefficient of viscous damping, and C_i for $p_i = 2$ is the coefficient of nonlinear viscous damping. Devices with values of exponent p_i in the range of 0.4 to 2 have been produced.

2.5 ELEMENT FOR FRICTION PENDULUM (FPS) BEARING

The principles of operation of the FPS Bearing have been established by Zayas et al. 1987, Mokha et al. 1990 and Constantinou et al. 1993. These principles are, of course, valid for all types of spherical sliding bearings. A cross-section view of an FPS bearing is shown in Fig. 2.1. The bearing consists of a spherical sliding surface and an articulated slider which is faced with a high pressure capacity bearing material. The bearing may be installed as shown in Fig. 2.1 or upside-down with the spherical surface down rather than up. In both installation methods the behavior is identical.

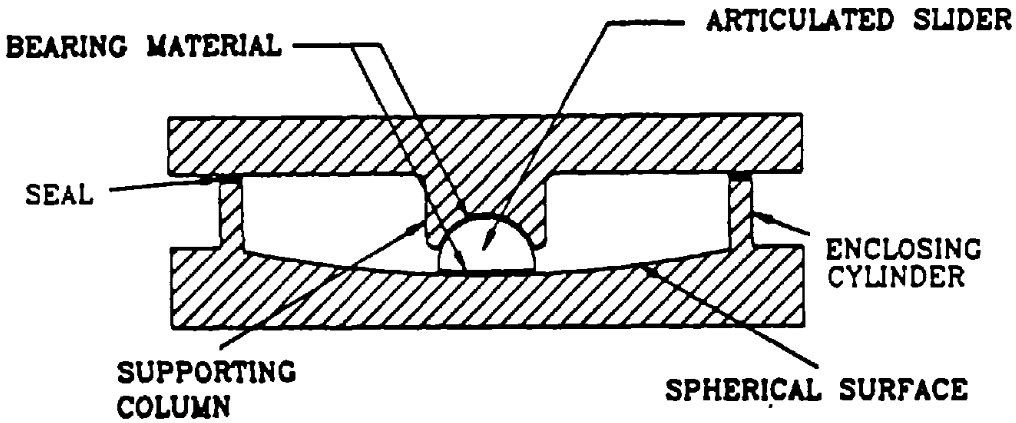


Fig. 2.1 FPS Bearing Section.

The force-displacement relation of an FPS bearing in any direction is given by:

$$F = \frac{W}{R} U + \mu_s W sgn(\dot{U}) \tag{2.13}$$

in which R is the radius of curvature of the spherical sliding surface, W is the normal load and μ_s is the coefficient of the sliding friction. In cases in which the normal load may be assumed to be constant and equal to the carried weight W_i, modeling of an FPS bearings may be accomplished by combining the linear elastic element of Section 2.4.1, using stiffness $K_{xi} = K_{yi} = W_i/R$, and the biaxial element for sliding bearing of Section 2.4.3, using $W = W_i$. To reduce computational effort, all the linear elastic elements may be combined in a global element described by translational stiffnesses $K_x = K_y = \sum W_i/R$ ($\sum W_i$ =total weight) and corresponding rotational stiffness K_r and associated eccentricities e_x^b and e_y^b (see Section 2.4.1 and Nagarajaiah et al. 1989 and 1991).

In general, the vertical load on an isolation bearing does not remain constant but rather varies as a result of the vertical ground motion and the effect of overturning moment. For vertically rigid structures, the normal load on an FPS bearing is:

$$W = W_i \left(1 + \frac{\ddot{U}_v}{g} + \frac{N_{om}}{W_i} \right) \tag{2.14}$$

where W_i is the weight $\ddot{U}_v$ is the vertical ground acceleration (positive when the direction is upwards) and N_{OM} is the additional axial force due to the overturning moment effects (N_{OM} is positive when compressive - see requirements for subroutine in Section 2.10.1.)

The direct effects of variations in the normal load on the behavior of the FPS bearing are to instantaneously change the stiffness and friction force. Another indirect effect is to change the coefficient of friction which is pressure dependent. Modeling of the behavior of FPS bearings to this detail is important in the accurate estimation of the forces in individual bearings. However, use of $W = W_i$ rather than Eq. (2.14) results in nearly the same global isolation system response and superstructure response. This has been demonstrated by comparison of analytical results to shake table results of a seven-story model in which the axial forces on individual bearings varied from 0 to 2 W_i, W_i being the gravity load (Al-Hussaini et al. 1994).

The forces in the FPS element are described by (Tsopelas et al. 1994):

$$F_x \frac{W}{R} \cdot U_x + \mu_s \cdot N Z_x \qquad F_y \frac{W}{R} \cdot U_y + \mu_s \cdot W Z_y \tag{2.15}$$

which Z_x and Z_y are described by Eq. 2.2 and W is described by Eq. 2.14. The current program requires user-supplied routines to:

a) Calculate the additional force on individual bearings from overturning moments about the two horizontal axes, and

b) Describe the variation of coefficient f_{max} in Eq. 2.6 with bearing pressure.

Details of these routines are given in Section 2.12.

2.6 NEW BIAXIAL ELEMENT FOR SLIDING BEARINGS

The new biaxial element for flat sliding bearings is described by equations (2.4-2.6 and 2.2) with the exception that W is not constant but rather described by Eq. 2.14. The element requires the user-supplied routines (Tsopelas et al. 1994) described in Sections 2.5 and 2.10. It should be noted that when $\ddot{U}_v$ is not given and when the user-supplied routine returns zero for the additional axial load N_{OM} (Eq. 2.14), the model collapses to the original constant normal load ($W = W_i$) model.

2.7 GLOBAL SYSTEM ASSEMBLY

The formulation for global system assembly of the combined superstructure and the isolation has been presented in detail by Nagarajaiah et al. (1993c); hence, it is presented only briefly herein.

A typical base isolated multistory building and the displacement coordinates that will be used in the formulation are shown in Fig. 2.2 (U_t, U_b, U_g may be in X or Y direction). The superstructure is modeled as an elastic frame-wall structure with three degrees of freedom per floor, as described earlier. The three degrees of freedom are attached to the center of mass of each floor and base. The floors and the base are assumed to be infinitely rigid inplane. The isolation system may consist of elastomeric and/or sliding isolation bearings, linear springs, viscous elements, and nonlinear damping elements.

The equations of motion for the elastic superstructure are expressed in the following form:

$$M_{nxn}\ddot{u}_{nx1} + C_{nxn}\dot{u}_{nx1} + K_{nxn}u_{nx1} = -M_{nxn}R_{nx3}\{\ddot{u}_g + \ddot{u}_b\}_{3x1} \qquad (2.16)$$

in which, n is three times the number of floors, M is the diagonal superstructure mass matrix, C is the superstructure damping matrix, K is the superstructure stiffness matrix

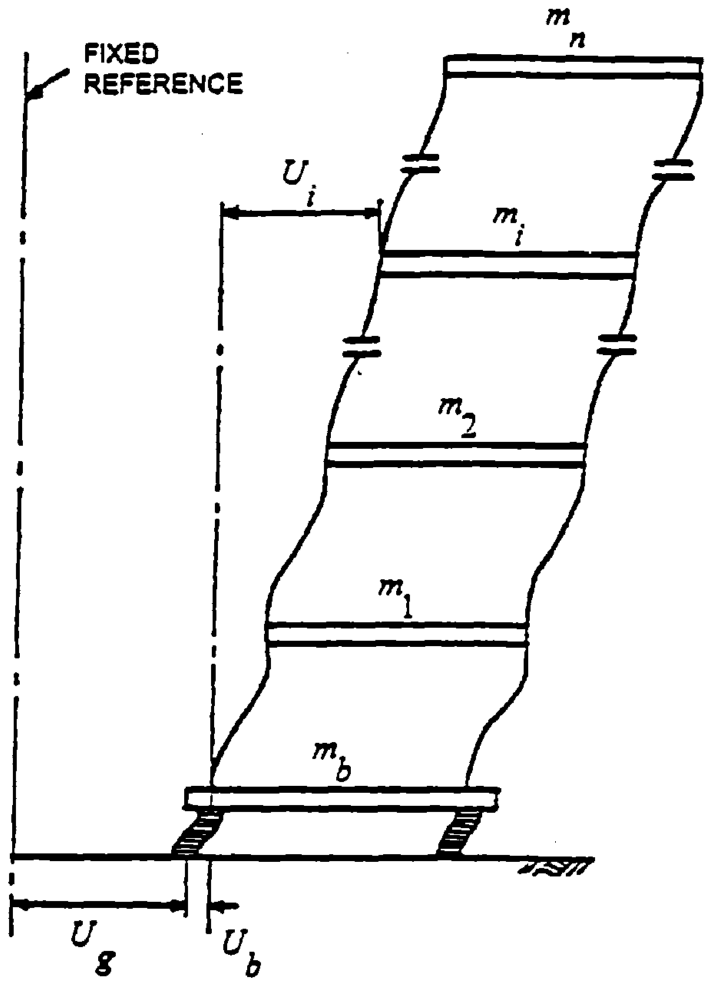


Fig. 2.2 Displacement Coordinates of the Base Isolated Structure

and R is the matrix of earthquake influence coefficients i.e., the matrix of displacements and rotation at the center of mass of the floors resulting from a unit translation in the X and Y directions and unit rotation at the center of mass of the base (with respect to global structure reference axis). Furthermore, $\ddot{u}$, $\dot{u}$ and u represent the floor acceleration, velocity and displacement vectors relative to the base, $\ddot{u}_b$ is the vector of base acceleration relative to the ground and $\ddot{u}_g$ is the vector of ground acceleration.

The equations of motion for the base are as follows:

$$R^T_{3xn} M_{nxn} \{\{\ddot{u}\} + R\{\ddot{u}_b + \ddot{u}_g\}\}_{nx1} + M_{b3x3}\{\ddot{u}_b + \ddot{u}_g\}_{3x1} + C_{b3x3}\{\dot{u}_b\}_{3x1} + K_{b3x3}\{u_b\}_{3x1} + \{f\}_{3x1} = 0 \tag{2.17}$$

in which, M_b is the diagonal mass matrix of the rigid base, C_b is the resultant damping matrix of viscous isolation elements, K_b is the resultant stiffness matrix of elastic isolation elements and f is the vector containing the forces mobilized in the nonlinear elements of the isolation system such as the presented elements for sliding, elastomeric bearings, etc. Employing modal reduction:

$$u_n = \Phi_{nxm} u^*_{mx1} \tag{2.18}$$

in which, Φ is the modal matrix normalized with respect to the mass matrix and u^* is the modal displacement vector relative to the base and m is the number of eigenvectors retained in the analysis, and combining Eqs. 2.16 to 2.18 the following equation is derived:

$$\begin{pmatrix} [I] & [\Phi^T M R] \\ [R^T M \Phi] & [R^T M R + M_b] \end{pmatrix}_{(m+3)x(m+3)} \begin{Bmatrix} \ddot{u}^* \\ \ddot{u}_b \end{Bmatrix}_{(m+3)x1} + \begin{pmatrix} [2\xi_i \omega_i] & 0 \\ 0 & [C_b] \end{pmatrix}_{(m+3)x(m+3)} \begin{Bmatrix} \dot{u}^* \\ \dot{u}_b \end{Bmatrix}_{(m+3)x1}$$

$$+ \begin{pmatrix} [\omega_i^2] & 0 \\ 0 & [K_b] \end{pmatrix}_{(m+3)x(m+3)} \begin{Bmatrix} u^* \\ u_b \end{Bmatrix}_{(m+3)x1} + \begin{Bmatrix} 0 \\ f \end{Bmatrix}_{(m+3)x1} = -\begin{bmatrix} \Phi^T M R \\ R^T M R + M_b \end{bmatrix}_{(m+3)x3} \ddot{u}_{g3x1} \tag{2.19}$$

in which, ξ_i = the modal damping ratio, and ω_i = the natural frequency, of the fixed base structure in the mode *i*. In Eq. 2.19 matrices $[2\xi_i\omega_i]$ and $[\omega_i^2]$ are diagonal.

Eq. 2.16 can be written as follows:

$$\tilde{M}\ddot{u}_t + \tilde{C}\dot{u}_t + \tilde{K}\bar{u}_t + f_t = \bar{P}_t \tag{2.20}$$

At time $t + \Delta t$

$$\tilde{M}\ddot{u}_{t+\Delta t} + \tilde{C}\dot{u}_{t+\Delta t} + \tilde{K}\bar{u}_{t+\Delta t} + f_{t+\Delta t} = \bar{P}_{t+\Delta t} \tag{2.21}$$

Written in incremental form

$$\tilde{M}\Delta\ddot{u}_{t+\Delta t} + \tilde{C}\Delta\dot{u}_{t+\Delta t} + \tilde{K}\Delta\bar{u}_{t+\Delta t} + \Delta f_{t+\Delta t} = \bar{P}_{t+\Delta t} - \tilde{M}\ddot{u}_t - \tilde{C}\dot{u}_t - \tilde{K}\bar{u}_t - f_t \tag{2.22}$$

in which, $\tilde{M}$, $\tilde{C}$, $\tilde{K}$ and $\bar{P}$ represent the reduced mass, damping, stiffness and load matrices (see Eq. 2.19). Furthermore, the state of motion of modal superstructure and base is represented by vectors $\ddot{u}_t$, $\dot{u}_t$ and $\bar{u}_t$ (see Eq. 2.19).

2.8 LOADING CONDITIONS

Vertical static loading conditions for representing dead loads, and earthquake loads --representing seismic excitation, can be specified. The vertical loading conditions can include up to three independent vertical load distributions (I,II,III) and these distributions are combined to form load cases for the complete building. For earthquake loading conditions, bidirectional lateral ground motions can be specified.

2.9 SOLUTION FOR GLOBAL SYSTEM RESPONSE

The incremental nonlinear force vector $\Delta f_{t+\Delta t}$ in Eq. 2.22 is unknown. This vector is brought on to the right hand side of Eq. 2.22 and treated as a pseudo-force vector. The two steps in the solution algorithm are (i) The solution of equations of motion using unconditionally stable Newmark's constant-average-acceleration method (Newmark 1959); (ii) The solution of differential equations governing the behavior of the nonlinear isolation elements using unconditionally stable semi-implicit Runge-Kutta method (Rosenbrock 1964) suitable for solution of stiff differential equations. Furthermore, a iterative procedure consisting of corrective pseudo-forces is employed within each time step until equilibrium is achieved. Detailed explanation of the solution algorithm can be found in Nagarajaiah et al. (1991a;1991b).

2.10 BACKSUBSTITUTION

The time history of member forces are computed by backsubstitution, after the non-linear time history analysis is completed. The peak member forces are output to facilitate the design of members. The backsubstitution procedure from ETABS is adopted.

2.11 OUTPUT DATA

The output data consists of three sets (i) input data for the structure and isolation system; (ii) dynamic characteristics of the structure; (iii) peak response results in the form of maximum response quantities; (iv) time history of response. The dynamic characteristics of the structure output are periods and mode shapes. The peak response results of member response and isolator response is output. A full range of options for output are available, the details of which can be found in the user's manual in APPENDIX A.

2.12 USERS - SUPPLIED ROUTINES IN PROGRAM 3D-BASIS-TABS

2.12.1 Routine for Additional Axial Load Due to Overturning Moment Effects

The routine (a function) has the form:

FOVM(OVMX,OVMY,XP,YP,I)

in which I is the bearing number, XP and YP are arrays containing the bearing coordinated (XP(I) = X coordinate of bearing I etc.), and OVMX and OVMY are the overturning moments about the X and Y axes, as illustrated in Fig. 2.3. Function FOVM is called by the main program at all time steps. The function returns to the main program the additional axial load FOVM on bearing I. FOVM is positive when compressive.

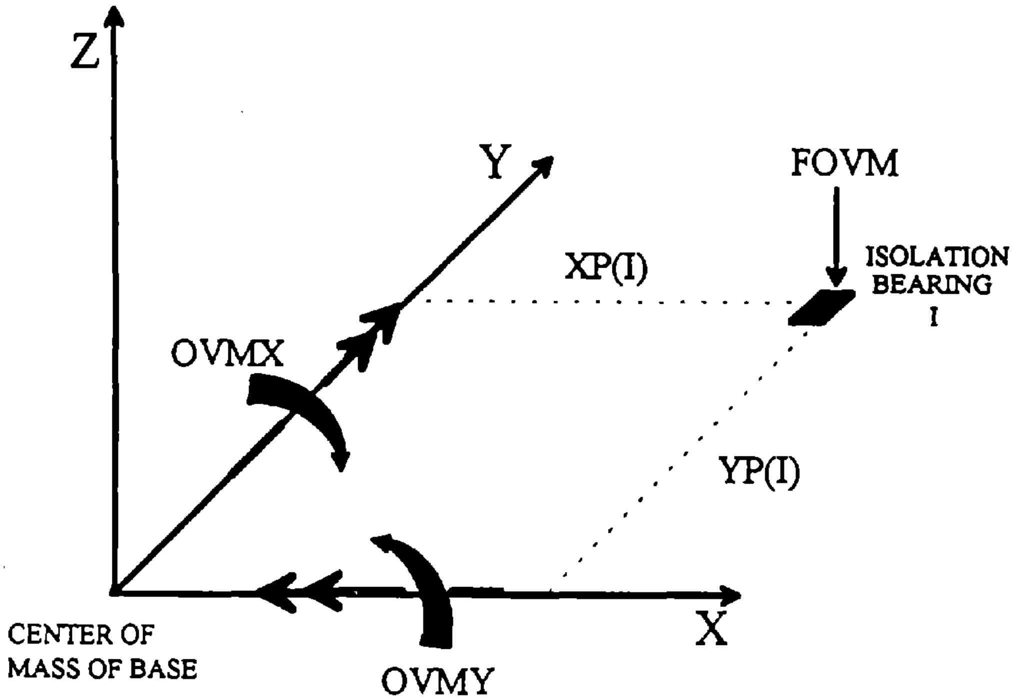


Fig. 2.3 Definition of Overturning Moments OVMX and OVMY, and Additional Force FOVM.

It should be noted that we have assumed a unique relation between overturning moments and additional axial load on bearings. The user is cautioned that this is a simplification of a complex phenomenon. However, it is a commonly used engineering approximation. The report of Al Hussaini et al. 1994 provides valuable insight into the behavior of slender isolated structures with FPS bearings which are subjected to strong overturning moments. To exclude the effect of the overturning moment on the additional axial force, function FOVM should be as follows:

```
FUNCTION FOVM(OVMX,OVMY,SP,YP,I)
IMPLICIT REAL *8
COMMON/MAIN1/NB,NP,MNF,MNE,NFE,MXF
DIMENSION XP(NP), YP(I)
FOVM=0.D0
RETURN
END
```

This default version of function FOVM in 3DBASIS-TABS.

2.12.2 Routine for Describing the Dependency of Parameter f_{max} on Bearing Pressure

Constantinou et al. 1990 and 1993 described the dependency on bearing pressure of the parameters in the model of friction in Eq. 2.6. Specifically, the coefficient of sliding friction is given by:

$$\mu_s = f_{max} - (f_{max} - f_{min})\exp(-\alpha|\dot{U}|) \tag{2.23}$$

where α is nearly independent of pressure, whereas f_{min} is dependent on pressure for unfilled and glass-filled PTFE but nearly independent of pressure for the PTFE-composites used in the FPS bearings. Parameter f_{max} is generally dependent on bearing pressure. Since parameter f_{max} describes the maximum friction force that is transmitted through the bearing, its dependency on pressure is explicitly modeled in this program. However, the much less significant dependency on pressure of parameters α and f_{min} is neglected.
The user-supplied routine (function) has the form:

FFMAX(FRMAX,FRMIN,FNOR,I)

in which I is the bearing number, FNOR is the normal load on bearing I, which includes the gravity, vertical ground motion and overturning moment effects, normalized by the weight W_i on the bearing. Furthermore, FRMAX and FRMIN are, respectively, the supplied, through the INPUT, parameters f_{max0} and f_{min0} under almost zero static pressure of bearing I. Function FFMAX returns the value of f_{max} at the bearing pressure resulting from the instantaneous normal load. Note that parameter f_{min} is assumed independent of pressure, that is $f_{min0} = f_{min}$.

For example, consider the case in which the dependency on pressure of parameter f_{max} is neglected.

Function FFMAX should be:

```
FUNCTION FFMAX(FRMAX,FRMIN,FNOR,I)
IMPLICIT REAL *8
COMMON/MAIN1/NB,NP,MNF,MNE,NFE,MXF
FFMAX=FRMAX
RETURN
END
```

This is the default version of function FFMAX.

Consider now the case of pressure dependent parameter f_{max}. Figure 2.4 shows the assumed dependency on pressure of parameter f_{max}. It is typical of the behavior of sliding bearings (Soong and Constantinou 1994). An accurate representation of the variation of parameter f_{max} with pressure can be accounted for by using the following expression:

$$f_{max} = f_{max0} - (f_{max0} - f_{maxp})\tanh(\epsilon P) \tag{2.24}$$

where P is the instantaneous bearing pressure, f_{maxp} is the maximum coefficient of friction at very high pressures, f_{max0} is the value of the coefficient at zero pressure, ϵ is a constant that controls the transition of f_{max} between very low and very high pressure.

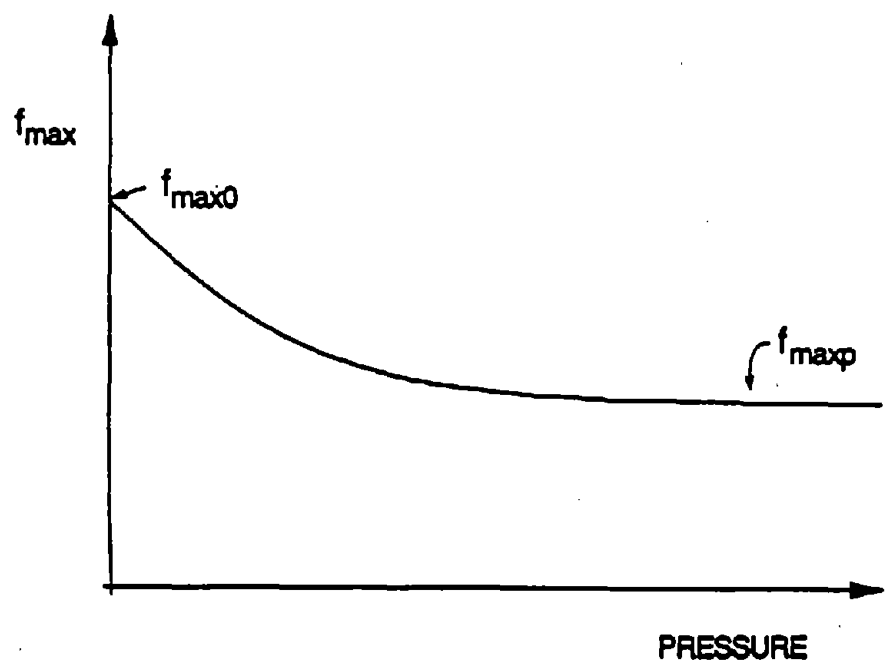


Fig. 2.4 Variation of Friction Parameter f_{max} with Pressure

As an example, Constantinou et al. 1993 gave the following values for the parameters of a bearing at pressure of 17.2 MPa: $f_{max} = 0.12$, $f_{maxp} = 0.05$, $\epsilon = 0.012$ (P the bearing pressure is in the units of MPa). For this case function FFMAX should be of the form:

```
FUNCTION FFMAX(FRMAX,FRMIN,FNOR,I)
IMPLICIT REAL *8
COMMON/MAIN1/NB,NP,MNF,MNE,NFE,MXF
DIMENSION P(500)
DATA/P(J)=17.2,J=1,../
 etc. etc.

PRES=FNOR*P(I)
FFMAX=FRMAX-0.07*DTANH(0.012*PRES)
END
```

Note that P(J) contains the bearing pressure under static conditions of bearing J. Quantity PRES is the instantaneous bearing pressure in units of MN/m^2 or MPa.

SECTION 3

VERIFICATION AND EXAMPLE PROBLEMS

3D-BASIS-TABS has been verified by the authors (Nagarajaiah et al. 1993c). This section describes the previous verification briefly, for completeness sake, and also describes additional verification of 3D-BASIS-TABS.

The verification is performed using three example problems. The first example problem consists of a three story reinforced concrete building with sliding isolation system. The second example considered is a single story structure on lead-rubber isolation system. The third example problem consists of a six story reinforced concrete building with lead-rubber bearing isolation system.

The verification using the three story reinforced concrete building with sliding isolation system is accomplished by comparing the dynamic analysis results of program 3D-BASIS-TABS, in the form of peak member forces at a chosen instant of time during the time history, with the pseudo-static analysis results of finite element program STAAD; thus, validating the member force computations in the program 3D-BASIS-TABS. The pseudo-static analysis, performed using commercially available finite element program STAAD, consists of application of lateral forces or inertial forces, at the same instant of time as chosen in 3D-BASIS-TABS time history analysis, at the center of mass of the three floors. The lateral forces or inertial forces are extracted from the dynamic analysis using 3D-BASIS-TABS.

The verfication using the single story structure with lead-rubber bearing isolation system is accomplished by comparing the results at the center of mass from program 3D-BASIS-TABS with the results of program ANSR (Mondkar and Powell 1975); thus, validating the global results.

The verification using the six story reinforced concrete building with lead-rubber bearing isolation system is accomplished by comparing the results of 3D-BASIS-TABS with the results of a two dimensional analysis performed using DRAIN-2D (Kannan and Powell 1975). Also, results, at the center of mass, from program 3D-BASIS-TABS --modeling the superstructure explicitly element-by-element-- are compared with the results of program 3D-BASIS (Nagarajaiah et al. 1991b) using the dynamic characteristics of the superstructure, i.e., eigenvalues and eigenvectors; thus, validating the global results.

3.1 THREE STORY REINFORCED CONCRETE BUILDING WITH SLIDING ISOLATION SYSTEM

The three story reinforced concrete building considered has three bays in each direction and has a square plan with dimensions 12 x 12 meters as shown in Fig. 3.1. The dimensions of the various members shown in Fig. 3.1 are (i) beams 300 x 400 mm; (ii) interior columns 300 x 400 mm; (iii) exterior columns 300 x 300 mm; (iv) R/C bracing members 300 x 300 mm; (v) shear wall or panel of 100 mm thickness. The floor slab is 150 mm thick. The floor masses are (i) translational mass of 119.4 kN-sec^2/m; and (ii) mass moment of inertia of 2985.6 kN-m-s^2. The modulus of elasticity of the concrete is assumed to be E_c = 29862560 kN/m^2. The damping ratio in the superstructure is assumed to be 5% of critical.

The building is base isolated using a sliding isolation system as shown in Fig. 3.2 and Fig. 3.3. The sliding isolation system consists of 16 sliding bearings placed concentrically under each column and 4 recentering springs placed at the four corners of the building as shown in Fig. 3.3. Design of the isolation system is based on appropriate code provisions. The sliding isolation bearings are made of unfilled Teflon and polished stainless steel plates. The sliding bearings have a coefficient of friction f_{max} = 0.1 and f_{min} = 0.07. The recentering helical springs are designed to provide an isolation period T_b = 3 sec. The sliding bearings and helical springs are shown in Fig. 3.2 in greater detail (see the enlarged detail Fig. 3.2).

3D-BASIS-TABS is used to analyze the base isolated building excited by El Centro NS earthquake. The input and output files for this building are given in APPENDIX B.

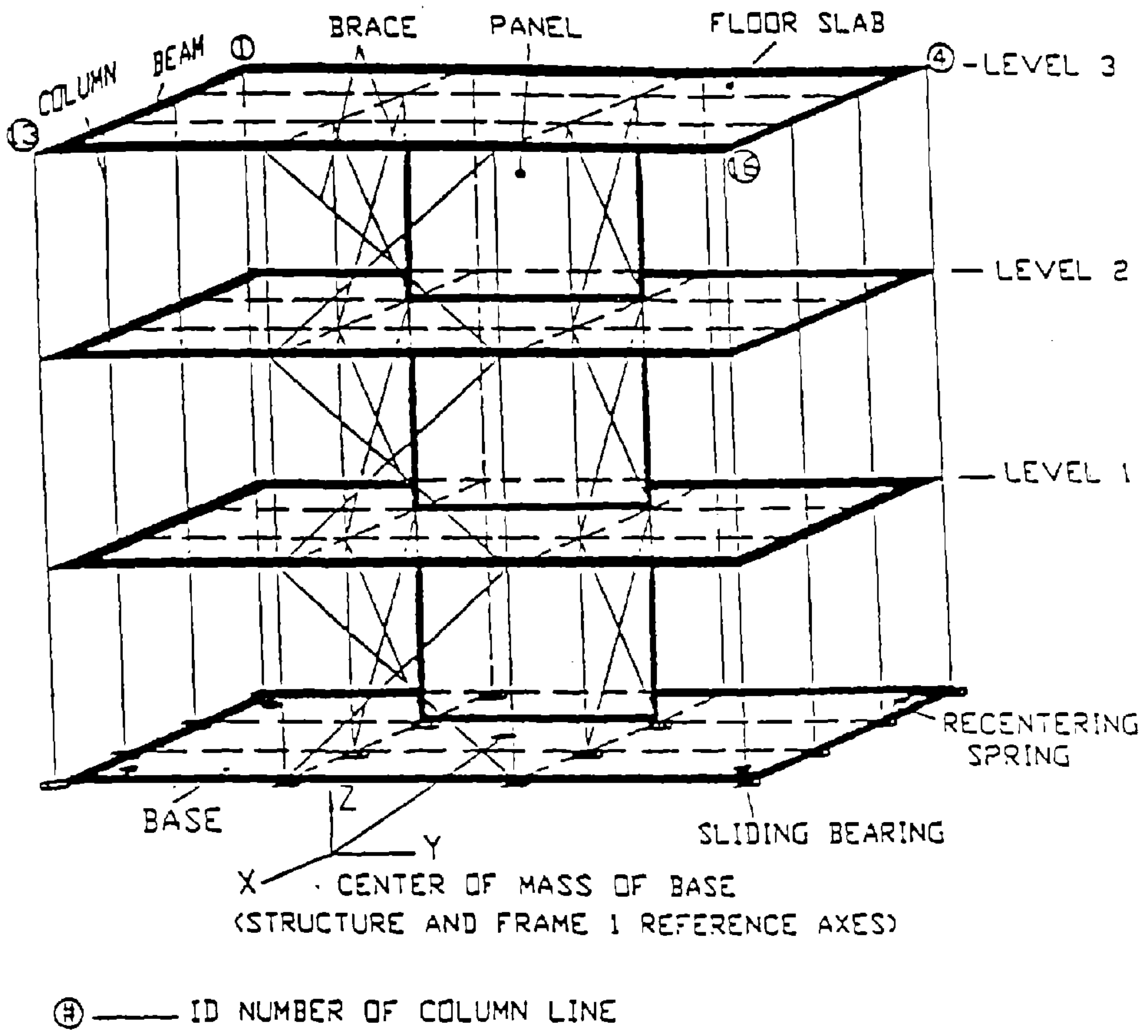


FIG. 3.1. Superstructure Member configuration and Isolation System Configuration of the Three-Story Reinforced Concrete Sliding Isolated Building. Note the Location of the Structure Axis at the Center of Mass of the Base and the Location of the Column Lines 1, 4, 13 and 16 (Refer to the Input File Given in Appendix B)

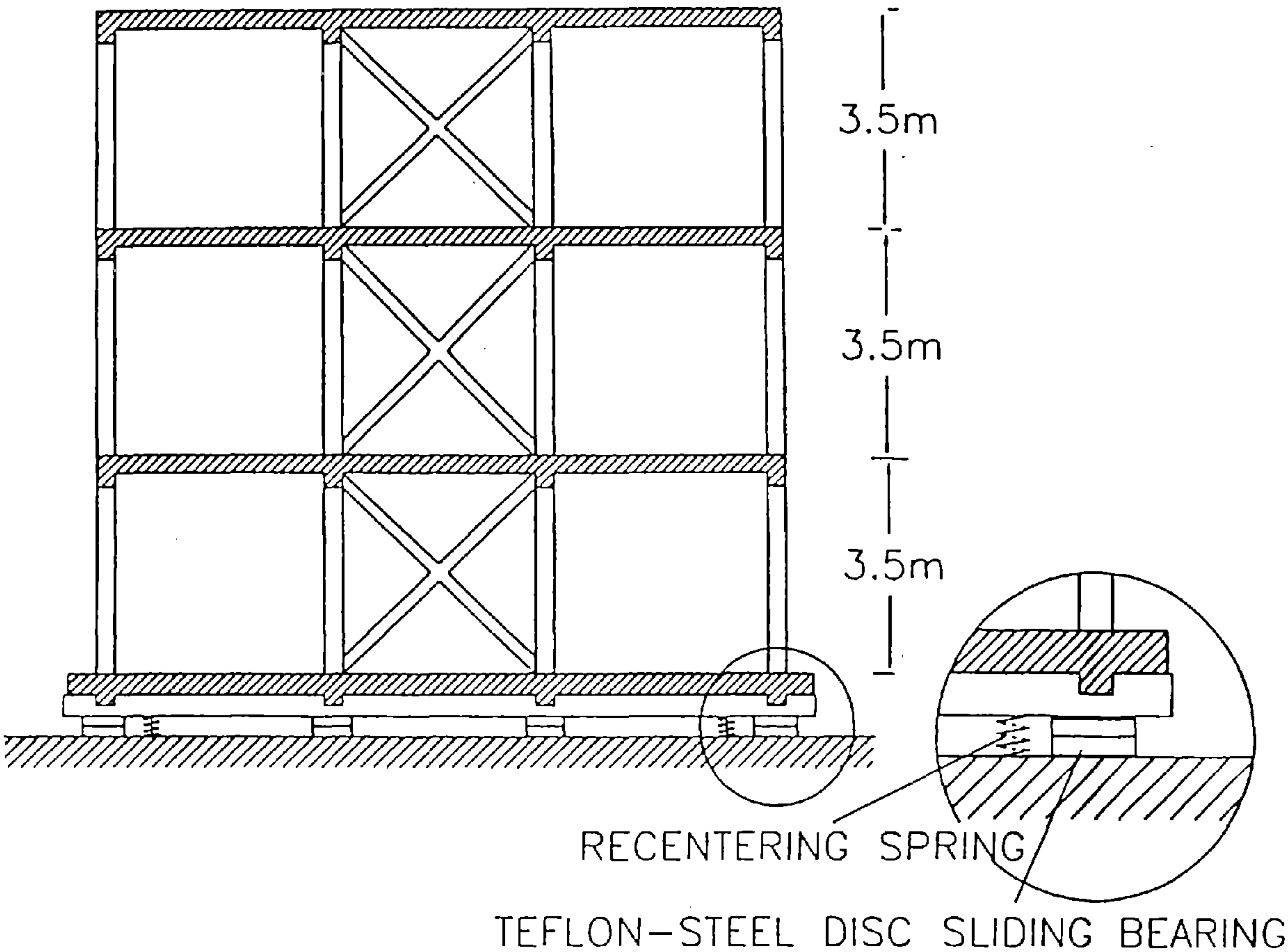


FIG. 3.2. Cross Section of the Three-Story Reinforced Concrete Sliding Isolated Building (Left Extreme Column Line is 16 and Right Extreme Column Line is 13). Note the Details of the Sliding Bearing and Recentering Spring Shown in the Inset and Plan Location Shown in FIG 3.3

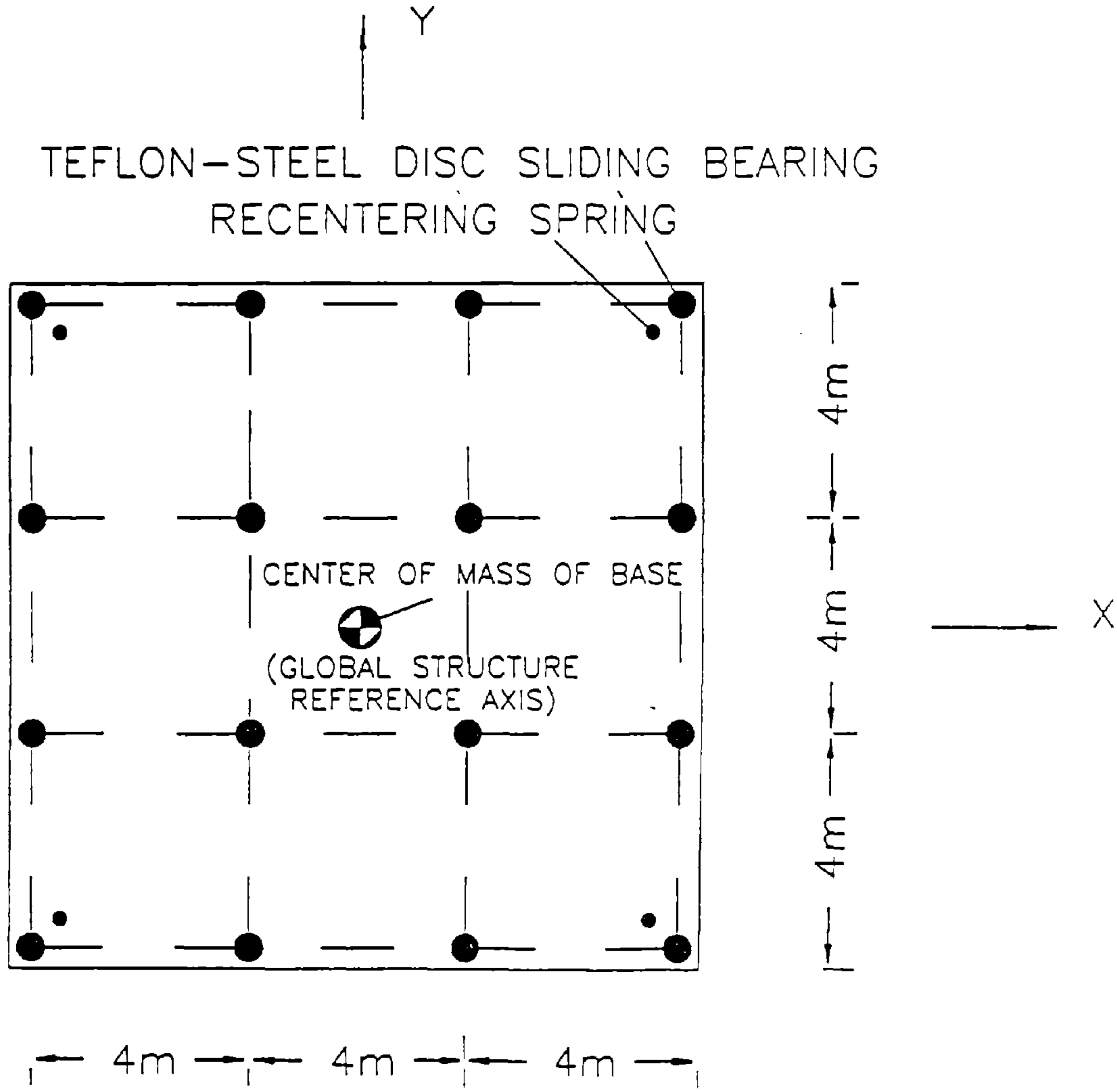


FIG. 3.3. Plan of the Sliding Isolation System with Teflon - Steel Disc Sliding Bearings and Recentering Springs

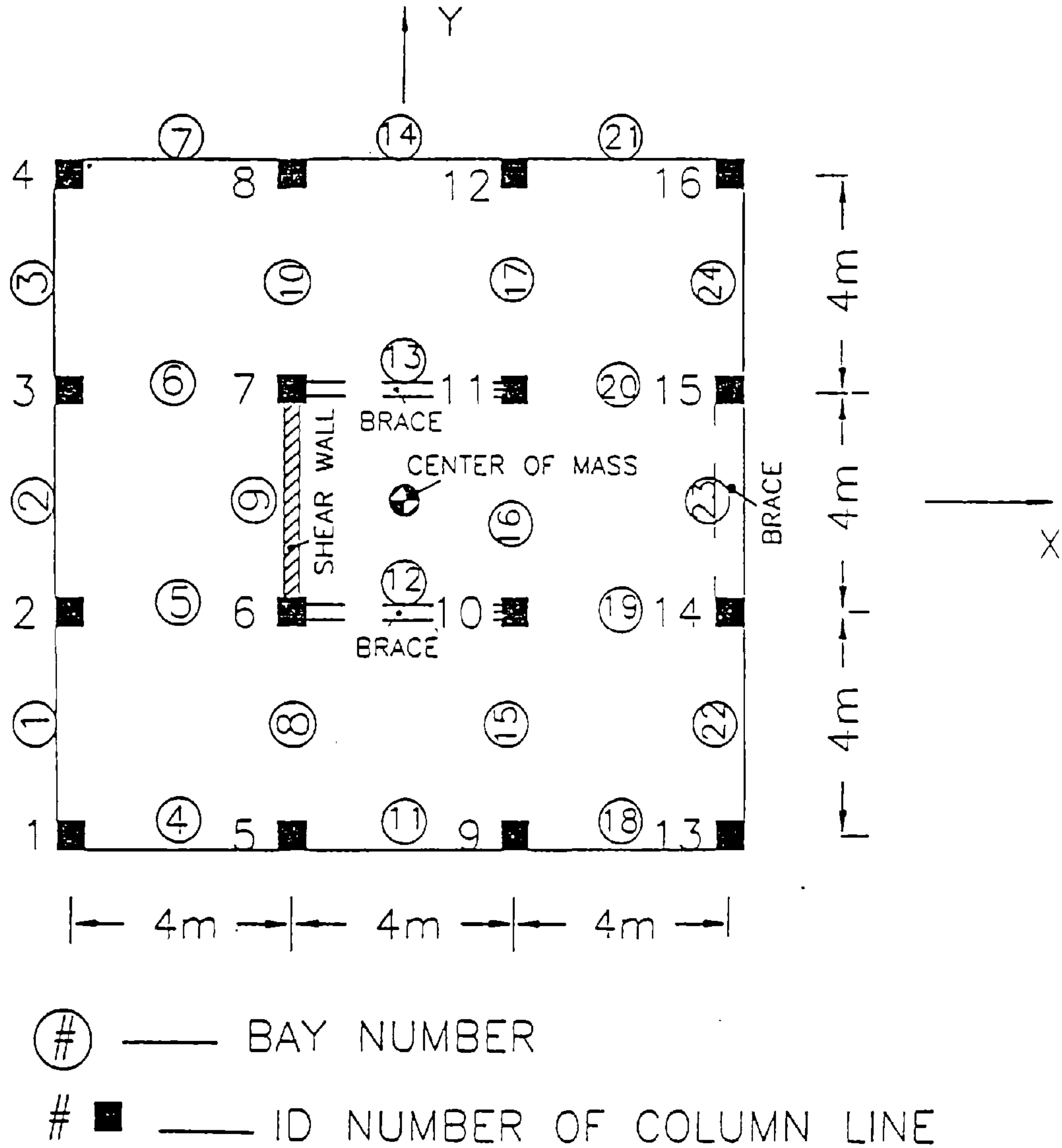


FIG. 3.4. Cross Sectional Plan of the Three-Story Reinforced Concrete Sliding Isolated Building Between Levels 2 and 3. Note the Location of the Column Lines and Bay Numbers (Refer to the Input File Given in Appendix B)

3.1.1 Verification of Member Force Computations

The local response results, in the form of peak member forces at a chosen instant of time (t = 3.05 sec) during the time history analysis, are verified by comparing the results of 3D-BASIS-TABS with the results of a pseudo-static analysis -- performed using commercially available finite element program STAAD. The pseudo-static analysis using STAAD consists of application of lateral forces or inertial forces, at the same instant of time as chosen in 3D-BASIS-TABS time history analysis, at the center of mass of the three floors. The lateral forces or inertial forces are extracted from the dynamic analysis using 3D-BASIS-TABS. A comparison between the member forces computed in 3D-BASIS-TABS and STAAD is shown in Table 3-1 and 3-2. Table 3-1 shows the column moments and forces. Table 3-2 shows the beam moments. It is evident from the comparison in Tables 3-1 and 3-2 that member force computation in 3D-BASIS-TABS is accurate.

3.2 SINGLE STORY STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM

The single story shear building has equal base dimensions L=480 inch (12192 mm); it is supported on four corner columns; it has a height of 180 inch (4572 mm) and a total weight of 480 Kips (2135 kN). Equal floor and base weight is considered. The center of mass of both the floor and the base are assumed to be on the same vertical axis. The vertical axis of centers of mass is offset from the geometric center of the building for inducing a mass eccentricity of 0.083L in the Y direction. Eccentricities $e_x = e_y = 0.1L$, of the center of resistance of the superstructure from the center of mass, are considered. The uncoupled translational period of the superstructure T_s is 0.3 sec in both X and Y directions. The uncoupled torsional period of the superstructure T_θ is equal to 0.58 T_s. Viscous damping of 2 percent of critical is used for the superstructure in all the three modes.

An isolation system consisting of four lead-rubber bearings placed below the columns is considered. The design of the isolation system is based on a ground motion with

Table 3-1 Comparison of Column Forces

Floor	Member ID	3D-BASIS-TABS					STADDIII				
		MOM-X (kN-m)	MOM-Y (kN-m)	SH-X (kN)	SH-Y (kN)	AXIAL (kN)	MOM-X (kN-m)	MOM-Y (kN-m)	SH-X (kN)	SH-Y (kN)	AXIAL (kN)
	COL. #1 (TOP)	9.75	0.06	7.43	0.03	23.43	9.73	0.06	7.42	0.03	23.41
1st	COL. #1 (BOT.)	13.29	0.03	7.43	0.03	23.43	13.28	0.03	7.42	0.03	23.41
	COL. #1 (TOP)	9.63	0.11	6.19	0.07	14.33	9.62	0.10	6.18	0.06	14.30
2nd	COL. #1 (BOT.)	9.61	0.10	6.19	0.07	14.33	9.61	0.09	6.18	0.06	14.30
	COL. #1 (TOP)	10.26	0.21	6.15	0.12	5.06	10.24	0.20	6.14	0.11	5.03
3rd	COL. #1 (BOT.)	8.82	0.16	6.15	0.12	5.06	8.81	0.15	6.14	0.11	5.03

Table 3-2 Comparison of Beam Moments

Floor	Member ID	3D-BASIS-TABS		STADDIII	
		I-MOM (kN-m)	J-MOM (kN-m)	I-MOM (kN-m)	J-MOM (kN-m)
1st	BEAM AT BAY #4	18.95	15.69	18.94	15.68
2nd	BEAM AT BAY #4	18.50	15.58	18.48	15.56
3rd	BEAM AT BAY #4	10.29	8.26	10.28	8.25

the characteristics of the ATC 0.4g S2 spectrum and on the procedure developed by Dynamic Isolation Systems (1983). A design live load of 200 Kips (889.6 kN) is considered in addition to the total dead load of 480 Kips (2135 kN). The bearings chosen are of 13 inch (330.2 mm) diameter and with 18 layers of natural rubber (hardness 50) of 0.375 inch (9.53 mm) thickness. Lead plugs of 2.5 inch (63.5 mm) diameter are present in all four bearings. The average properties of bearings determined are the initial elastic stiffness of 17.8 K/in (3.12 kN/mm), the postyielding stiffness of 2.74 K/in (0.48 kN/mm) and the yield strength F^y of 6.6 Kip (29.36 kN). The total yield strength of the isolation system is 5.5% the structural weight. The rigid body mode period is:

$$T_b = 2\pi\left(\frac{W}{K_b g}\right)^{1/2} \tag{3.1}$$

in which, W is the total weight and K_b is the total post yielding stiffness of four Lead-rubber bearings. T_b in the present case is 2.12 sec.

The single story base isolated building excited by 1940 El Centro is analyzed using 3D-BASIS-TABS. The S00E component is input in the X direction and S90W is input in the Y direction. The input and output files for the single story base isolated building are given in APPENDIX C.

Fig. 3.5 shows the bearing displacement response at corner bearing No. 1 (see the input/output files in APPENDIX C for details). The peak ground displacement (PGD) of 4.29 inch (108.96 mm) is used for normalizing the displacement response. The same base isolated building is analyzed using ANSR (Mondkar and Powell 1975). The comparison between the response computed using 3D-BASIS-TABS and ANSR --with completely different modeling and solution procedures-- is shown in Fig. 3.5, from which, it is evident that the results of 3D-BASIS-TABS are accurate. Also, the results of 3D-BASIS-TABS (see APPENDIX C) and the results of 3D-BASIS (refer to section 7.3 of NCEER 91-0005; Nagarajaiah et al. 1991b) are identical.

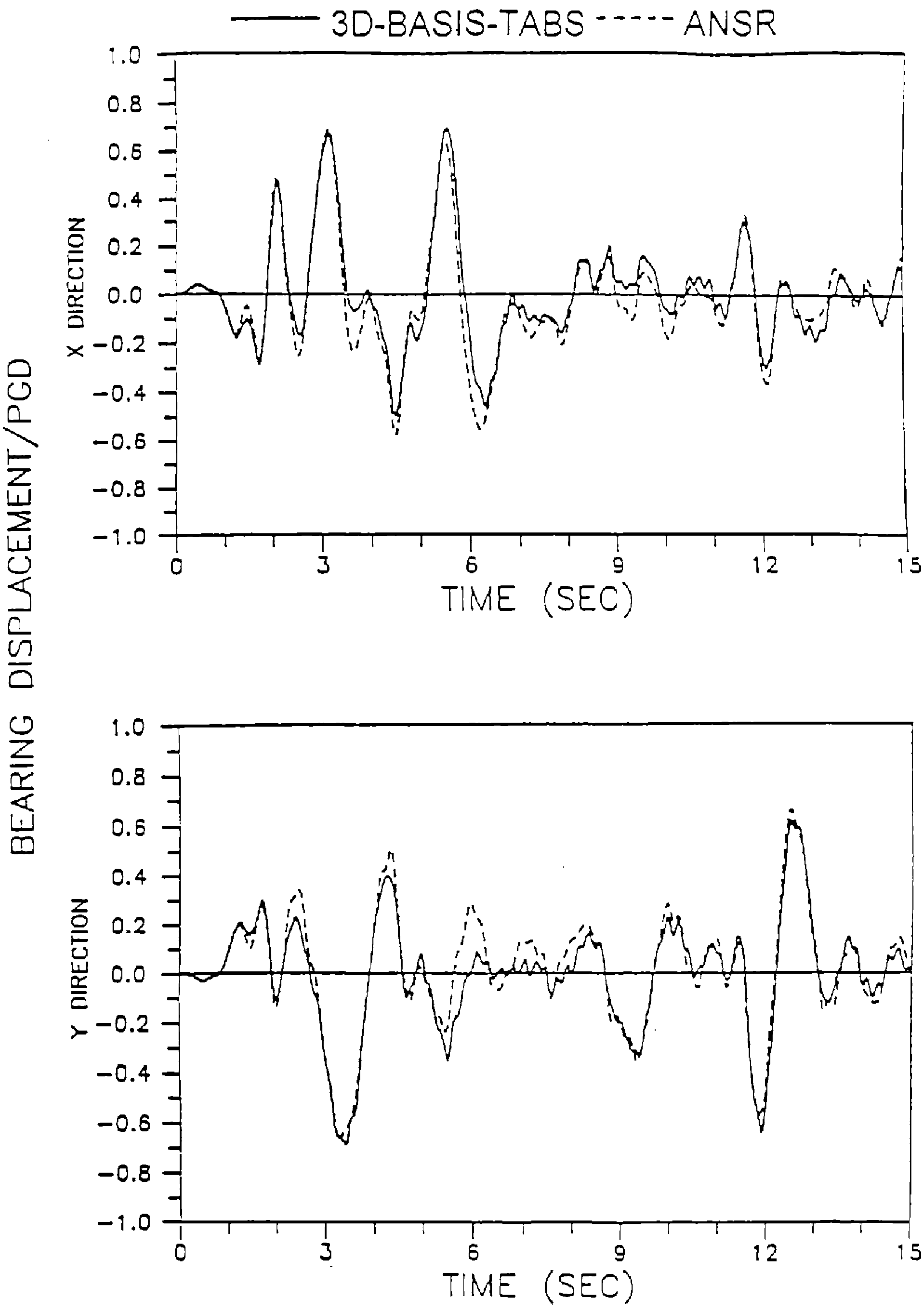


FIG. 3.5. Comparison of Response Computed Using 3D-BASIS-TABS and ANSR of Single-Story Structure on Lead-rubber Isolation System Subjected to El Centro Earthquake with Component S00E in X Direction and Component S90W in Y Direction (PGD = 108.9 mm)

3.3 SIX STORY REINFORCED CONCRETE STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM

The analysis of a six story reinforced concrete base isolated structure with the lead-rubber bearing isolation system is considered. The plan and section of the building are shown in Fig. 3.6. The reinforced concrete superstructure is designed to resist lateral loads equivalent to a seismic base shear coefficient of 0.15 g using shear walls. Damping of 5% of critical is used for the superstructure in all the modes. 3D-BASIS-TABS is used to model the superstructure (i) using option 2 -- with member-by-member modeling; (ii) using option 3 -- with eigenvalues and eigenvectors.

The lead-rubber bearing isolation system designed based on the procedure developed by Dynamic Isolation Systems (1983) consists of 22 lead-rubber bearings (see Fig. 3.6(b)). A site specific response spectrum is used in the design of the structure/isolation system. The average isolation yield level Q_d is set to 0.045W, where W is the total weight of the structure = 25143 kN. The rigid body isolation period T_b (see Eq. 3.1) is 1.65 sec. The dynamic response is computed for a artificial accelerogram of 20 sec duration. The artificial accelerogram is realized from the site specific response spectrum. For more details about the isolation system parameters and the artificial accelerogram refer to Nagarajaiah et al. (1991b). The 3D-BASIS-TABS input and output files, for option 2 are given in APPENDIX D, and for option 3 in APPENDIX E.

To verify the response the structural stiffness properties are condensed to six degrees of freedom (one per floor in the Y direction) and used for a two dimensional analysis using DRAIN-2D (Kannan and Powell 1975). The properties of the isolation system are lumped with F^y = 1328 kN, Y = 0.00525 meters, α = 0.148, and Q_d = 0.045W in a single isolation element, resulting in T_b = 1.6 sec. The artificial accelerogram used in 3D-BASIS-TABS analysis is used as the excitation. The base displacement response (Y direction) is shown in Fig. 3.7. The comparison between the results of 3D-BASIS-TABS and DRAIN-2D, shown in Fig. 3.7.

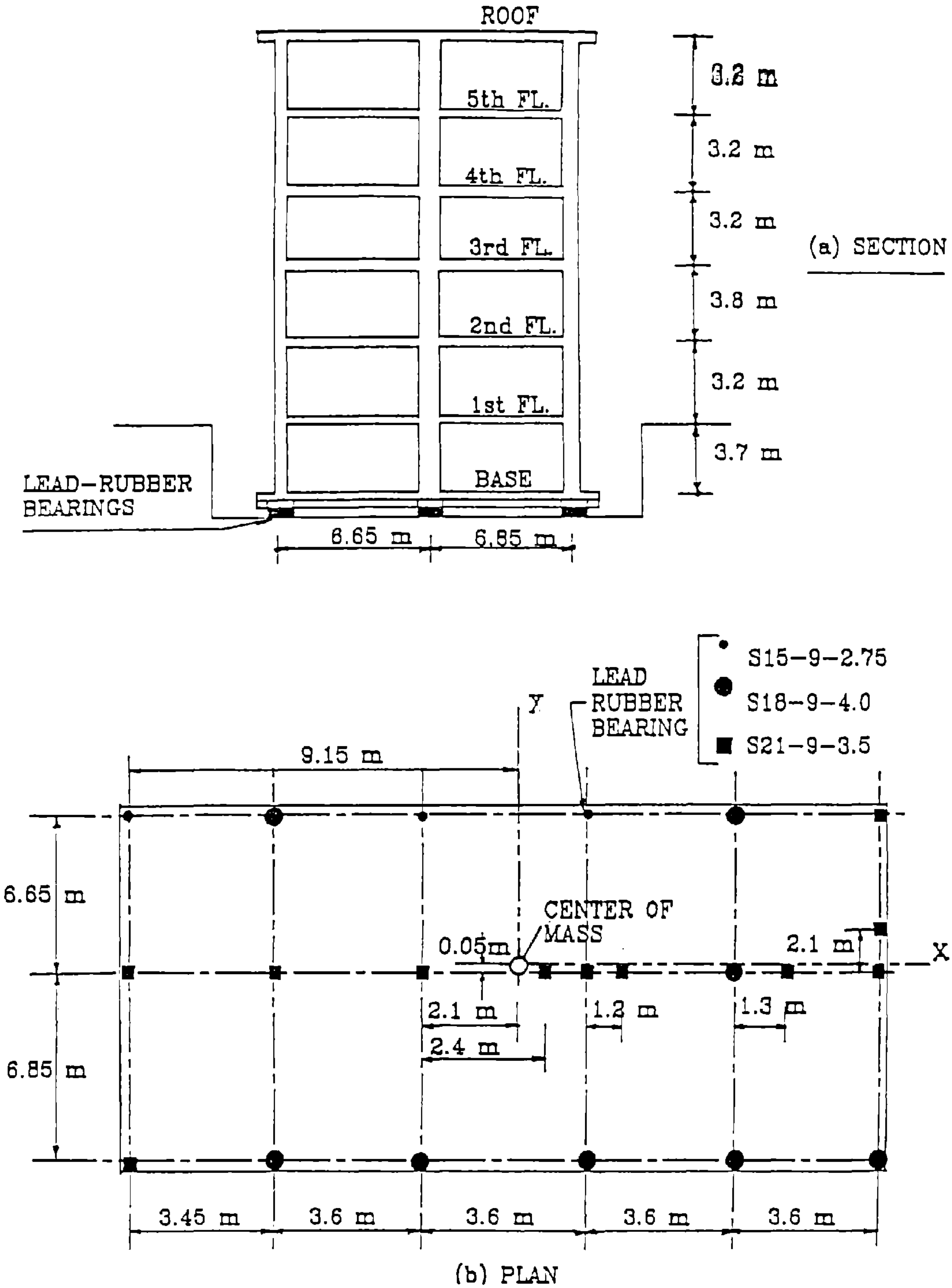


FIG. 3.6. Six-Story Reinforced Concrete Base Isolated Structure: (a) Section; (b) Plan

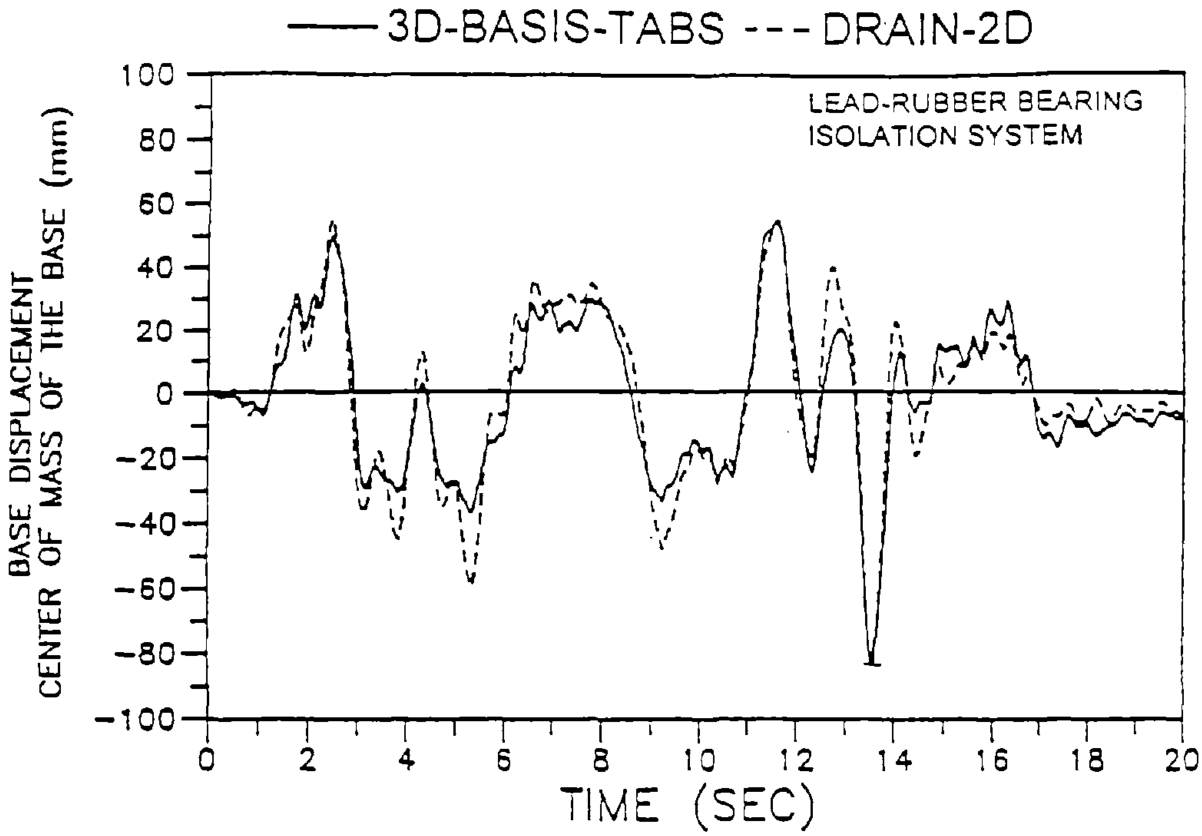


FIG. 3.7. Comparison of Response Computed Using 3D-BASIS-TABS and DRAIN-2D of the Six-Story Base Isolated Structure to Simulated Earthquake

indicates good agreement. Also, the results of 3D-BASIS-TABS (see APPENDIX D and E) and the results of 3D-BASIS (refer to section 8 and APPENDIX B of NCEER 91-0005; Nagarajaiah et al. 1991b) are identical.

3.4 SIX STORY STRUCTURE WITH LEAD-RUBBER BEARINGS AND SUPPLEMENTAL NONLINEAR DAMPERS

The analysis of the six-stories base isolated structure presented previously in Section 3.3 is considered again with addition of nonlinear viscous dampers at the base to limit the maximum base movement. The plan of the building and its characteristics are described in Section 3.3.

The base isolation is complemented in this example by the addition of four pairs of dampers placed at the bearings S18-9-4.0 positions along the north and south lines at the intersection with the first interior column lines (see Fig. 3.6). Each pair of dampers has rectangularly arranged dampers co-linear with the column lines. Each nonlinear damper has a linear range at low velocities (C_{01}=877kN-sec/m, p =1, F_{01}=70kN), a nonlinear range starting at 10 cm/sec (C_{02}=182.6kN-sec/m, p =0.5, F_{02}=100kN) and is limited to deliver a maximum force of 200 kN for velocities larger than 35 cm/sec. The design was obtained aiming to add approximately 10% of critical damping to the damping delivered by the lead rubber bearings.

The structure was reanalyzed with the same artificial accelerogram obtained from the site specific response spectrum. The 3D-BASIS-TABS input-output files are presented in Appendix G.

The response of the isolation base without supplemental damping and with the additional dampers, with linear characteristics only, is presented in Fig. 3.8(a). The response of the same structure with the supplemental nonlinear dampers is shown in Fig. 3.8(b). The effect of the nonlinear dampers is particularly strong in reducing the peak base movement from 8 to 5.2 cm. Although the forces in the superstructure may increase somewhat, this increase is not substantial to require a change in the design.

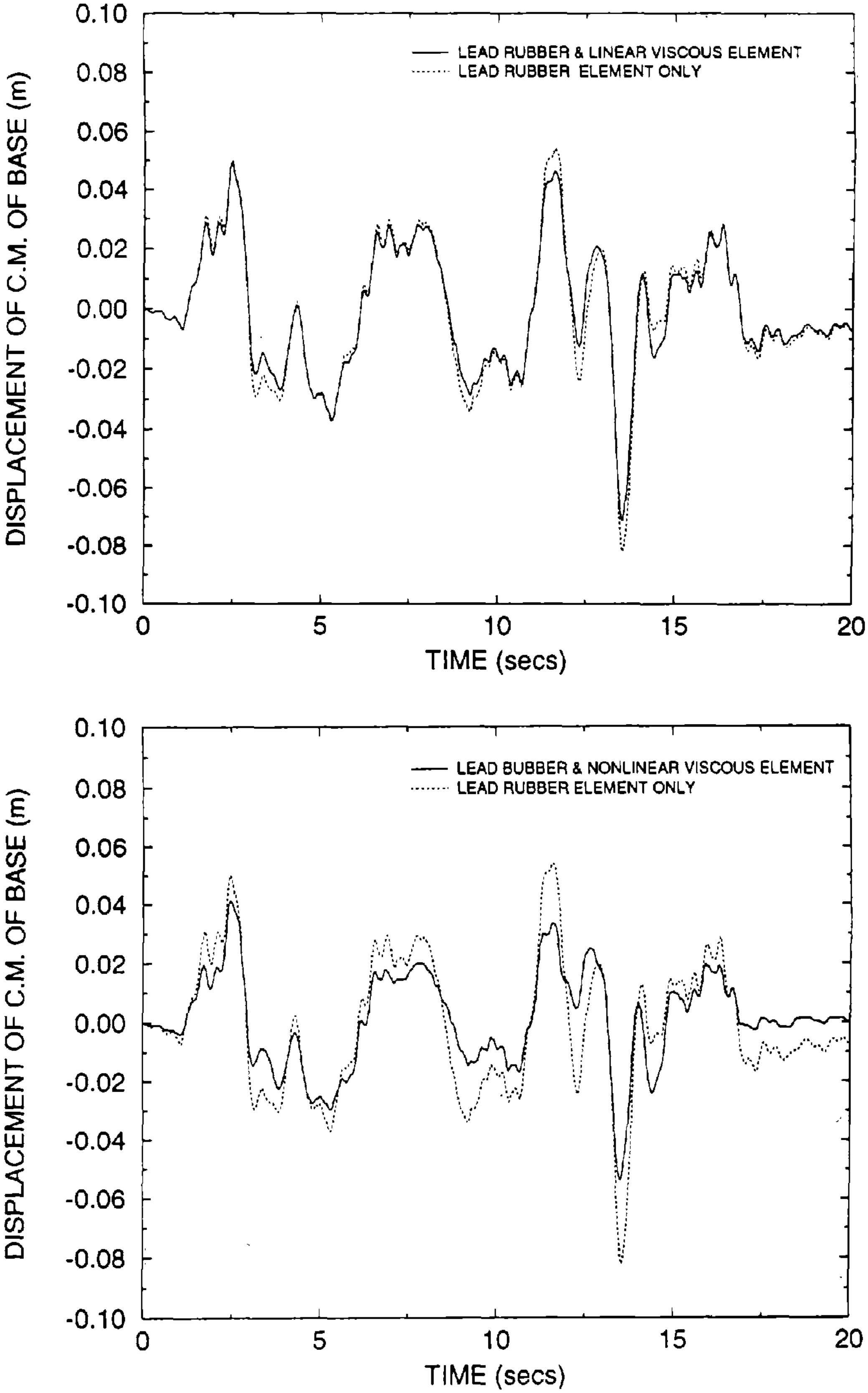


Fig. 3.8 Comparison of Response of Six-Story Base Isolated Structure To Simulated Earthquake with (a) Supplemental Linear Viscous Dampers and (b) Supplemental Nonlinear Damper

SECTION 4

CONCLUDING REMARKS

3D-BASIS-TABS Version 2.0 has been described in this report. 3D-BASIS-TABS integrates the special features of ETABS, such as the efficient modeling approach for the 3D-superstructure, and the special features of 3D-BASIS, such as the modeling approach for sliding isolation systems in plane motion and accurate solution algorithm; this enhanced program will help engineers to analyze and design base isolated structures with accuracy and efficiency.

Addition of new isolation elements for modeling nonlinear dampers has been described. Addition of frictional bearings (FPS) with variable pressure resulting from vertical earthquake components and from overturning has been described. The verification of 3D-BASIS-TABS has also been described by means of several useful examples (the input and output files of which are included in the APPENDICES). Microcomputer PC version, and main frame VAX and SUN versions of 3D-BASIS-TABS have been developed. The versatility of 3D-BASIS-TABS stems from the fact that it can analyze base isolated structures, like sliding isolated structures, with great accuracy and yet complete the analysis in a reasonable CPU time on a microcomputer.

Extensions to 3D-BASIS-TABS to incorporate hybrid control capabilities are envisaged. Hybrid control involves augmentation of the passive isolation system with active hydraulic devices (Reinhorn et al. 1993, Yang et al. 1992, Feng et al. 1993, Nagarajaiah et al. 1993d;1993e, Riley et al. 1993, Subramaniam et al. 1993).

SECTION 5

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APPENDIX A
3D-BASIS-TABS PROGRAM
USER'S MANUAL

A.1 INPUT FORMAT

The program 3D-BASIS-TABS prompts for the input file name, the output file name and the earthquake excitation file names; the choice of file names (e.g., EXAMPL1.DAT, EXAMPL1.OUT, WAVEX.DAT, WAVEY.DAT and WAVEZ.DAT) rests with the user. Instructions of use of the program, input information and short cuts for various operating systems (DOS, VAX, UNIX) are included in the distribution computer diskettes. In the program dynamic arrays are used; also, double precision is used for accuracy. Common block size has been set to 100,000 and should be changed if the need arises.

A free format is used to read all input data. Hence, conventional delimiters (commas, blanks) may be used to separate data items. Standard FORTRAN variable format is used to distinguish integers and floating point numbers. Input data must therefore, conform to the specified variable type. All values are to be input unless mentioned otherwise. No blank lines are to be specified.

Note: Provision is made for a line of user defined descriptive text between each set of data items (refer to variable USER_TXT in sections A.2 to A.9 and to the example data files accompanying this manual).

A.2 PROBLEM TITLE

TITLE	TITLE upto 80 characters.

A.3 UNITS

UNITS	UNITS upto 80 characters.

A.4 CONTROL PARAMETERS

A.4.1 General Control Information

USER_TEXT Reference information: upto 80 characters of text.

ISEV,NST,NFQ,NP,LOR, G, IEXE

(1)* ISEV = 1 for option 1 - Data for 3D-shear building (story shear stiffnesses to be specified in the input file).

(1) ISEV = 2 for option 2 - Data for full 3D-building (member properties for beams, columns etc. to be specified in the input file).

(1) ISEV = 3 for option 3 - Data for 3D-building (Eigenvalues/Eigenvectors to be specified in the input file).

NST = Number of stories in the complete building excluding the base (If NST<1 then NST set = 1)

(2) NFQ = Number of eigenvectors/eigenvalues to be retained in the analysis (If NFQ<3 then NFQ set = 3)

(3) NP = Number of isolators such as bearings, dampers etc. (if NP<4 then NP set = 4)

LOR = Length of earthquake records (number of data points; the X, Y, and Z direction records must have the same length).

G = Gravitational acceleration

IEXE = Flag (integer) for data check
= 1 for data check only
= 0 data check and complete execution of analysis.

*Notes: 1. For explanation of the option 1, option 2 and option 3 refer to section 3.2 (of NCEER 93-0011). If option 1 or 3 are used then member forces are not needed as output.

2. Number of eigenvectors/eigenvalues retained in the analysis should be in groups of three - the minimum being one set of three modes.

3. Number of bearings refers to the total number of bearings which could be a combination of linear elastic elements, viscous elements, elastomeric bearings, steel dampers, and sliding bearings.

A.4.2 Superstructure Control Information (for ISEV = 2 only; skip this section and go to Section A.4.3 if ISEV = 1 OR 3)

USER_TXT — Reference information; upto 80 characters of text.

NDF,NTF,NLD

(1)*	NDF = Number of frames with different properties or different vertical loading
(1)	NTF = Total number of frame or shear wall elements in the structure
(2)	NLD = Total number of load conditions

*Notes: 1. Input data for frames with identical properties and vertical loading are given only once - see also section A.5.1.3 on Frame Location.

2. Load conditions are defined as combinations of the four load cases - see section A.8 on Load Case Definition.

A.4.3 Integration Control Parameters

USER_TXT Reference information; upto 80 characters of text.

TSI,TOL,FMNORM,MAXMI,KVSTEP

(1)* TSI = Time step of integration.
(If TSI > TSR then TSI set = TSR;
refer to A.4.5 for details about TSR)

(2) TOL = Tolerance for the nonlinear force
vector computation.

(3) FMNORM = Reference moment at
the center of mass of the base
used for computing convergence.

(4) MAXMI = Maximum number of iterations within
a time step.

KVSTEP = Index for time step variation.

KVSTEP = 1 for constant time step.
KVSTEP = 2 for variable time step.

*Note: 1. The time step of integration cannot exceed the time step of earthquake record given in A.4.5.

2. Tolerance for force computation may be 0.001.

3. The reference moment at the center of mass of the base can be calculated approximately by multiplying the base shear by one half the maximum dimension at the base.

4. If MAXMI is exceeded the program is terminated with an error message.

A.4.4 Newmark's Method Control Parameters

USER_TXT Reference information; upto 80 characters of text.

GAM,BET GAM = Parameter which produces numerical damping within a time step.
(if GAM = 0.0 then GAM set = 0.5)

BET = Parameter which controls the variation of acceleration within a time step.
(if GAM = 0.0 then GAM set = 0.25)

A.4.5 Earthquake Control Parameters

USER_TXT Reference information; upto 80 characters of text.

INDGACC,TSR,XTH,ULF

(1)a* INDGACC = 1 for a single lateral earthquake record at an angle of incidence XTH.

(1)b INDGACC = 2 for two independent lateral earthquake records along the X and Y axes.

(1)c INDGACC = 3 for two independent lateral earthquake records along the X and Z axes.

(1)d INDGACC = 4 for three independent lateral earthquake records along the X, Y, and Z axes.

(2) TSR = Time step of the earthquake record(s).

XTH = Angle of incidence of the earthquake with respect to the X axis in anticlockwise direction in degrees (for INDGACC = 1).

(3) ULF = Load factor.

*Notes: 1. Two options are available for the earthquake record input:

a) INDGACC = 1 refers to a single earthquake record input at any angle of incidence XTH with respect to the X axis. Input only one earthquake record (read through a single file e.g., WAVEX.DAT). Refer to A.9.1 for wave input information.

b) INDGACC = 2 refers to two independent earthquake records input in the X and Y directions, e.g., El Centro N-S along the X direction and El Centro E-W along the Y direction. Input two independent earthquake records in the X and Y directions (read through two files e.g., WAVEXP1.DAT and WAVEYP1.DAT). Refer to A.9.1 and A.9.2 for wave input information.

c) INDGACC = 3 refers to two independent earthquake records in X and Z directions. Refer to A.9.1 and A.9.3 for wave input information.

d) INDGACC = 4 refers to three independent earthquake records in X, Y, and Z directions. Refer to A.9.3. for wave input information.

2. The time step of earthquake record and the length of earthquake record has to be the same in X, Y and Z directions for INDGACC = 1, 2, 3 and 4.

3. Load factor is applied to the earthquake records in X,Y and Z directions.

A.5 SUPERSTRUCTURE DATA

Go to A.5.1 for ISEV = 2 (refer to A.4.1) and specify beam, column, panel and bracing properties for full three dimensional representation of the superstructure.

Go to A.5.2 for ISEV = 1 (refer to A.4.1) and specify story stiffness for three dimensional shear building representation of the superstructure.

Go to A.5.3 for ISEV = 3 (refer to A.4.1) and specify eigenvalues and eigenvectors for three dimensional representation of the superstructure.

A.5.1 THREE DIMENSIONAL BUILDING (for ISEV = 2 only; Skip this section if ISEV = 1 OR 3)

USR_TXT Reference information; upto 80 characters of text

Note: The sections A.5.1.1 to A.5.1.3 are based on the input requirements of ETABS.

A.5.1.1 Story Data

USR_TXT Reference information; upto 80 characters of text.

[(SD(N,I),I=2,6), N=1,NST]

SD(N,2) Story height [distance from the floor (or roof) level to the floor (or base) level below].

SD(N,3) = Translational mass.

SD(N,4) = Rotational mass moment of inertia about a vertical axis through the center of mass.

(1) SD(N,5) = X-distance to the center of mass measured from the STRUCTURE REFERENCE AXIS.

(1) SD(N,6) = Y-distance to the center of mass measured from the STRUCTURE REFERENCE AXIS.

Note: Input one set per story from the top story to the bottom story of the superstructure.

(1) The GLOBAL STRUCTURE REFERENCE AXIS has to be a vertical axis at the center of mass of the base.

A.5.1.2 Frame Data

Repeat the following block of data for each different frame (upto the total number of different frames = NDF).

USR_TXT Reference information; upto 80 characters of text.

A.5.1.2.1 Frame Control Parameters

USR_TXT Reference information; upto 80 characters of text.

M,NS,NC,NB,NCP,NBP,NFEF,NPAN,NTRU

(1)* M = Frame identification number.

(2) NS = Number of story levels above the base.

(3) NC = Number of vertical column lines in the frame.

NB = Number of bays in the frame.

(4) NCP = Number of sets of different column properties.

(5) NBP = Number of sets of different beam properties.

(6) NFEF = Number of sets of different fixed end moments and shears to be applied as vertical loads to beams

(7) NPAN = Number of infill shear panels in the frame.

(8) NTRU = Number of bracing elements in the frame.

*Note: One set of data must be entered for each different frame. Frames with different locations but identical properties and vertical loading need be entered only once (see also section A.5.1.3 on Frame location cards).

1. Frame identification numbers must be entered in numerical sequence beginning with number one (1). This frame may be located (repeated) at different positions in the structure.

2. If a frame does not extend the full height of the building, then only those story levels actually existing in the frame are to be input.

3. An isolated shear wall is a single column line frame. For this case all data pertaining to beams is meaningless and must be omitted in the data input section to follow.

4. Column properties may be referenced to any number of columns in the frame. The number of column property sets control A.5.1.2.3.

5. The number of beam property sets control the number sets of data to be read in section A.5.1.2.4.

6. If no vertical static loads act on the structure, then input zero, and skip section A.5.1.2.5.

7. If no panel elements are included in this frame, then input zero, and skip section A.5.1.2.8.

8. If no bracing elements are included in this frame, then input zero, and skip section A.5.1.2.9.

A.5.1.2.2 Vertical Column Line Coordinates

USR_TXT   Reference information; upto 80 characters of text.

(M,(CLN(J,I),I = 1,2),J = 1,NC)

(1)*   M = Column line identification number

(2)   CLN(J,1) = X-distance to J^{th} column line from frame reference point.
CLN(J,2) = Y-distance to J^{th} column line from frame reference point.

*Note: 1. One set of vertical column line coordinates have to be input for each column line in the frame. For frames with a single column line a second column should be specified to define the major axis for column properties entered in section A.5.1.2.7.

2. Coordinates of column lines are measured from the frame (local) axis.

A.5.1.2.3 Column Property

USR_TXT — Reference information; upto 80 characters of text.

(M,(CP(J,I),J=1,9),I=1,NCP)

(1)*	M = Identification number for this column property set
	CP(1,I) = Modulus of Elasticity, E.
	CP(2,I) = Axial Area A.
(2)	CP(3,I) = Shear area associated with shear forces in major axis direction.
(2)	CP(4,I) = Shear area associated with shear forces in minor axis direction.
	CP(5,I) = Torsional inertia.
	CP(6,I) = Flexural inertia for bending in the major axis direction.
	CP(7,I) = Flexural inertia for bending in the minor axis direction.
(3)	CP(8,I) = Rigid zone depth at the top of column (for both axis). DT.
(4)	CP(9,I) = Rigid zone depth at the bottom of column. DB.

*Note: One set of data must be supplied for each different column in this frame.

1. Property set identification numbers must be in increasing numerical sequence beginning with one (1).

2. Shearing deformations are ignored if shear areas are zero.

3. The rigid zone depth is used to reduce the effective length of the column about both axis.

4. Usually zero unless beam extends above the floor level.

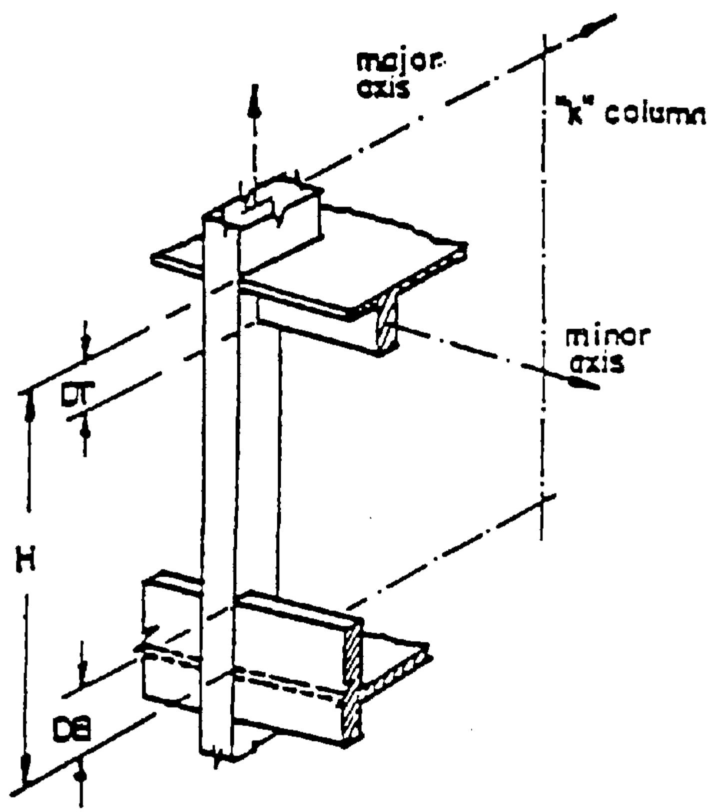

Fig. A-1 - Typical Column Model.

A.5.1.2.4 Beam Property

USR_TXT Reference information; upto 80 characters of text.

(M,(BP(J,I),J = 1,9),I = 1,NBP)

(1)*	M = Identification number for this beam property set
	BP(1,I) = Modulus of Elasticity, E.
(2)	BP(2,I) = Shear Area A.
	BP(3,I) = Torsional inertia.
	BP(4,I) = Flexural inertia, I.
	BP(5,I) = K_{II} - stiffness factor (e.g., 4)
	BP(6,I) = K_{JJ} - stiffness factor (e.g., 4)
	BP(7,I) = K_{IJ} - stiffness factor (e.g., 2)
(3)	BP(8,I) = Rigid zone length at end I of the beam.
	BP(9,I) = Rigid zone length at end J of the beam.

*Note: One set of data must be supplied for each different beam in the frame; skip this input if the frame has only one column line.

1. Property set identification numbers must be input in increasing numerical sequence beginning with one (1).

2. Shearing deformations are ignored if shear areas are zero.

3. The beam rigid zone lengths are used to reduce the effective length of the beam.

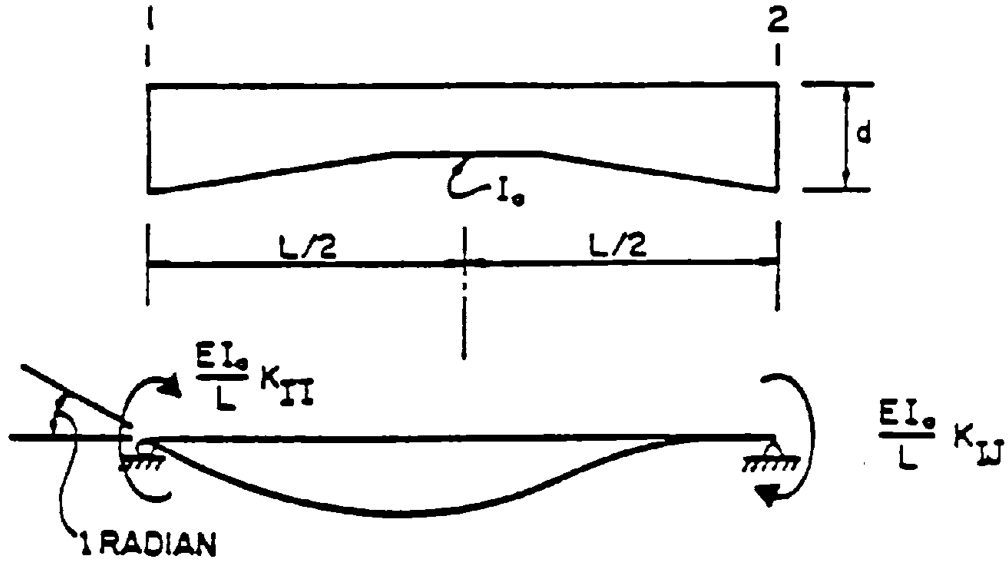

Fig. A-2 - Typical Notation of Beam Stiffness Coefficients

A.5.1.2.5 Fixed-End Beam Loads

(if NFEF = 0 in section A.5.1.2.1 skip this section)

USR_TXT Reference information; upto 80 characters of text.

(M,IFEF(I),(FEF(J,I),J = 1,5),I = 1,NFEF)

(1)* M = Identification number for this vertical loading set

IFEF(I) = Index:

EQ. 0; Fixed-end forces are applied at the column faces

EQ. 1; Fixed-end forces are applied at the column centerlines

(2) FEF(1,I) = Fixed-end reaction, M_1

FEF(2,I) = Fixed-end reaction, V_1

FEF(3,I) = Fixed-end reaction, M_2

FEF(4,I) = Fixed-end reaction, V_2

(3) FEF(5,I) = Uniform force per unit length, w, acting downward to be added to fixed-end reactions

*Note: One set of data must be supplied for each different type of vertical beam loading; omit this data set if this is a single column line frame

1. Load set numbers must be input in sequence.

2. Reactions act on the beam ends and are positive as shown in the Fig. A-3.

3. Additional fixed-end forces due to the uniform load, w, are calculated using:
$M = w*l^2/12$; $V = w*l/2$
and are added to any specified fixed-end reactions. The forces due to uniform load, w, are exact only for prismatic beams.

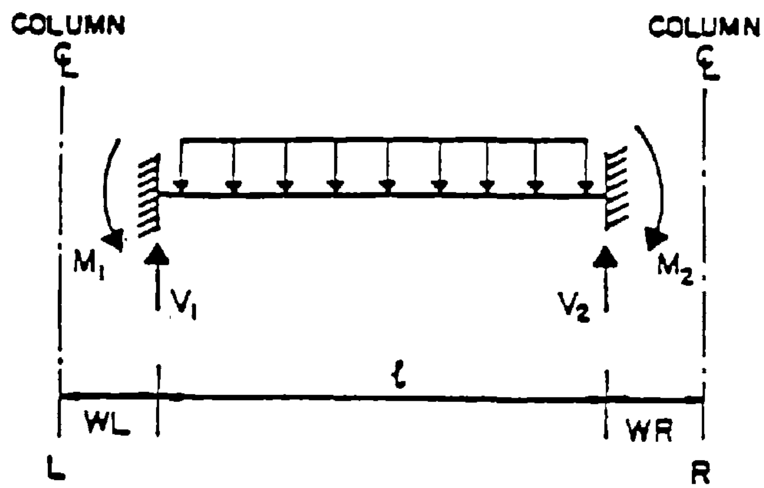

Fig. A-3 - Typical Beam Loading

A.5.1.2.6 Beam Location, Properties and Loads

USR_TXT Reference information; upto 80 characters of text.

[{ I,(LB(N,M,L),L=1,3),K,(LDB(N,M,L),L=1,3) },N=1,NS],M=1,NB

I = Bay identification number for this beam.

(1)* LB(N,M,1) = Column line number at end I.

LB(N,M,2) = Column line number at end J.

(2) LB(N,M,3) = Beam property set identification number for this beam.

(3) K = Number of beams in sequence below to be generated having the same properties and vertical loading as this beam.

(4) LDB(N,M,1) = Vertical loading set identification number for vertical load case I.

LDB(N,M,2) = Vertical loading set identification number for vertical load case II.

LDB(N,M,3) = Vertical loading set identification number for vertical load case III.

*Note: One set of data must be input from top to bottom and from bay to bay in the frame (unless the data generation option is used)

1. Position of I and J ends defines local coordinate axis with local "y" positive from I to J and local "z" positive vertically upwards. A right hand screw rule sign convention applies.

2. Beams with zero stiffness (missing beams) may be input as having a property set number of zero; if the beam has finite stiffness, the set number must reference an existing property set defined previously is section A.5.1.2.4.

3. The generation option can only be used to define girders within the current bay; a new bay must be started with a new beam card.

4. The vertical loading sets defined in section A.5.1.2.5, are applied to the beams defined herein. Three independent vertical load distributions (I,II,III) are allowed, and these distributions are combined to form load cases for the complete building; see section A.8.

A.5.1.2.7 Column Location and properties

USR_TXT Reference information; upto 80 characters of text.

[{ KK,(LC(N,M,I),I=1,2),K } ,N=1,NS],M=1,NC

KK = Column line identification number for this column.

(1)* LC(N,M,1) = Column property set identification number.

(2) LC(N,M,2) = Column line number defining direction of major axis.

(3) K = Number of columns in sequence below to be generated having the same properties as this column member.

*Note: One card per column must be input from top to bottom and from column line to column line of the frame (unless the data generation option is used).

1. Missing columns may be input as having a property set number of zero (0); if the column has finite stiffness, then the set number referenced must correspond to one of the property sets defined previously in section A.5.1.2.3.

2. Defines direction on local "y" axis; local "z" axis is in the vertical plane with positive upwards. A right hand screw rule convention applies.

3. Generation is allowed only within the current column line; begin a new column line with a new column card.

A.5.1.2.8 Panel Properties

USR_TXT Reference information; upto 80 characters of text.

(LP(1,I),LP(2,I),LP(3,I),(PP(J,I),J=1,5),I=1,NPAN)

(1)*	LP(1,I) = Level identification number at the top of this panel.	
	LP(2,I) = Column line number at the I side of this panel.	
	LP(3,I) = Column line number at the J side of this panel.	
	PP(1,I) = Modulus of elasticity, E.	
	PP(2,I) = Gross sectional area, A.	
(2)	PP(3,I) = Moment of inertia, I.	
	PP(4,I) = Effective shear area, A_v	
	PP(5,I) = Shear modulus, G.	

*Note: Input one set of data per panel in any order; no generation is allowed.

1. Base is defined as level zero, and the roof level number is equal to the total number of stories in the building.

2. A zero (0) value for the moment of inertia selects the pure shear deformation panel model. The pure shear panel uses the gross sectional area, not the effective area, to calculate stiffness and stress values.

A.5.1.2.9 Bracing Properties

USR_TXT Reference information; upto 80 characters of text.

(LT(1,I),LT(2,I),LT(3,I),TP(1,I),TP(2,I),I=1,NTRU)

LT(1,I) = Level identification number at the top of this brace.

LT(2,I) = Column line number at the upper end of this brace.

LT(3,I) = Column line number at the lower end of this brace.

TP(1,I) = Modulus of elasticity, E.

TP(2,I) = Cross sectional area, A.

*Note: Input one set of data per brace in any order; no generation is allowed.

A.5.1.3 Frame location cards

USR_TXT Reference information; upto 80 characters of text.

IF,IFC,X1,Y1,ANG

(1)* IF = Frame identification number

(2) IFC = Force calculation code;

EQ. 0; Frame forces will be calculated and printed.

EQ. 1; Frame forces will not be calculated.

(3) X1 = Distance, X_1.

Y1 = Distance, Y_1.

(4) ANG = Angle between the frame x axis and the structure (global) X axis (anti-clockwise from X to x).

*Note: One set of data must be entered in this section for each frame (or single column) in the building; the total number of frame locations to be read is controlled by the entry in section A.4.2.

1. Frame identification numbers may be repeated, but location data set must be input in frame identification number sequence.

2. A frame force calculation code of one (1) will suppress output of member forces.

3. Distance from Structure (Global) axis to the origin of the frame (Local) axis. Structure reference axis has to be at the center of mass of the base.

4. Angle is input in degrees and decimal fractions e.g., 15° 30' input as 15.5.

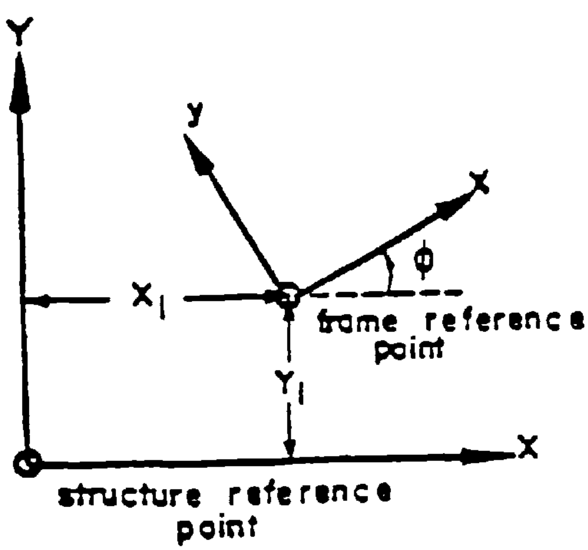

Fig. A-4 - Typical Coordinate Systems.

A.5.2 Shear Stiffness Data for Three Dimensional Shear Building
(for ISEV = 1 only; skip this section if ISEV = 2 or 3)

USR_TXT	Reference information; upto 80 characters of text

A.5.2.1 Shear Stiffness - X, Y and Torsional Stiffness in 0 Direction

USR_TXT	Reference information; upto 80 characters of text.
SX(I),I=1,NF	SX(I) = Shear stiffness of story I in the X direction.
SY(I),I=1,NF	SY(I) = Shear stiffness of story I in the Y direction.
ST(I),I=1,NF	ST(I) = Torsional stiffness of story I in the 0 direction about the center of mass of the floor.

Note: Input shear stiffness in the X and Y direction and torsional stiffness in the 0 direction of **each individual story** starting from the top story to the first story.

A.5.2.2 Eccentricity Data - X and Y Direction

USR_TXT	Reference information; upto 80 characters of text.
EX(I),I=1,NF	EX(I) = Eccentricity of center of resistance from the center of mass of the floor I.
EY(I),I=1,NF	EY(I) = Eccentricity of center of resistance from the center of mass of the floor I.

Note: Input eccentricity at each individual story in the X and Y direction starting from the top story to the first story. If both the eccentricities are zero, a default value of 0.0001 is used to facilitate eigensolution.

A.5.3 Eigenvalues and Eigenvectors for Three Dimensional Building
(for ISEV = 3 only; skip this section if ISEV = 1 or 2)

USR_TXT	Reference information; upto 80 characters of text

A.5.3.1 Eigenvalues

USR_TXT	Reference information; upto 80 characters of text.
W(I),I=1,NFQ	W(I) = Eigenvalue of mode I

Note: Input from the first mode to the NFQ mode given in section A.4.1.

A.5.3.2 Eigenvectors

USR_TXT	Reference information; upto 80 characters of text.
E(3*NF,I),I=1,NFQ	
	E(3*NF,I) = Eigenvector of mode I.

Note: Input from the first mode to the NFQ mode given in section A.4.1.

A.5.4 Superstructure Translational Mass and Rotational Mass moment of Inertia (Skip this section if ISEV = 2)

USR_TXT	Reference information; upto 80 characters of text.
CMX(I),I=1,NF	CMX(I) = Translational mass at floor I.
CMR(I),I=1,NF	CMR(I) = Mass moment of inertia of floor I about the center of mass.

Note: Input from the top floor to the first floor.

A.5.5 Superstructure Damping

USR_TXT Reference information; upto 80 characters of text.

DR(I),I = 1,NE

DR(I) = Damping ratio corresponding to mode I.

Note: Input from the first mode to the NE mode.

A.5.6 Eccentricities of center of mass

USR_TXT Reference information; upto 80 characters of text.

XN(I),YN(I),I = 1,NF

XN(I) = Distance of the center of mass of the floor I from the center of mass of the base in the X direction.

YN(I) = Distance of the center of mass of the floor I from the center of mass of the base in the Y direction.
(If ISEV = 1 then XN(I) and YN(I) set = 0)

Note: Input from the top floor to the first floor.

A.5.7 Height of Different Floors and the Base

USR_TXT Reference information; upto 80 characters of text.

H(I),I = 1,NF + 1

H(I) = Height from the ground to the floor I.

Note: Input heights from the top floor to the base.

A.6 ISOLATION SYSTEM DATA

USR_TXT Reference information; upto 80 characters of text.

A.6.1 Stiffness Data for Linear Elastic Isolation System

USR_TXT Reference information; upto 80 characters of text.

SXE,SYE,STE,EXE,EYE

SXE = Resultant stiffness of the linear elastic isolation system in the X direction.

SYE = Resultant stiffness of the linear elastic isolation system in the Y direction.

STE = Resultant torsional stiffness of the linear elastic isolation system in the 0 direction about the center of mass of the base.

EXE = Eccentricity of the center of resistance of the linear elastic isolation system in the X direction from the center of mass of the base.

EYE = Eccentricity of the center of resistance of the linear elastic isolation system in the Y direction from the center of mass of the base.

Note: Data for linear elastic elements can also be input individually (refer to A.6.4.1).

A.6.2 Mass Data of the Base

USR_TXT	Reference information; upto 80 characters of text.
CMXB,CMTB	CMXB = Mass of the base in the translational direction. CMTB = Mass moment of Inertia of the base about the center of mass of the base.

A.6.3 Global Damping Data of the Base

USR_TXT — Reference information; upto 80 characters of text.

CBX,CBY,CBT,ECX,ECY

CBX = Resultant global damping coefficient in the X direction.

CBY = Resultant global damping coefficient in the Y direction.

CBT = Resultant global damping coefficient in the 0 direction about the center of mass of the base.

ECX = Eccentricity of the center of global damping of the isolation system in the X direction from the center of mass of the base.

ECY = Eccentricity of the center of global damping of the isolation system in the Y direction from the center of mass of the base.

Note: 1. Data for viscous elements can also be input individually (refer to A.6.4.2).

A.6.4 Isolation Element Data

USR_TXT Reference information; upto 80 characters of text.

Notes for sections A.6.4.1 to A.6.4.4:

(i). **K=1,NP -- Data for NP isolation elements** to be given using the elements in A.6.4.1, A.6.4.2, A.6.4.3, A.6.4.4, A.6.4.5, A.6.4.6, A.6.4.7, and A.6.4.8.

(ii). The indices INELEM(NP,2) are used in the subsequent sections A.6.4.1 to A.6.4.8 to identify the element types in the isolation system. Index INELEM(NP,2) is defined as follows:

INELEM(K,1:2) = Indices for the isolation element K indicating its type and whether it is a uniaxial or biaxial element.

INELEM(K,1) = 1 for a uniaxial element in the X direction, (or A direction)
INELEM(K,1) = 2 for a uniaxial element in the Y direction, (or B direction)
INELEM(K,1) = 3 for a biaxial element

INELEM(K,2) = 1 for linear elastic element.
INELEM(K,2) = 2 for linear viscous element.
INELEM(K,2) = 3 for hysteretic element
for elastomeric bearing steel damper.
INELEM(K,2) = 4 for element for flat sliding bearing
(friction force and f_{max} independent of instant changes in
normal force)
INELEM(K,2) = 5 for hysteretic element for flat sliding
bearing (friction force and f_{max} depend on instant change
in normal force)
INELEM(K,2) = 6 for FPS bearing element
INELEM(K,2) = 7 for hysteretic nonlinear stiffening element
(not available in the current Version)
INELEM(K,2) = 8 for nonlinear viscous element

A.6.4.1 Linear Elastic Element

INELEM(K,1:2) INELEM(K,1) can be either 1,2 or 3
INELEM(K,2) = 1
(Refer to A.6.4 for further details).

PS(K,1),PS(K,2)

PS(K,1) = Shear stiffness in the X direction for biaxial element or uniaxial element in the X direction (leave blank if the uniaxial element is in the Y direction only).

PS(K,2) = Shear stiffness in the Y direction for biaxial element or uniaxial element in the Y direction (leave blank if the uniaxial element is in the X direction only).

Note: Biaxial element means elastic stiffness in both X and Y directions (no interaction between forces in the X and Y direction).

A.6.4.2 Linear Viscous Elements

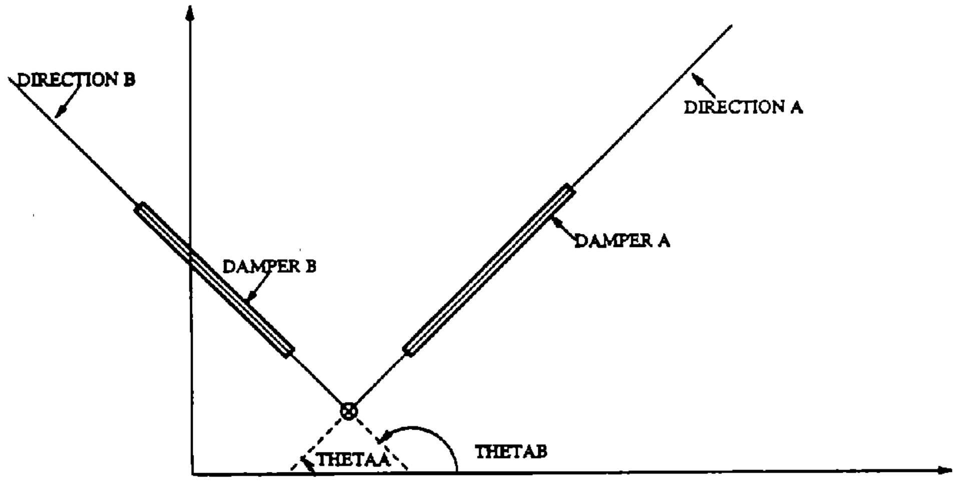

Fig. A5 - Position of Viscous Elements Cluster

INELEM(K,1:2) INELEM(K,1) can be either 1,2 or 3
INELEM(K,2) = 2
(Refer to A.6.4 for further details).

CA, CB, THETAA, THETAB

CA = C(K,3) = Damping coefficient in the A direction for biaxial element or uniaxial element in the A direction (leave blank if the uniaxial element is in the B direction only).

CB = PC(K,6) = Damping coefficient in the B direction for biaxial element or uniaxial element in the B direction (leave blank if the uniaxial element is in the A direction only).

THETAA = PC(K,13) = Orientation angle θ for damper A with X axis in degrees ($-180^\circ \le \theta \le 180^\circ$) (leave blank if the uniaxial element is in the B direction only)

THETAB = PC(K,14) = Orientation angle θ for damper B with X axis in degrees ($-180^\circ \le \theta \le 180^\circ$) (leave blank if the uniaxial element is in the A direction only)

Note: Biaxial element means damping in both A and B directions (no interaction between forces in two directions).

A.6.4.3 Hysteretic Element for Elastomeric Bearings/Steel Dampers

INELEM(K,1:2) INELEM(K,1) can be either 1,2 or 3
INELEM(K,2) = 3
(Refer to A.6.4 for further details).

ALP(K,I),YF(K,I),YD(K,I),I=1,2

ALP(K,1) = Post-to-preyielding stiffness ratio;
YF(K,1) = Yield force;
YD(K,1) = Yield displacement;
in the X direction for biaxial element or uniaxial element in the X direction
(leave blank if the uniaxial element is in the Y direction only).

ALP(K,2) = Post-to-preyielding stiffness ratio;
YF(K,2) = Yield force;
YD(K,2) = Yield displacement;
in the Y direction for biaxial element or uniaxial element in the Y direction
(leave blank if the uniaxial element is in the X direction only).

A.6.4.4 Biaxial Element for Sliding Bearings with (Friction Independent of Instantaneous Change of Normal Load)

INELEM(K,1:2) INELEM(K,1) can be either 1, 2 or 3
INELEM(K,2) = 4 (Refer to C.6 for further details).

(FMAX(K,I),FMIN(K,I),PA(K,I),YD(K,I),I=1,2),FN(K)

FMAX(K,1) = Maximum coefficient of sliding friction (leave blank if the uniaxial element is in the Y direction only);

FMAX(K,2) = Maximum coefficient of sliding friction (leave blank if the uniaxial element is in the X direction only);

FMIN(K,1) = Minimum coefficient of sliding friction (leave blank if the uniaxial element is in the Y direction only);

FMIN(K,2) = Minimum coefficient of sliding friction (leave blank if the uniaxial element is in the X direction only);

PA(K,1) = Constant which controls the transition of coefficient of sliding friction from maximum to minimum value (leave blank if the uniaxial element is in the Y direction only);

PA(K,2) = Constant which controls the transition of coefficient of sliding friction from maximum to minimum value (leave blank if the uniaxial element is in the X direction only);

YD(K,1) = Yield displacement; in the X direction for biaxial element or uniaxial element in the X direction (leave blank if the uniaxial element is in the Y direction only);

YD(K,2) = Yield displacement; in the Y direction for biaxial element or uniaxial element in the Y direction (leave blank if the uniaxial element is in the X direction only);

FN(K) = Initial normal force at the sliding interface.

A.6.4.5 Biaxial Element for Sliding Bearings (with Friction Dependent on Instantaneous Change of Normal Load)

INELEM(K,1:2 INELEM(K,1) can be either 1, 2, or 3
INELEM(K,2) = 5 (Refer to C.6 for further details).

(FMAX(K,I),FMIN(K,I),PA(K,I),YD(K,I),I=1,2),FN(K)

FMAX(K,1) = Maximum coefficient of sliding friction at almost zero pressure (f_{max0} in Equation 2.24) (leave blank if the uniaxial element is in the Y direction only);

FMAX(K,2) = Maximum coefficient of sliding friction at almost zero pressure f_{max0} in Equation 2.24) (leave blank if the uniaxial element is in the X direction only);

FMIN(K,1) = Minimum coefficient of sliding friction (independent of pressure) (leave blank if the uniaxial element is in the Y direction only);

FMIN(K,2) = Minimum coefficient of sliding friction (independent of pressure) (leave blank if the uniaxial element is in the X direction only);

PA(K,1) =Constant which controls the transition of coefficient of sliding friction from maximum (f_{max}) to minimum (f_{min}) value (leave blank if the uniaxial element is in the Y direction only);

PA(K,2) =Constant which controls the transition of coefficient of sliding friction from maximum (f_{max}) to minimum (f_{min}) value (leave blank if the uniaxial element is in the X direction only);

YD(K,1) = Yield displacement; in the X direction for biaxial element or uniaxial element in the X direction (leave blank if the uniaxial element is in the Y direction only);

YD(K,2) = Yield displacement; in the Y direction for biaxial element or uniaxial element in the Y direction (leave blank if the uniaxial element is in the X direction only);

FN(K) = Initial normal force at the sliding interface.

A.6.4.6 Element for Friction Pendulum Bearings (FPS)

INELEM(K,1:2) INELEM(K,1) can be either 1,2 or 3
INELEM(K,2) = 6 (Refer to C.6 for further details).

ALP(K3),(FMAX(K,I),FMIN(K,I),PA(K,I),YD(K,I),I = 1,2),FN(K)

ALP(K,3) =Radius of curvature of the concave surface of the bearing.

FMAX(K,1) = Maximum coefficient of sliding friction at almost zero pressure (f_{max0} in Equation 2.24) (leave blank if the uniaxial element is in the Y direction only);

FMAX(K,2) = Maximum coefficient of sliding friction at almost zero pressure f_{max0} in Equation 2.24) (leave blank if the uniaxial element is in the X direction only);

FMIN(K,1) = Minimum coefficient of sliding friction (independent of pressure) (leave blank if the uniaxial element is in the Y direction only);

FMIN(K,2) = Minimum coefficient of sliding friction (independent of pressure) (leave blank if the uniaxial element is in the X direction only);

PA(K,1) =Constant which controls the transition of coefficient of sliding friction from maximum (f_{max}) to minimum (f_{min}) value (leave blank if the uniaxial element is in the Y direction only);

PA(K,2) =Constant which controls the transition of coefficient of sliding friction from maximum (f_{max}) to minimum (f_{min}) value (leave blank if the uniaxial element is in the X direction only);

YD(K,1) = Yield displacement; in the X direction for biaxial element or uniaxial element in the X direction (leave blank if the uniaxial element is in the Y direction only);

YD(K,2) = Yield displacement; in the Y direction for biaxial element or uniaxial element in the Y direction (leave blank if the uniaxial element is in the X direction only);

FN(K) = Initial normal force at the sliding interface.

A.6.4.7 Hysteretic Nonlinear Stiffening Elements (Not available in this version)

A.6.4.8 Nonlinear Viscous Element*

(see Fig. A5 for positioning definition)

INELEM(K,1:2) INELEM (K,1) can be either 1, 2 or 3
INELEM(K,2) = 8 (Refer to A.6.4 for further details).

(PC(K,I), I = 1,14)

PC(K,1) = Force offset for dampers A or B in range 1 (F_{o1} in Eq. (2.9)). (To be determined from operation data of damper. Leave blank if the uniaxial element is in the B direction only);

PC(K,2) = Force offset for dampers A or B in range 2 (F_{o2} in Eq. (2.9)). (To be determined from operation data of damper. Leave blank if the uniaxial element is in the A direction only);

PC(K,3) = Nonlinear viscous constant for damper A in range 1 (C_{1A} in Eq. (2.9)). (Leave blank if the uniaxial element is in the B direction only);

PC(K,4) = Nonlinear viscous constant for damper A in range 2 (C_{2A} in Eq. (2.9)). (Leave blank if the uniaxial element is in the B direction only);

PC(K,5) = Limit velocity for transition from range 1 to 2 in A direction $(\dot{U}_{12})_A$. (Leave blank if the uniaxial element is in the B direction only);

PC(K,6) = Nonlinear viscous constant for damper B in range 1 (C_{1B} in (Eq. 2.9)). (Leave blank if the uniaxial element is in the A direction only);

PC(K,7) = Nonlinear viscous constant for damper B in range 2 (C_{2B} in (Eq. 2.9)). (Leave blank if the uniaxial element is in the A direction only);

PC(K,8) = Limit velocity for transition from range 1 to 2 in B direction $(\dot{U}_{12})_B$. (Leave blank if the uniaxial element is in the A direction only);

PC(K,9) = Power (integer or fractional) for the velocity in range 1 for either dampers A or B (p_1 in Eq. (2.9));

PC(K,10) = Power (integer or fractional) for the velocity in range 2 for either dampers A or B (p_2 in Eq. (2.9));

PC(K,11) = Maximum damper force (operational limitation) for either one of dampers A or B (F_{dmax} in Eq. (2.9)).

PC(K,12) = Displacement limit for damper operation start at low velocities and displacements for either A or B.

PC(K,13) = Orientation angle θ for damper A with x axis in degrees ($-180° \le \theta \le 180°$)

PC(K,14) = Orientation angle θ for damper B with x axis in degrees ($-180° \le \theta \le 180°$)

*Note: This model is suitable for a cluster of two (horizontal) dampers A and B oriented at an arbitrary angle to each other and to the building. The dampers have different nonlinear properties, but same maximum and same offset constants).

A.6.5 Coordinates of Isolation Elements

USR_TXT Reference information; upto 80 characters of text.

XP(I),YP(I),I=1,NP

XP(I) = X Coordinate of isolation element I from the center of mass of the base.

YP(I) = Y Coordinate of isolation element I from the center of mass of the base.

A.7 OUTPUT INFORMATION DATA

A.7.1 Output Parameters

USR_TXT	Reference information; upto 80 characters of text.

LTMH,KPD,IP1,IP2,IP3,IP4,

LTMH = 0 for both the time history and peak response output.
LTMH = 1 for only peak response output.

KPD = No. of time steps before the next response quantity is output.

IP1,IP2, IP3, IP4 = Bearing numbers of four bearings at which the peak response values and the force - displacement time history response is desired.

A.7.2 Interstory drift output

USR_TXT	Reference information; upto 80 characters of text.

CORDX(K), CORDY(K),K=1,6

CORDX(K) = X coordinate of the column line K at which the interstory drift is desired.

CORDY(K) = Y coordinate of the column line K at which the interstory drift is desired.

Note: 1. The coordinates of the column lines are with respect to the reference axis at the center of mass of the base. Six column lines can be specified.

A.8 LOAD CASE DEFINITION:

USR_TXT — Reference information; upto 80 characters of text.

[XM(1,L),XM(2,L),XM(3,L),XM(4,L), L=1,NLD]

XM(1,L) = Multiplier for vertical load case I

XM(2,L) = Multiplier for vertical load case II

XM(3,L) = Multiplier for vertical load case III

XM(4,L) = Multiplier for earthquake response

Note: Load cases for the complete building are defined as a combination of vertical load conditions (I,II,III), and earthquake loading. One card must be entered in this section for each different building load case; the total number of building load cases is controlled by the control information in section A.4.2.

A.9 EARTHQUAKE DATA

This information has to be specified in additional files outside the main input data file (e.g., WAVEXP1.DAT and WAVEYP1.DAT).

A.9.1 Unidirectional or Bidirectional Earthquake Record

Note: the following data has to be specified in the file which the user defined at the start of the user manual in section A.1 e.g., in the file WAVEX.DAT

X(I),I=1,LOR — X(I) = Unidirectional acceleration component.

Note: 1.If INDGACC as specified in A.4.5 is 1, then the input will be assumed at an angle XTH specified in A.4.5. If INDGACC as specified in A.4.5 is 2, 3, or 4 then X(LOR) is considered to be the X component of the bidirectional or tridirectional earthquake.

A.9.2 Earthquake Record in the Y Direction for the Bidirectional Earthquake (Input only if INDGACC=2 or 4)

Note: the following data has to be specified in the file which the user defined at the start of the user manual in section A.1 e.g., in the file WAVEY.DAT

Y(I,1),I=1,LOR Y(I,1) = Acceleration component in the Y direction.

A.9.3 Earthquake Record in the Z Direction for the Bidirectional or tridirectional Earthquake (Input only if INDGACC=3 or 4)

Note: The following data has to be specified in the file which the user defined at the start of the user manual in section A.1 e.g., in the file
WAVEZ.DAT
Y(I,2), I=1,LOR Y(I,2) = Acceleration component in the Z direction.

A.10 Execution Instructions

Check the README file in the distribution disk for details on execution of program.

APPENDIX B

EXAMPLE 1

EXAMPLE WITH (1) FULL 3D-SUPERSTRUCTURE (BEAM-COLUMN)
(2) SLIDING ISOLATION SYSTEM
(3) UNIAXIAL EXCITATION
(4) OUTPUT OF PEAK RESPONSE AND MEMBER FORCES

```
THREE STOREY BUILDING IN ITALY
UNIT KN-METER-SEC
GENERAL CONTROL INFORMATION
  2 3 9 16 750 9.8 0
SUPERSTRUCTURE CONTROL INFORMATION
  1 1 1
INTEGRATION CONTROL PARAMETERS
  0.01 0.005 1000 20 1
NEWMARK METHOD CONTROL PARAMETERS (DEFAULT VALUES: 0.5 AND 0.25)
  0 0
EARTHQUAKE CONTROL PARAMETERS
  1 0.02 0 9.8
SUPERSTRUCTURE INFORMATION
THIRD STORY-GENERAL DATA
  3.5 119.4 2985.6 0 0
SECOND
  3.5 119.4 2985.6 0 0
FIRST
  3.5 119.4 2985.6 0 0
FRAME DATA
FIRST FRAME
   1 3 16 24 2 1 0 3 16
COLUMN LINE COORDINATES
  1 -6 -6
  2 -6 -2
  3 -6 2
  4 -6 6
  5 -2 -6
  6 -2 -2
  7 -2 2
  8 -2 6
  9 2 -6
 10 2 -2
 11 2 2
 12 2 6
 13 6 -6
 14 6 -2
 15 6 2
 16 6 6
COLUMN PROPERTIES
1 29862560 0.09 0.0747 0.0747 0.0011 0.000675 0.0006751 0.2 0.2
2 29862560 0.12 0.0998 0.0998 0.0018 0.0018 0.0008 0.2 0.2
BEAM PROPERTIES
: 29862560 0.0998 0.0018 0.0016 4. 4. 2. 0.15 0.15
BEAM LOCATION
  1  1  2  1 2 0 0 0
  2  2  3  1 2 0 0 0
  3  3  4  1 2 0 0 0
  4  1  5  1 2 0 0 0
  5  2  6  1 2 0 0 0
  6  3  7  1 2 0 0 0
  7  4  8  1 2 0 0 0
  8  5  6  1 2 0 0 0
  9  6  7  1 2 0 0 0
  10 7  8  1 2 0 0 0
  11 5  9  1 2 0 0 0
  12 6  10 1 2 0 0 0
  13 7  11 1 2 0 0 0
  14 8  12 1 2 0 0 0
  15 9  10 1 2 0 0 0
  16 10 11 1 2 0 0 0
  17 11 12 1 2 0 0 0
  18 9  13 1 2 0 0 0
  19 10 14 1 2 0 0 0
  20 11 15 1 2 0 0 0
  21 12 16 1 2 0 0 0
  22 13 14 1 2 0 0 0
  23 14 15 1 2 0 0 0
  24 15 16 1 2 0 0 0
COLUMN LOCATION
     1 1 5  2
     2 1 6  2
     3 1 7  2
     4 1 8  2
     5 1 9  2
     6 2 10 2
     7 2 11 2
     8 1 12 2
     9 1 13 2
    10 2 14 2
    11 2 15 2
```

```
    12 1 16 2
    13 1 9  2
    14 1 10 2
    15 1 11 2
    16 1 12 2
PANEL INFORMATION
      3 6 7 29882580 0.37 0.42 0.31 11845024
      2 6 7 29882580 0.37 0.42 0.31 11845024
      1 6 7 29882580 0.37 0.42 0.31 11845024
BRACE INFORMATION
   3 7 11 43280000 0.016
   3 11 7 43280000 0.016
   2 7 11 43280000 0.016
   2 11 7 43280000 0.016
   1 7 11 43280000 0.016
   1 11 7 43280000 0.016
   3 6 10 43280000 0.016
   3 10 6 43280000 0.016
   2 6 10 43280000 0.016
   2 10 6 43280000 0.016
   1 6 10 43280000 0.016
   1 10 6 43280000 0.016
   3 14 15 43280000 0.01
   3 15 14 43280000 0.01
   2 14 15 43280000 0.01
   2 15 14 43280000 0.01
   1 14 15 43280000 0.01
   1 15 14 43280000 0 01
FIRST FRAME LOCATION
  1 0 0 0 0
SUPERSTRUCTURE DAMPING
 0.05 0.05 0 05 0.05 0.05 0.05 0.05 0.05 0.05
ECCENTRICITIES OF CENTER OF MASS
  0 0
  0 0
  0 0
HEIGHT OF FLOORS
  10 5 7 3.5 0
** BASE ISOLATION SYSTEM DATA **
STIFFNESS DATA FOR LINEAR ELASTIC BEARING
  2092.64 2092.64 602680.32 0 0
MASS OF BASE
  119.4 2985.6
GLOBAL DAMPING
  0 1 0.1 0.1 0. 0.
BEARNG DATA
  3 4
  0.1 0 07 23.6 0.000254 0.1 0.07 23.6 0 000254 292.85
  3 4
  0 1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0 000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0 07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 4
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
COORDINATES OF BEARING
  -6 -6
  -6 -2
```



```
  -6 2
  -6 6
  -2 -6
  -2 -2
  -2 2
  -2 6
  2 -6
  2 -2
  2 2
  2 6
  6 -6
  6 -2
  6 2
  6 6
OUTPUT CONTROL PARAMETERS
  1 1 1 2 3 4
COORDINATES OF DESIRED INTERSTORY DRIFT
  0 0
  0 0
  0 0
  0 0
  0 0
  0 0
LOAD CASE DATA
  0 0 0 1
```

OUTPUT FILE FOR EXAMPLE 1
(EXAMPLE FROM SECTION 4.1 - NCEER 93-0011)

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

PROGRAM 3D-BASIS-TABS ...A GENERAL PROGRAM FOR NONLINEAR
                         DYNAMIC ANALYSIS OF THREE DIMENSIONAL
                         BASE ISOLATED BUILDINGS

VERSION 2.0 FOR VAX/SUN/PC COMPUTERS, SEPT. 1994

DEVELOPED BY:

ANDREI REINHORN, MICHALAKIS CONSTANTINOU
                    DEPT. OF CIVIL ENGINEERING
                    STATE UNIV. OF NEW YORK AT BUFFALO

SATISH NAGARAJAIAH, DEPT. OF CIVIL ENGINEERING
                    UNIVERSITY OF MISSOURI AT COLUMBIA

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH,BUFFALO
STATE UNIVERSITY OF NEW YORK AT BUFFALO

CONTRIBUTIONS:

PANAGIOTIS TSOPELAS, CHEN LI AND RENFEN LI
                    DEPT. OF CIVIL ENGINEERING
                    STATE UNIV. OF NEW YORK AT BUFFALO

************************************************************ **************


VERSION 1.0 FOR VAX/PC COMPUTERS, AUGUST 1993

DEVELOPED BY ... SATISH NAGARAJAIAH
                 CHEN LI
                 ANDREI M. REINHORN
                 AND MICHALAKIS C. CONSTANTINOU
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                 STATE UNIV. OF NEW YORK AT BUFFALO

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH
STATE UNIVERSITY OF NEW YORK AT BUFFALO

************************************************************* ****************


THIS PROGRAM HAS BEEN DEVELOPED USING:
(1) PROGRAM 3D-BASIS
DEVELOPED BY ... SATISH NAGARAJAIAH
                 ANDREI M. REINHORN
                 AND MICHALAKIS C. CONSTANTINOU
                 DEPARTMENT OF CIVIL ENGINEERING
                 STATE UNIV. OF NEW YORK AT BUFFALO,        VAX VERSION, 1990
(2) PROGRAM ETABS
DEVELOPED BY ... E. L. WILSON
                 H. H. DOVEY
                 AND J. P. HOLLIN,
                 DEPARTMENT OF CIVIL ENGINEERING
                 UNIVERSITY OF CALIFORNIA, BERKELEY,        SEPTEMBER 1974, REVISED MARCH 1979

************************************************************* **************

1

 ******** MIRROR OF INPUT DATA ********


   THREE STOREY BUILDING IN ITALY
   UNIT KN-METER-SEC
   GENERAL CONTROL INFORMATION
     2 3 9 16 750 9.8 0
   SUPERSTRUCTURE CONTROL INFORMATION
     1 1 1
   INTEGRATION CONTROL PARAMETERS
     0.01 0.005 1000 20 1
   NEWMARK METHOD CONTROL PARAMETERS (DEFAULT VALUES: 0.5 AND 0.25)
     0 0
   EARTHQUAKE CONTROL PARAMETERS
     1 0.02 0 9.8
   SUPERSTRUCTURE INFORMATION
   THIRD STORY-GENERAL DATA
```



```
  3.5 119.4 2985.6 0 0
SECOND
  3.5 119.4 2985.6 0 0
FIRST
  3.5 119.4 2985.6 0 0
FRAME DATA
FIRST FRAME
   1 3 16 24 2 1 0 3 18
COLUMN LINE COORDINATES
  1 -6 -6
  2 -6 -2
  3 -6 2
  4 -6 6
  5 -2 -6
  6 -2 -2
  7 -2 2
  8 -2 6
  9 2 -6
 10 2 -2
 11 2 2
 12 2 6
 13 6 -6
 14 6 -2
 15 6 2
 16 6 6
COLUMN PROPERTIES
1 29862560 0.09 0.0747 0.0747 0.0011 0.000675 0.0006751 0.2 0.2
2 29862560 0.12 0.0996 0.0996 0.0018 0.0016 0.0009 0.2 0.2
BEAM PROPERTIES
1 29862560 0.0996 0.0018 0.0016 4. 4. 2. 0.15 0.15
BEAM LOCATION
  1  1  2  1 2 0 0 0
  2  2  3  1 2 0 0 0
  3  3  4  1 2 0 0 0
  4  1  5  1 2 0 0 0
  5  2  6  1 2 0 0 0
  6  3  7  1 2 0 0 0
  7  4  8  1 2 0 0 0
  8  5  6  1 2 0 0 0
  9  6  7  1 2 0 0 0
 10 7  8  1 2 0 0 0
 11 5  9  1 2 0 0 0
 12 6  10 1 2 0 0 0
 13 7  11 1 2 0 0 0
 14 8  12 1 2 0 0 0
 15 9  10 1 2 0 0 0
 16 10 11 1 2 0 0 0
 17 11 12 1 2 0 0 0
 18 9  13 1 2 0 0 0
 19 10 14 1 2 0 0 0
 20 11 15 1 2 0 0 0
 21 12 16 1 2 0 0 0
 22 13 14 1 2 0 0 0
 23 14 15 1 2 0 0 0
 24 15 16 1 2 0 0 0
COLUMN LOCATION
    1 1 5  2
    2 1 6  2
    3 1 7  2
    4 1 8  2
    5 1 9  2
    6 2 10 2
    7 2 11 2
    8 1 12 2
    9 1 13 2
   10 2 14 2
   11 2 15 2
   12 1 16 2
   13 1 9  2
   14 1 10 2
   15 1 11 2
   16 1 12 2
PANEL INFORMATION
      3 6 7 29862560 0.37 0.42 0.31 11945024
      2 6 7 29862560 0.37 0.42 0.31 11945024
      1 6 7 29862560 0.37 0.42 0.31 11945024
BRACE INFORMATION
   3 7 11 43280000 0.016
   3 11 7 43280000 0.016
   2 7 11 43280000 0.016
   2 11 7 43280000 0.016
```

```
  1 7 11 43280000 0.016
  1 11 7 43280000 0.016
  3 6 10 43280000 0.016
  3 10 6 43280000 0.016
  2 6 10 43280000 0.016
  2 10 6 43280000 0.016
  1 6 10 43280000 0.016
  1 10 6 43280000 0.016
  3 14 15 43280000 0.01
  3 15 14 43280000 0.01
  2 14 15 43280000 0.01
  2 15 14 43280000 0.01
  1 14 15 43280000 0.01
  1 15 14 43280000 0.01
FIRST FRAME LOCATION
 1 0 0 0 0
SUPERSTRUCTURE DAMPING
 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05
ECCENTRICITIES OF CENTER OF MASS
 0 0
 0 0
 0 0
HEIGHT OF FLOORS
 10.5 7 3.5 0
** BASE ISOLATION SYSTEM DATA **
STIFFNESS DATA FOR LINEAR ELASTIC BEARING
 2092.64 2092.64 602680.32 0 0
MASS OF BASE
 119.4 2985.6
GLOBAL DAMPING
 0.1 0.1 0.1 0. 0.
BEARNG DATA
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0 07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0 000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0 1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0 07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
 3 4
 0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
COORDINATES OF BEARING
 -6 -6
 -6 -2
 -6 2
 -6 6
 -2 -6
 -2 -2
 -2 2
 -2 6
 2 -6
 2 -2
 2 2
 2 6
 6 -6
 6 -2
 6 2
 6 6
```



```
 OUTPUT CONTROL PARAMETERS
  1 1 1 2 3 4
 COORDINATES OF DESIRED INTERSTORY DRIFT
  0 0
  0 0
  0 0
  0 0
  0 0
  0 0
 LOAD CASE DATA
  0 0 0 1

******** END OF MIRROR OF INPUT ********
1
 THREE STOREY BUILDING IN ITALY

 SUPERSTRUCTURE CONTROL INFORMATION

 UNIT KN-METER-SEC

  TOTAL NUMBER OF STORIES..... ...........=          3
  NUMBER OF DIFF. FRAMES..................=          1
  TOTAL NUMBER OF FRAMES..................=          1
  NUMBER OF LOAD CONDITIONS.......... ....=          1
  NUMBER OF FREQUENCIES...................=          9

  NO. OF FLOORS(EXCL. BASE)............ ..=          3
  NO. OF BEARINGS.........................=         16
  NO. OF EIGEN VECTORS CONSIDERED.........=          9
  INDEX FOR  SUPERSTRUCTURE STIFFNESS DATA=          2

    INDEX = 1 FOR 3D SHEAR BUILDING  REPRES.
    INDEX = 2 FOR FULL 3D REPRESENTATION
    INDEX = 3 FOR REPRESENTATION USING EIGEN DATA

  TIME STEP OF INTEGRATION (NEWMARK)......=      .0100
  INDEX FOR TYPE OF TIME STEP.............=          1

    INDEX = 1 FOR CONSTANT TIME STEP
    INDEX = 2 FOR VARIABLE TIME STEP

  GAMA FOR NEWMARKS  METHOD...............=        .50
  BETA FOR NEWMARKS  METHOD...............=        .25
  TOLERANCE FOR FORCE COMPUTATION.........=      .0050
  REFERENCE MOMENT OF CONVERGENCE.........=     1000.0
  MAX NUMBER OF ITERATIONS WITHIN T.S.....=         20
  INDEX FOR GROUND MOTION INPUT...........=          1

    INDEX = 1 FOR UNIDIRECTIONAL INPUT
    INDEX = 2 FOR BIDIRECTIONAL INPUT

  TIME STEP OF RECORD ....................=       .020
  LENGTH OF RECORD.. ...................  =        750
  LOAD FACTOR... ...   ...................=       9.80
  ANGLE OF EARTHQUAKE INCIDENCE..... .....=        .00


  ************** SUPERSTRUCTURE DATA **************


STORY DATA

LEVEL NO.   ID        HEIGHT     MASS(M)       MR**2       X(M)        Y(M)        K-X         K-Y
THIRD STORY-GENERAL DATA
      3              3.50      119.40      2985.60         .00         .00         .00          00
SECOND
      2              3.50      119.40      2985.60         .00         .00         .00         .00
FIRST
      1              3.50      119.40      2985.60         .00         .00         .00         .00
```

STRUCTURE LATERAL LOADS...CASES A AND B

LEVEL NO.	FX-A	FY-A	MOM-A	FX-B	FY-B	MOM-B	XA	YA	XB	YB
3	.00	.00	.00	.00	.00	.00	.0	.0	.0	.0
2	.00	.00	.00	.00	.00	.00	.0	.0	.0	.0
1	.00	.00	.00	.00	.00	.00	.0	.0	.0	.0

FIRST FRAME

FRAME ID NUMBER.........................=	1
NUMBER OF STORY LEVELS..................=	3
NUMBER OF COLUMN LINES..................=	16
NUMBER OF BAYS..........................=	24
NUMBER OF DIFF. COL. PROP...............=	2
NUMBER OF DIFF. BEAM PROP...............=	1
NUMBER OF DIFF. FEF.....................=	0
NUMBER OF PANEL ELEMENTS................=	3
NUMBER OF BRACING ELEMENTS..............=	18

0COLUMN LINE COORDINATES

LINE	X	Y
1	-6.00	-6.00
2	-6.00	-2.00
3	-6.00	2.00
4	-6.00	6.00
5	-2.00	-6.00
6	-2.00	-2.00
7	-2.00	2.00
8	-2.00	6.00
9	2.00	-6.00
10	2.00	-2.00
11	2.00	2.00
12	2.00	6.00
13	6.00	-6.00
14	6.00	-2.00
15	6.00	2.00
16	6.00	6.00

0COLUMN ID	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	RIGID TOP	RIGID BOT
1	29862560.00	.09	.07	.07	.00	.00	.00	.20	.20
2	29862560.00	.12	.10	.10	.00	.00	.00	.20	.20

0 BEAM ID	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	RIGID I	RIGID J
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15

BEAM LOCATIONS

BAY	LEV	IC	JC	BID	GEN	VL1	VL2	VL3
1	3	1	2	1	2	0	0	0
2	3	2	3	1	2	0	0	0
3	3	3	4	1	2	0	0	0
4	3	1	5	1	2	0	0	0
5	3	2	6	1	2	0	0	0
6	3	3	7	1	2	0	0	0
7	3	4	8	1	2	0	0	0
8	3	5	6	1	2	0	0	0
9	3	6	7	1	2	0	0	0
10	3	7	8	1	2	0	0	0
11	3	5	9	1	2	0	0	0
12	3	6	10	1	2	0	0	0
13	3	7	11	1	2	0	0	0
14	3	8	12	1	2	0	0	0
15	3	9	10	1	2	0	0	0
16	3	10	11	1	2	0	0	0
17	3	11	12	1	2	0	0	0
18	3	9	13	1	2	0	0	0
19	3	10	14	1	2	0	0	0
20	3	11	15	1	2	0	0	0
21	3	12	16	1	2	0	0	0
22	3	13	14	1	2	0	0	0
23	3	14	15	1	2	0	0	0
24	3	15	16	1	2	0	0	0

GENERATED BEAM LOCATIONS

0STORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

0COLUMN LOCATIONS

0 LINE	LEV	CID	KCOL	GEN
1	3	1	5	2
2	3	1	6	2
3	3	1	7	2
4	3	1	8	2
5	3	1	9	2
6	3	2	10	2
7	3	2	11	2
8	3	1	12	2
9	3	1	13	2
10	3	2	14	2
11	3	2	15	2
12	3	1	16	2
13	3	1	9	2
14	3	1	10	2
15	3	1	11	2
16	3	1	12	2

GENERATED COLUMN LOCATIONS

0STORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3	1	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1
2	1	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1
1	1	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1

PANEL CARDS

LEVEL	COL I	COL J	E	A	I	SA	G
3	6	7	29862560.00	.37	.42	.31	11945024.00
2	6	7	29862560.00	.37	.42	.31	11945024.00
1	6	7	29862560.00	.37	.42	.31	11945024.00

BRACING ELEMENT CARDS

LEV	UC	LC	E	A
3	7	11	43280000.00000	.01600
3	11	7	43280000.00000	.01600
2	7	11	43280000.00000	.01600
2	11	7	43280000.00000	.01600

1	7	11	43280000.00000	.01600
1	11	7	43280000.00000	.01600
3	6	10	43280000.00000	.01600
3	10	6	43280000.00000	.01600
2	6	10	43280000.00000	.01600
2	10	6	43280000.00000	.01600
1	6	10	43280000.00000	.01600
1	10	6	43280000.00000	.01600
3	14	15	43280000.00000	.01000
3	15	14	43280000.00000	.01000
2	14	15	43280000.00000	.01000
2	15	14	43280000.00000	.01000
1	14	15	43280000.00000	.01000
1	15	14	43280000.00000	.01000

BEAM PROPERTIES AND LOADS

BAY NUMBERS 1

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 2

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 3

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 4

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 5

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 6

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 7

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 8

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 9

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 10

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 11

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 12

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 13

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0

BAY NUMBERS 14

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VI
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	

BAY NUMBERS 15

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 16

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 17

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 18

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 19

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 20

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 21

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 22

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 23

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

BAY NUMBERS 24

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
3	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
2	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0
1	29862560.00	.10	.00	.00	4.00	4.00	2.00	.15	.15	0	0	0

COLUMN PROPERTIES

COLUMN LINE NO. 1

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
3	29862560.00	.08	.07	.07	.00	.00	.00	.20	.20
2	29862560.00	.09	.07	.07	.00	.00	.00	.20	.20
1	29862560.00	.09	.07	.07	.00	.00	.00	.20	.20

COLUMN LINE NO. 2

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
3	29862560.00	.09	.07	.07	.00	.00	.00	.20	.20
2	29862560.00	.09	.07	.07	.00	.00	.00	.20	.20
1	29862560.00	.09	.07	.07	.00	.00	.00	.20	.20

COLUMN LINE NO. 3

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
3	29862560.00	.09	.07	.07	.00	.00	.00	.20	.20
2	29862560.00	.09	.07	.07	.00	.00	.00	.20	.20
1	29862560.00	.08	.07	.07	.00	.00	.00	.20	.20

COLUMN LINE NO. 4

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB

```
  3  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  2  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  1  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
COLUMN LINE NO.   5
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  2  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  1  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
COLUMN LINE NO.   6
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
  2  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
  1  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
COLUMN LINE NO.   7
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
  2  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
  1  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
COLUMN LINE NO.   8
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  2  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  1  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
COLUMN LINE NO.   9
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  2  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  1  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
COLUMN LINE NO.  10
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
  2  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
  1  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
COLUMN LINE NO.  11
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
  2  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
  1  29862560.00    .12     .10     .10     .00     .00     .00     .20     .20
COLUMN LINE NO.  12
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  2  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  1  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
COLUMN LINE NO.  13
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  2  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  1  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
COLUMN LINE NO.  14
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  2  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  1  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
COLUMN LINE NO.  15
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  2  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  1  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
COLUMN LINE NO.  16
LEVEL        E      A    MAJ SA  MIN SA  TORS I   MAJ I   MIN I     DT      DB

  3  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  2  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20
  1  29862560.00    .09     .07     .07     .00     .00     .00     .20     .20

FIRST FRAME LOCA


FRAME POSITION DATA
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FRAME   ID  FORCE CODE          X1          Y1          ANG
  1     1       0               .00         .00         .00


    SUPERSTRUCTURE DAMPING.......
    MODE SHAPE      DAMPING RATIO (%)

         1             5.000
         2             5.000
         3             5.000
         4             5.000
         5             5.000
         6             5.000
         7             5.000
         8             5.000
         9             5.000


    HEIGHT.........
    FLOOR         HEIGHT

         3          10.500
         2           7.000
         1           3.500
         0            .000


    ************* ISOLATION SYSTEM DATA ************


    BASEMAT MASS AT THE CENTER OF MASS OF THE BASE ...
              TRANSL. MASS   ROTATIRAL MASS

    MASS            119.400       2985.600


    BASE ISOLATION DATA:
    OPTION ONE: EQUIVALENT GLOBAL DEVICE PROPERTIES


    GLOBAL ISOLATION DEVICE AT THE CENTER OF MASS        OF THE BASE.....
                                   X             Y              R            ECX     ,    ECY

    LINEAR STIFFNESS(F/L)      2092.6400     2092.6400    602680.3200      .0000        .0000
    VISCOUS DAMPING(F/L/T)         .1000         .1000          .1000      .0000        .0000


......ELEMENT TYPE =


    SLIDING BEARING PARAMETERS..(CONSTANT NORMAL FORCE & FMAX)...........
    ISOLATOR   FMAX  X   FMAX  Y   FMIN  X   FMIN  Y     FA X      FA Y  YIELD DISPL. X  YIELD DISPL. Y   NORMAL FORCE

       1      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
       2      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
       3      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
       4      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
       5      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
       6      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
       7      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
       8      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
       9      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
      10      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
      11      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
      12      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
      13      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
      14      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
      15      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000
      16      .10000    .10000    .07000    .07000    23.600    23.600       .00025          .00025        292.85000


    BEARING LOCATION ..........
    BEARING      X          Y

       1      -6.000     -6.000
       2      -6.000     -2.000
       3      -6.000      2.000
       4      -6.000      6.000
```

5	-2.000	-6.000
6	-2.000	-2.000
7	-2.000	2.000
8	-2.000	6.000
9	2.000	-6.000
10	2.000	-2.000
11	2.000	2.000
12	2.000	6.000
13	6.000	-6.000
14	6.000	-2.000
15	6.000	2.000
16	6.000	6.000

************ OUTPUT PARAMETERS ************

TIME HISTORY OPTION ....= 1
INDEX = 0 FOR TIME HISTORY OUTPUT
INDEX = 1 FOR NO TIME HISTORY OUTPUT

NO. OF TIME STEPS AT WHICH TIME HISTORY
OUTPUT IS DESIRED ....= 1
FORCE-DISPLACEMENT TIME HISTORY DESIRED
AT BEARINGS NUMBERED...................= 1 2 3 4

COORDINATES OF COLUMN LINES AT WHICH INTERSTORY DRIFTS ARE DESIRED

COL. LINE	X. CORD.	Y. CORD.
1	.000	.000
2	.000	.000
3	.000	.000
4	.000	.000
5	.000	.000
6	.000	.000

*********************** OUTPUT ******* ****************

MODE SHAPES

LEVEL ID	DIRN	1	2	3	4	5	6	7	8
3	X	.000000	.070705	.000000	.000000	.051357	.000000	.000000	.027174
3	Y	.028814	.000000	.068441	.017460	.000000	.044028	.008113	.000000
3	ROTN	.012811	.000000	-.005789	.009780	.000000	-.003318	.005265	.000000
2	X	.000000	.052181	.000000	.000000	-.037300	.000000	.000000	-.065277
2	Y	.020758	.000000	.044503	-.013985	.000000	-.041217	-.021188	.000000
2	ROTN	.009859	.000000	-.004117	-.008752	.000000	.002711	-.012361	.000000
1	X	.000000	.025556	.000000	.000000	-.065927	.000000	.000000	.058101
1	Y	.009895	.000000	.018832	-.023792	.000000	-.060575	.021215	.000000
1	ROTN	.004814	.000000	-.001039	-.012291	.000000	.004938	.010762	.000000

MODE SHAPES

LEVEL ID	DIRN	9
3	X	.000000
3	Y	.023486
3	ROTN	-.001717
2	X	.000000
2	Y	-.060167
2	ROTN	.004355
1	X	.000000
1	Y	.056696
1	ROTN	-.004091

MODE NUMBER	PERIOD
1	.269144
2	.267683
3	.205015
4	.080896
5	.080022
6	.062462
7	.056352
8	.057300
9	.037163

************* MAX. RESPONSE ************

MAX. REL. DISP. AT THE CENTER OF MASS OF FLOORS
(WITH RESPECT TO THE BASE)

FLOOR	X DISP.	Y DISP.	ROTN.(rad)
3	.0048	.0000	.0000
2	.0030	.0000	.0000
1	.0014	.0000	.0000

MAX INTERSTORY DRIFT

STORY	X DST.	Y DST.	TIME	X DRIFT/FL. HT.(%)	TIME	Y DRIFT/FL. HT.(%)
3	.00	.00	4.57	.04	.00	.00
2	.00	.00	4.56	.05	.00	.00
1	.00	.00	2.58	.04	.00	.00
3	.00	.00	4.57	.04	.00	.00
2	.00	.00	4.56	.05	.00	.00
1	.00	.00	2.58	.04	.00	.00
3	.00	.00	4.57	.04	.00	.00
2	.00	.00	4.56	.05	.00	.00
1	.00	.00	2.58	.04	.00	.00
3	.00	.00	4.57	.04	.00	.00
2	.00	.00	4.56	.05	.00	.00
1	.00	.00	2.58	.04	.00	.00
3	.00	.00	4.57	.04	.00	.00
2	.00	.00	4.56	.05	.00	.00
1	.00	.00	2.58	.04	.00	.00
3	.00	.00	4.57	.04	.00	.00
2	.00	.00	4.56	.05	.00	.00
1	.00	.00	2.58	.04	.00	.00

MAX. DISP. AT THE CENTER OF MASS OF BASE

X DISP.	Y DISP.	ROTN...
.034	.000	.000

MAX RESULTANT DISP. AT THE CENTER OF MASS OF BASE

TIME	RES. DISP.	X COMP.	Y COMP
5.440	.034	.034	.000

MAX RESULTANT BEARING DISP.

BEARING	TIME	MAX. DISP	ANG. WITH X AXIS
1	5.440	.034	.000
2	5.440	.034	.000
3	5.440	.034	.000
4	5.440	.034	.000

MAX BEARING DISP. IN X

BEARING	TIME	MAX. DISP X

1	5.440	.034
2	5.440	.034
3	5.440	.034
4	5.440	.034

MAX BEARING DISP. IN Y

BEARING	TIME	MAX. DISP Y
1	.000	.000
2	.000	.000
3	.000	.000
4	.000	.000

MAX. TOTAL ACCL. AT CENTER OF MASS OF FLOORS

FLOOR	ACCL. X	ACCL. Y	ACCL. R
3	-3.632366	.000000	.000000
2	-2.292849	.000000	.000000
1	2.342263	.000000	.000000

MAX STORY SHEAR

STORY	TIME	X SHEAR	TIME	Y SHEAR
3	2.550	-433.705	.000	.000
2	4.550	-540.763	.000	.000
1	2.570	-525.499	.000	.000

MAX. STRUCTURE SHEAR (TOP OF BASE)

FORCE X	FORCE Y	Z MOMENT
-525.499	.000	000

MAX. BASE SHEAR (BEARING LEVEL)

FORCE X	FORCE Y	Z MOMENT
511.885	.000	.000

LOAD CONDITION DEFINITION CARDS

OLOAD	I	II	III	RESPONSE
1	.00	.00	00	1.00

MEMBER FORCES . . . . FRAME ID FIRS T FR AME LOCA FRAME TYPE 1

LEVEL NO 1 . . . LEVEL ID "0"0"0"0"0

COLUMN FORCES

0 LINE	LOAD		TORSIONAL MOMENT	MAJOR AXIS TOP MOMENT	MAJOR AXIS BOT MOMENT	AXIAL FORCE	MINOR AXIS TOP MOMENT	MINOR AXIS BOT MOMENT	MAJOR SHEAR	MINOR SHEAR
1	1	MAX	.0000	9 7447	13.2904	23.4320	.0562	.0300	7.4307	.0278
	1	MIN	.0000	-9.7447	-13.2904	-23.4320	-.0562	-.0300	-7.4307	-.0278
2	1	MAX	.0000	10.9554	13.9377	33.5536	.0401	.0215	8.0300	.0199
	1	MIN	.0000	-10.9554	-13.9377	-33.5536	-.0401	-.0215	-8.0300	-.0199
3	1	MAX	.0000	10.9554	13.9377	33.5536	.0401	.0215	8.0300	.0199
	1	MIN	.0000	-10.9554	-13.9377	-33.5536	-.0401	-.0215	-8.0300	-.0199
4	1	MAX	.0000	9.7447	13.2904	23.4320	.0562	.0300	7.4307	.0278
	1	MIN	.0000	-9.7447	-13.2904	-23.4320	-.0562	-.0300	-7.4307	-.0278
5	1	MAX	.0000	13.1818	15.1280	2.0934	.4078	.2179	9.1322	.2018
	1	MIN	.0000	-13.1818	-15.1280	-2.0934	-.4078	-.2179	-9.1322	-.2018
6	1	MAX	.0000	21.7101	30.5117	144.4242	.3892	.2081	16.8458	.1927
	1	MIN	.0000	-21.7101	-30.5117	-144.4242	-.3892	-.2081	-16.8458	-.1927
7	1	MAX	.0000	21.7101	30.5117	144.4242	.3892	.2081	16.8458	.1927
	1	MIN	.0000	-21.7101	-30.5117	-144.4242	-.3892	-.2081	-16.8458	-.1927
8	1	MAX	0000	13 1818	15.1280	2.0934	.4076	.2179	9.1322	.2018
	1	MIN	.0000	-13.1818	-15.1280	-2.0934	-.4076	-.2179	-9.1322	-.2018
9	1	MAX	.0000	13.1944	15.1348	1.5861	.9571	.5117	9.1385	.4738
	1	MIN	.0000	-13.1944	-15.1348	-1.5861	-.9571	-.5117	-9.1385	-.4738
10	1	MAX	.0000	22.2055	30.7729	325.1305	.8851	.4732	17.0898	.4382
	1	MIN	.0000	-22.2055	-30.7729	-325.1305	-.8851	-.4732	-17.0898	-.4382
11	1	MAX	.0000	22.2055	30.7729	325.1305	.8851	.4732	17.0898	.4382
	1	MIN	.0000	-22.2055	-30.7729	-325.1305	-.8851	-.4732	-17.0898	-.4382
12	1	MAX	.0000	13.1944	15.1348	1.5861	.9571	.5117	9.1385	.4738
	1	MIN	.0000	-13.1944	-15.1348	-1.5861	-.9571	-.5117	-9.1385	-.4738
13	1	MAX	.0000	9 7745	13 3063	23.3867	.0880	.0471	7.4454	.0436
	1	MIN	.0000	-9 7745	-13.3063	-23.3867	-.0880	-.0471	-7.4454	-.0436
14	1	MAX	0000	11.4166	14.1843	36.1181	.0573	.0307	8.2583	.0284
	1	MIN	.0000	-11.4166	-14.1843	-36.1181	-.0573	-.0307	-8.2583	-.0284
15	1	MAX	.0000	11.4166	14.1843	36.1181	.0573	.0307	8.2583	.0284
	1	MIN	.0000	-11.4166	-14.1843	-36.1181	-.0573	-.0307	-8.2583	-.0284
16	1	MAX	.0000	9.7745	13.3063	23.3867	.0880	.0471	7.4454	.0436
	1	MIN	.0000	-9.7745	-13.3063	-23.3867	-.0880	-.0471	-7.4454	-.0436

BEAM FORCES

BAY	LOAD		TORS MOMENT	I MOMENT	J MOMENT
1	1	MAX	.2765	.0895	.1043
	1	MIN	-.2765	-.0895	-.1043
2	1	MAX	0000	.0371	.0371
	1	MIN	0000	- 0371	- 0371
3	1	MAX	.2765	1043	.0895
	1	MIN	-.2765	-.1043	-.0895
4	1	MAX	.0756	18.9458	15.6913
	1	MIN	- 0756	-18.9458	-15.6913
5	1	MAX	.0542	22.5196	24.1015
	1	MIN	-.0542	-22.5196	-24.1015
6	1	MAX	.0542	22.5196	24.1015
	1	MIN	-.0542	-22.5196	-24.1015
7	1	MAX	.0756	18.9458	15.6913
	1	MIN	-.0756	-18.9458	-15.6913
8	1	MAX	8504	1.5124	1.6192
	1	MIN	-.8504	-1.5124	-1 6192
9	1	MAX	.0000	2697	.2697
	1	MIN	.0000	-.2697	-.2697
10	1	MAX	.8504	1.6192	1.5124
	1	MIN	-.8504	-1 6192	-1 5124
11	1	MAX	.2937	12 7436	12.7298
	1	MIN	-.2937	-12 7436	-12.7298
12	1	MAX	.2057	16.5341	16.3104
	1	MIN	- 2057	-16 5341	-16.3104
13	1	MAX	.2057	16.5341	16.3104
	1	MIN	-.2057	-16 5341	-16 3104
14	1	MAX	.2937	12 7436	12.7298
	1	MIN	-.2937	-12 7436	-12.7298
15	1	MAX	8015	3.1751	3 4460
	1	MIN	- 8015	-3.1751	-3.4460
16	1	MAX	.0000	.6135	.6135
	1	MIN	0000	- 6135	-.6135
17	1	MAX	.8015	3.4460	3 1751
	1	MIN	- 8015	-3 4460	-3.1751

18	1	MAX	.1870	15.7040	18.9404
	1	MIN	-.1870	-15.7040	-18.9404
19	1	MAX	.1305	25.9291	24.0847
	1	MIN	-.1305	-25.9291	-24.0847
20	1	MAX	.1305	25.9291	24.0847
	1	MIN	-.1305	-25.9291	-24.0847
21	1	MAX	.1870	15.7040	18.9404
	1	MIN	-.1870	-15.7040	-18.9404
22	1	MAX	.3923	.0725	.1009
	1	MIN	-.3923	-.0725	-.1009
23	1	MAX	.0000	.0530	.0530
	1	MIN	.0000	-.0530	-.0530
24	1	MAX	.3923	.1009	.0725
	1	MIN	-.3923	-.1009	-.0725

PANEL FORCES

FLEXURAL PANELS

I COL	LOAD		TOP-MOMENT	BOT-MOMENT	AXIAL-FORCE	SHEAR-FORCE
6	1	MAX	.0000	.0000	394.4155	.0000
	1	MIN	.0000	.0000	-394.4155	.0000

BRACING ELEMENTS - LISTED IN SAME SEQUENCE AS INPUT

T-COL	LOAD		AXIAL-FORCE
7	1	MAX	130.5503
	1	MIN	-130.5503
11	1	MAX	120.0124
	1	MIN	-120.0124
6	1	MAX	130.5503
	1	MIN	-130.5503
10	1	MAX	120.0124
	1	MIN	-120.0124
14	1	MAX	2.2338
	1	MIN	-2.2338
15	1	MAX	2.2338
	1	MIN	-2.2338

MEMBER FORCES ..... FRAME ID FIRS T FR AME LOCA FRAME TYPE 1

LEVEL NO 2 ... LEVEL ID ^8^8^8^8

COLUMN FORCES

0 LINE	LOAD		TORSIONAL MOMENT	MAJOR AXIS TOP MOMENT	MAJOR AXIS BOT MOMENT	AXIAL FORCE	MINOR AXIS TOP MOMENT	MINOR AXIS BOT MOMENT	MAJOR SHEAR	MINOR SHEAR
1	1	MAX	.0000	9.6309	9.6128	14.3279	.1082	.0979	6.1945	.0665
	1	MIN	.0000	-9.6309	-9.6128	-14.3279	-.1082	-.0979	-6.1945	-.0665
2	1	MAX	.0000	11.5751	11.5917	21.2852	.0863	.0748	7.4732	.0520
	1	MIN	.0000	-11.5751	-11.5917	-21.2852	-.0863	-.0748	-7.4732	-.0520
3	1	MAX	.0000	11.5751	11.5917	21.2852	.0863	.0748	7.4732	.0520
	1	MIN	.0000	-11.5751	-11.5917	-21.2852	-.0863	-.0748	-7.4732	-.0520
4	1	MAX	.0000	9.6309	9.6128	14.3279	.1082	.0979	6.1945	.0665
	1	MIN	.0000	-9.6309	-9.6128	-14.3279	-.1082	-.0979	-6.1945	-.0665
5	1	MAX	.0000	14.5564	14.6782	.7632	.8084	.7233	9.4305	.4941
	1	MIN	.0000	-14.5564	-14.6782	-.7632	-.8084	-.7233	-9.4305	-.4941
6	1	MAX	.0000	20.3872	20.3208	80.8203	.7781	.6939	13.0216	.4748
	1	MIN	.0000	-20.3872	-20.3208	-80.8203	-.7781	-.6939	-13.0216	-.4748
7	1	MAX	.0000	20.3872	20.3208	80.8203	.7781	.6939	13.0216	.4748
	1	MIN	.0000	-20.3872	-20.3208	-80.8203	-.7781	-.6939	-13.0216	-.4748
8	1	MAX	.0000	14.5564	14.6782	.7632	.8084	.7233	9.4305	.4941

	1	MIN	.0000	-14.5564	-14.6782	-.7632	-.8084	-.7233	-9.4305	-.4941
9	1	MAX	.0000	14.5937	14.7102	2.1275	1.8674	1.6819	9.4529	1.1449
	1	MIN	.0000	-14.5937	-14.7102	-2.1275	-1.8674	-1.6819	-9.4529	-1.1449
10	1	MAX	.0000	21.4273	21.3798	180.5953	1.7662	1.5764	13.7376	1.0782
	1	MIN	.0000	-21.4273	-21.3798	-180.5953	-1.7662	-1.5764	-13.7376	-1.0782
11	1	MAX	.0000	21.4273	21.3798	180.5953	1.7662	1.5764	13.7376	1.0782
	1	MIN	.0000	-21.4273	-21.3798	-180.5953	-1.7662	-1.5764	-13.7376	-1.0782
12	1	MAX	.0000	14.5937	14.7102	2.1275	1.8674	1.6819	9.4528	1.1449
	1	MIN	.0000	-14.5937	-14.7102	-2.1275	-1.8674	-1.6819	-9.4529	-1.1449
13	1	MAX	.0000	9.6902	9.6756	14.2844	.1624	.1497	6.2361	.1007
	1	MIN	.0000	-9.6902	-9.6756	-14.2844	-.1624	-.1497	-6.2361	-.1007
14	1	MAX	.0000	12.6877	12.5982	23.3448	.1246	.1075	8.1568	.0749
	1	MIN	.0000	-12.6877	-12.5982	-23.3448	-.1246	-.1075	-8.1568	-.0749
15	1	MAX	.0000	12.6877	12.5982	23.3448	.1246	.1075	8.1568	.0749
	1	MIN	.0000	-12.6877	-12.5982	-23.3448	-.1246	-.1075	-8.1568	-.0749
16	1	MAX	.0000	9.6902	9.6756	14.2844	.1624	.1497	6.2361	.1007
	1	MIN	.0000	-9.6902	-9.6756	-14.2844	-.1624	-.1497	-6.2361	-.1007

BEAM FORCES

BAY	LOAD		TORS MOMENT	I MOMENT	J MOMENT
1	1	MAX	.2794	.1856	.1979
	1	MIN	-.2794	-.1856	-.1979
2	1	MAX	.0000	.0599	.0599
	1	MIN	.0000	-.0599	-.0599
3	1	MAX	.2794	.1979	.1856
	1	MIN	-.2794	-.1979	-.1856
4	1	MAX	.1103	18.4990	15.5766
	1	MIN	-.1103	-18.4990	-15.5766
5	1	MAX	.0781	23.4171	25.2584
	1	MIN	-.0781	-23.4171	-25.2584
6	1	MAX	.0781	23.4171	25.2584
	1	MIN	-.0781	-23.4171	-25.2584
7	1	MAX	.1103	18.4990	15.5766
	1	MIN	-.1103	-18.4990	-15.5766
8	1	MAX	.8299	2.4599	2.6105
	1	MIN	-.8299	-2.4599	-2.6105
9	1	MAX	.0000	.3951	.3951
	1	MIN	.0000	-.3951	-.3951
10	1	MAX	.8299	2.6105	2.4599
	1	MIN	-.8299	-2.6105	-2.4599
11	1	MAX	.4188	13.3384	13.3123
	1	MIN	-.4188	-13.3384	-13.3123
12	1	MAX	.3007	11.4809	11.1504
	1	MIN	-.3007	-11.4809	-11.1504
13	1	MAX	.3007	11.4809	11.1504
	1	MIN	-.3007	-11.4809	-11.1504
14	1	MAX	.4188	13.3384	13.3123
	1	MIN	-.4188	-13.3384	-13.3123
15	1	MAX	.7591	5.2267	5.5832
	1	MIN	-.7591	-5.2267	-5.5832
16	1	MAX	.0000	.8962	.8962
	1	MIN	.0000	-.8962	-.8962
17	1	MAX	.7591	5.5832	5.2267
	1	MIN	-.7591	-5.5832	-5.2267
18	1	MAX	.2669	15.6281	18.5343

	1	MIN	-.2669	-15.6281	-18.5343
19	1	MAX	.1885	28.5608	26.3065
	1	MIN	-.1885	-28.5608	-26.3065
20	1	MAX	1885	28.5608	26.3065
	1	MIN	-.1885	-28.5608	-26.3065
21	1	MAX	.2669	15.6281	18.5343
	1	MIN	-.2669	-15.6281	-18.5343
22	1	MAX	.4427	.1960	.2158
	1	MIN	-.4427	-.1960	-.2158
23	1	MAX	.0000	.0868	.0868
	1	MIN	.0000	-.0868	-.0868
24	1	MAX	.4427	.2158	.1960
	1	MIN	-.4427	-.2158	-.1960

PANEL FORCES

FLEXURAL PANELS

I COL	LOAD		TOP-MOMENT	BOT-MOMENT	AXIAL-FORCE	SHEAR-FORCE
6	1	MAX	.0000	.0000	220.7165	.0000
	1	MIN	.0000	.0000	-220.7165	.0000

BRACING ELEMENTS - LISTED IN SAME SEQUENCE AS INPUT

I-COL	LOAD		AXIAL-FORCE
7	1	MAX	131.3476
	1	MIN	-131.3476
11	1	MAX	124.0440
	1	MIN	-124.0440
6	1	MAX	131.3476
	1	MIN	-131.3476
10	1	MAX	124.0440
	1	MIN	-124.0440
14	1	MAX	1.4438
	1	MIN	-1.4438
15	1	MAX	1.4438
	1	MIN	-1.4438

MEMBER FORCES ..... FRAME ID FIRS T FR AME LOCA   FRAME TYPE 1

LEVEL NO 3 ... LEVEL ID ^@^@^@^@^@

COLUMN FORCES

LINE	LOAD		TORSIONAL MOMENT	MAJOR AXIS TOP MOMENT	MAJOR AXIS BOT MOMENT	AXIAL FORCE	MINOR AXIS TOP MOMENT	MINOR AXIS BOT MOMENT	MAJOR SHEAR	MINOR SHEAR
1	1	MAX	.0000	10.2559	8.8238	5.0615	.2061	.1660	6.1547	.1200
	1	MIN	.0000	-10.2559	-8.8238	-5.0615	-.2061	-.1660	-6.1547	-.1200
2	1	MAX	.0000	13.0323	11.2294	8.2814	.1350	.1185	7.8263	.0818
	1	MIN	.0000	-13.0323	-11.2294	-8.2814	-.1350	-.1185	-7.8263	-.0818
3	1	MAX	.0000	13.0323	11.2294	8.2814	.1350	.1185	7.8263	.0818
	1	MIN	.0000	-13.0323	-11.2294	-8.2814	-.1350	-.1185	-7.8263	-.0818
4	1	MAX	0000	10.2559	8.8238	5.0615	.2061	.1660	6.1547	.1200
	1	MIN	.0000	-10.2559	-8.8238	-5.0615	-.2061	-.1660	-6.1547	-.1200
5	1	MAX	.0000	14.1217	13.1272	.4156	1.2315	1.0801	8.7900	.7457
	1	MIN	.0000	-14.1217	-13.1272	-.4156	-1.2315	-1.0801	-8.7900	-.7457
6	1	MAX	.0000	19.7117	17.0956	23.4224	1.1612	1.0279	11.8733	.7062
	1	MIN	.0000	-19.7117	-17.0956	-23.4224	-1.1612	-1.0279	-11.8733	-.7062
7	1	MAX	.0000	19.7117	17.0956	23.4224	1.1612	1.0279	11.8733	.7062
	1	MIN	.0000	-19.7117	-17.0956	-23.4224	-1.1612	-1.0279	-11.8733	-.7062
8	1	MAX	.0000	14.1217	13.1272	.4156	1.2315	1.0801	8.7900	.7457
	1	MIN	.0000	-14.1217	-13.1272	-.4156	-1.2315	-1.0801	-8.7900	-.7457

9	1	MAX	.0000	14.1796	13.1785	1.2844	2.9232	2.5310	8.8252	1.7594
	1	MIN	.0000	-14.1796	-13.1785	-1.2844	-2.9232	-2.5310	-8.8252	-1.7594
10	1	MAX	.0000	21.6603	18.7282	51.6743	2.6376	2.3335	13.0285	1.6036
	1	MIN	.0000	-21.6603	-18.7282	-51.6743	-2.6376	-2.3335	-13.0285	-1.6036
11	1	MAX	.0000	21.6603	18.7282	51.6743	2.6376	2.3335	13.0285	1.6036
	1	MIN	.0000	-21.6603	-18.7282	-51.6743	-2.6376	-2.3335	-13.0285	-1.6036
12	1	MAX	.0000	14.1796	13.1785	1.2844	2.9232	2.5310	8.8252	1.7594
	1	MIN	.0000	-14.1796	-13.1785	-1.2844	-2.9232	-2.5310	-8.8252	-1.7594
13	1	MAX	.0000	10.4033	8.8356	4.9866	.3304	.2590	6.2384	.1901
	1	MIN	.0000	-10.4033	-8.8356	-4.9866	-.3304	-.2590	-6.2384	-.1901
14	1	MAX	.0000	14.8121	12.7581	9.2394	.1045	.1710	8.8936	.1179
	1	MIN	.0000	-14.8121	-12.7581	-9.2394	-.1045	-.1710	-8.8936	-.1179
15	1	MAX	.0000	14.8121	12.7581	9.2394	.1045	.1710	8.8936	1179
	1	MIN	0000	-14.8121	-12.7581	-9.2394	-.1045	-.1710	-8.8936	-.1179
16	1	MAX	.0000	10.4033	8.9356	4.9866	.3304	.2590	6.2384	.1901
	1	MIN	.0000	-10.4033	-8.9356	-4.9866	-.3304	-.2590	-6.2384	-.1901

BEAM FORCES

BAY	LOAD		TORS MOMENT	I MOMENT	J MOMENT
1	1	MAX	.4491	.0610	.1202
	1	MIN	-.4491	-.0610	-.1202
2	1	MAX	.0000	.0927	0927
	1	MIN	.0000	- 0927	- 0927
3	1	MAX	.4491	.1202	.0610
	1	MIN	-.4491	-.1202	-.0610
4	1	MAX	.1617	10.2858	8.2605
	1	MIN	-.1617	-10.2858	-8.2605
5	1	MAX	.1166	13.7971	17.0253
	1	MIN	-.1166	-13.7971	-17.0253
6	1	MAX	.1166	13.7971	17.0253
	1	MIN	-.1166	-13.7971	-17.0253
7	1	MAX	.1617	10.2858	8.2605
	1	MIN	-.1617	-10.2858	-8.2605
8	1	MAX	.7743	2 0371	2.2897
	1	MIN	- 7743	-2.0371	-2.2897
9	1	MAX	.0000	.5936	.5936
	1	MIN	.0000	- 5936	-.5936
10	1	MAX	7743	2.2897	2.0371
	1	MIN	- 7743	-2.2897	-2.0371
11	1	MAX	.6701	7.0700	7.0305
	1	MIN	-.6701	-7.0700	-7.0305
12	1	MAX	4524	3.1354	2.9437
	1	MIN	-.4524	-3.1354	-2.9437
13	1	MAX	.4524	3.1354	2.9437
	1	MIN	- 4524	-3 1354	-2.9437
14	1	MAX	.6701	7.0700	7.0305
	1	MIN	- 6701	-7.0700	-7.0305
15	1	MAX	.6445	4.0078	4.6902
	1	MIN	-.6445	-4.0078	-4.6902
16	1	MAX	0000	1.3490	1.3490
	1	MIN	.0000	-1 3490	-1.3490
17	1	MAX	.6445	4.6902	4.0078
	1	MIN	-.6445	-4.6902	-4 0078
18	1	MAX	4152	8.2398	10.1910
	1	MIN	- 4152	-8.2398	-10.1910

19	1	MAX	.2831	19.7376	15.8604
	1	MIN	-.2831	-19.7376	-15.8604
20	1	MAX	.2831	19.7376	15.8604
	1	MIN	-.2831	-19.7376	-15.8604
21	1	MAX	.4152	8.2398	10.1910
	1	MIN	-.4152	-8.2398	-10.1910
22	1	MAX	.7128	.0476	.0674
	1	MIN	-.7128	-.0476	-.0674
23	1	MAX	.0000	.1333	.1333
	1	MIN	.0000	-.1333	-.1333
24	1	MAX	.7128	.0674	.0476
	1	MIN	-.7128	-.0674	-.0476

PANEL FORCES

FLEXURAL PANELS

I COL	LOAD		TOP-MOMENT	BOT-MOMENT	AXIAL-FORCE	SHEAR-FORCE
6	1	MAX	.0000	.0000	63.9654	.0000
	1	MIN	.0000	.0000	-63.9654	.0000

BRACING ELEMENTS - LISTED IN SAME SEQUENCE AS INPUT

T-COL	LOAD		AXIAL-FORCF
7	1	MAX	96.4843
	1	MIN	-96.4843
11	1	MAX	94.3961
	1	MIN	-94.3961
6	1	MAX	96.4843
	1	MIN	-96.4843
10	1	MAX	94.3961
	1	MIN	-94.3961
14	1	MAX	.5714
	1	MIN	-.5714
15	1	MAX	.5714
	1	MIN	-.5714

******** END OF OUTPUT ********

APPENDIX C

EXAMPLE 2

EXAMPLE WITH
(1) 3D-SHEAR BUILDING (STORY STIFFNESS)
(2) ELASTOMERIC ISOLATION SYSTEM
(3) BIAXIAL EXCITATION
(4) OUTPUT OF PEAK RESPONSE

```
SINGLE STORY STRUCTURE WITH ELASTOMERIC ISOLATION SYSTEM (SEE SECTION 7.3 - NCEER 910005)
units kip in
general control information
1 1 3 4 750  386.2  0
integration control parameters
0.01 0.001 10000 20 1
newmarks parameters
0.5 0.25
earthquake control parameters
2 0.02 0 38.62
superstructure information
shear stiffness
272.58
272.58
30164202
eccentricity
48
48
superstructure mass
0.6214
22867
superstructure damping
0.02 0.02 0.02
eccentricity of mass
0 0
height
180 0
isolation system data
stiffness of linear elastic isoalation system
0 0 0 0 0
base mass
0.6214   22867
global damping
0 0 0 0 0
elastomeric isolators
3 3
0.1659 6.395   0.3784 0.1659 6.395  0.3784
3 3
0.1659 6.395   0.3784 0.1659 6.395  0.3784
3 3
0.142   6.9156 0 3676 0.142   6.9156 0.3676
3 3
0.142   6.9156 0.3676 0.142   6.9156 0.3676
coordinates of isolation elements
240   280
-240  280
-240  -200
240   -200
output parameters
1 50 1 2 3 4
coordinates for interstory drift
0 0
0 0
0 0
0 0
0 0
0 0
load case
0 0 0 1
```

OUTPUT FILE FOR EXAMPLE 2
(EXAMPLE FROM SECTION 7.3 - NCEER 91-0005)

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

PROGRAM 3D-BASIS-TABS ...A GENERAL PROGRAM FOR NONLINEAR
                        DYNAMIC ANALYSIS OF THREE DIMENSIONAL
                        BASE ISOLATED BUILDINGS

VERSION 2.0 FOR VAX/SUN/PC COMPUTERS, SEPT. 1994

DEVELOPED BY:

ANDREI REINHORN, MICHALAKIS CONSTANTINOU
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SATISH NAGARAJAIAH, DEPT. OF CIVIL ENGINEERING
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NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH,BUFFALO
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CONTRIBUTIONS:

PANAGIOTIS TSOPELAS, CHEN LI AND RENFEN LI
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                  STATE UNIV. OF NEW YORK AT BUFFALO

************************************************************ **************


VERSION 1.0 FOR VAX/PC COMPUTERS, AUGUST 1993

DEVELOPED BY ... SATISH NAGARAJAIAH
                 CHEN LI
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NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH
STATE UNIVERSITY OF NEW YORK AT BUFFALO

************************************************************** ****************


THIS PROGRAM HAS BEEN DEVELOPED USING:
(1) PROGRAM 3D-BASIS
DEVELOPED BY ... SATISH NAGARAJAIAH
                 ANDREI M. REINHORN
                 AND MICHALAKIS C. CONSTANTINOU
                 DEPARTMENT OF CIVIL ENGINEERING
                 STATE UNIV. OF NEW YORK AT BUFFALO,           VAX VERSION, 1990
(2) PROGRAM ETABS
DEVELOPED BY ... E. L. WILSON
                 H. H. DOVEY
                 AND J. P. HOLLIN,
                 DEPARTMENT OF CIVIL ENGINEERING
                 UNIVERSITY OF CALIFORNIA, BERKELEY,         SEPTEMBER 1974, REVISED MARCH 1979

************************************************************** **************

1
 ******** MIRROR OF INPUT DATA ********


   SINGLE STORY STRUCTURE WITH ELASTOMERIC ISOLATION SYSTEM (SEE SECTION 7.3 - NCEER 910005)
   units kip in
   general control information
   1 1 3 4 750  386.2  0
   integration control parameters
   0.01 0.001 10000 20 1
   newmarks parameters
   0.5 0.25
   earthquake control parameters
   2 0.02 0 38.62
   superstructure information
   shear stiffness
   272.58
   272.58
```



```
   30164202
   eccentricity
   48
   48
   superstructure mass
   0.6214
   22867
   superstructure damping
   0.02 0.02 0.02
   eccentricity of mass
   0 0
   height
   180 0
   isolation system data
   stiffness of linear elastic isoslation system
   0 0 0 0 0
   base mass
   0.6214   22867
   global damping
   0 0 0 0 0
   elastomeric isolators
   3 3
   0.1659 6.395  0.3784 0.1659 6.395  0.3784
   3 3
   0 1659 6.395  0.3784 0.1659 6.395  0.3784
   3 3
   0.142  6.9156 0.3676 0.142  6.9156 0.3676
   3 3
   0.142  6.9156 0.3676 0.142  6.9156 0.3676
   coordinates of isolation elements
   240  280
   -240 280
   -240 -200
   240  -200
   output parameters
   1 50 1 2 3 4
   coordinates for interstory drift
   0 0
   0 0
   0 0
   0 0
   0 0
   0 0
   load case
   0 0 0 1


 ******** END OF MIRROR OF INPUT ********
1

 SINGLE STORY STRUCTURE WITH ELASTOMERIC ISOLATION SYSTEM (SEE SECTION 7.3 - NCEER 910005)


 general control information

 units kip in

   TOTAL NUMBER OF STORIES.................=          1
   NUMBER OF DIFF. FRAMES..... .......... ..=          0
   TOTAL NUMBER OF FRAMES..................=          0
   NUMBER OF LOAD CONDITIONS..... .........=          0
   NUMBER OF FREQUENCIES...................=          3

   NO  OF FLOORS(EXCL. BASE)............  .=           1
   NO  OF BEARINGS......  ...........  ...  =           4
   NO  OF EIGEN VECTORS CONSIDERED.........=           3
   INDEX FOR  SUPERSTRUCTURE STIFFNESS DATA=           1

     INDEX = 1 FOR 3D SHEAR BUILDING  REPRES.
     INDEX = 2 FOR FULL 3D REPRESENTATION
     INDEX = 3 FOR REPRESENTATION USING EIGEN DATA

   TIME STEP OF INTEGRATION (NEWMARK) .   =        0100
   INDEX FOR TYPE OF TIME STEP............=           1

     INDEX = 1 FOR CONSTANT TIME STEP
     INDEX = 2 FOR VARIABLE TIME STEP

   GAMA FOR NEWMARKS  METHOD     ........ .=          50
   BETA FOR NEWMARKS  METHOD  .  .    .   .=          25
```

```
TOLERANCE FOR FORCE COMPUTATION.. ......=        .0010
REFERENCE MOMENT OF CONVERGENCE.........=      10000.0
MAX NUMBER OF ITERATIONS WITHIN T.S.....=           20
INDEX FOR GROUND MOTION INPUT. ....... .=            2

  INDEX = 1 FOR UNIDIRECTIONAL INPUT
  INDEX = 2 FOR BIDIRECTIONAL INPUT

TIME STEP OF RECORD ...... .  .........=          .020
LENGTH OF RECORD..  ...... .....  ......=          750
LOAD FACTOR........ ....................=        38.62
ANGLE OF EARTHQUAKE INCIDENCE... .......=          .00


SUPERSTRUCTURE STIFFNESS DATA.........

 STIFFNESS (THREE DIMENSIONAL SHEAR BUILDING) ....
FLOOR          STIFF  X          STIFF  Y          STIFF  R        ECCENT  X      ECCENT  Y

   1           272.580           272.580       30164202.000        48.000         48.000

SUPERSTRUCTURE MASS... . ....
FLOOR        TRANSL. MASS     ROTATIONAL MASS

   1              .621          22867 000            .000           .000

SUPERSTRUCTURE DAMPING.... ..
MODE SHAPE      DAMPING RATIO (%)

   1             2.000
   2             2.000
   3             2 000

HEIGHT. ... ...
FLOOR        HEIGHT

   1        160.000
   0           .000


************* ISOLATION SYSTEM DATA ************

BASEMAT MASS AT THE CENTER OF MASS OF THE BASE ...
            TRANSL. MASS    ROTATINAL MASS

MASS              621        22867 000

BASE ISOLATION DATA.
OPTION ONE: EQUIVALENT GLOBAL DEVICE PROPERTIES

GLOBAL ISOLATION DEVICE AT THE CENTER OF MASS        OF THE BASE... .
                                   X           Y           R           ECX          ECY

LINEAR STIFFNESS(F/L)            .0000       0000       .0000        .0000        .0000
VISCOUS DAMPING(F/L/T)           .0000       0000       .0000        .0000        .0000

......ELEMENT TYPE =

ELASTOMERIC/DAMPER FORCE                       -DISPLACEMENT LOOP PARAMETERS.... . .
ISOLATOR           ALPFA X       ALPFA Y   YIELD FORCE X   YIELD FORCE Y  YIELD DISPL  X  YIELD DISPL. Y

   1               .16590        16590        6.39500         6.39500        37840         .37840
   2                16590        16590        6.39500         6.39500       .37840         .37840
   3                14200        14200        6.91560         6.91560        36760         .36760
   4                14200        14200        6 91560         6 91560        36760          36760

BEARING LOCATION
BEARING        X           Y
```



```
   1    240 000     280 000
   2   -240.000     280.000
   3   -240 000    -200.000
   4    240 000    -200.000

************ OUTPUT PARAMETERS *************

TIME HISTORY OPTION ........... ...      =             1
 INDEX = 0 FOR TIME HISTORY OUTPUT
 INDEX = 1 FOR NO TIME HISTORY OUTPUT

NO. OF TIME STEPS AT WHICH TIME HISTORY
OUTPUT IS DESIRED ....  .. .  .........=             50
FORCE-DISPLACEMENT TIME HISTORY DESIRED
AT BEARINGS NUMBERED .. ... ... ...... =    1    2    3    4

COORDINATES OF COLUMN LINES AT WHICH INTERSTORY DRIFTS ARE DESIRED
COL. LINE      X. CORD       Y  CORD.
   1           .000          000
   2            000          000
   3            000          000
   4            000          000
   5            000          000
   6            000          000


*************OUTPUT************


******** EIGENVALUES AND EIGEN VECTORS (FOR          THREE DIMENSIONAL SHEAR BUILDING REPRESENTATION) *******

EIGEN VALUES

COLUMN     1
ROW  1    412 09
ROW  2    438 65
ROW  3    1345 7

EIGEN VECTORS

COLUMN:   1             2              3
ROW  1     88416         89701        -.15131
ROW  2   -.88416         89701         15131
ROW  3     11155E-02   - 23662E-17    65182E-02

************ MAX. RESPONSE ***********


 MAX  REL  DISP  AT THE CENTER OF MASS OF FLOORS
                        (WITH RESPECT TO THE BASE)
FLOOR   X DISP      Y DISP      ROTN (rad)

1         1274        1197          0001

 MAX INTERSTORY DRIFT
STORY      X DST.        Y DST        TIME    X DRIFT/FL. HT.(%) TIME      Y DRIFT/FL  HT (%)


  1          00           00          5 54         07        3 22         .07

  1          00           00          5 54         07        3 22          07

  1          00           00          5 54         07        3 22          07
```

```
1          00          00          5 54          07          3.22          07

1          00          00          5 54          .07         3.22          07

1          00          .00         5 54          07          3.22          ·07

 MAX. DISP. AT THE CENTER OF MASS OF BASE
 X DISP        Y DISP.       ROTN

     3 432        -3.267          .002

 MAX RESULTANT DISP. AT THE CENTER OF MASS OF BASE
 TIME       RES. DISP.       X COMP.       Y COMP

  3.240        3.850           2 548          -3.019

 MAX RESULTANT BEARING DISP
 BEARING       TIME        MAX. DISP   ANG. WITH X AXIS

1         5 530          3.376        -.498
2         3.260          4.013       -1 057
3         3 240          4 472        -.871
4         5.580          4 025        - 366

 MAX BEARING DISP  IN X
 BEARING       TIME          MAX  DISP X

1         5.560          2.987
2         5 560          2 987
3         5.600          3 768
4         5 600          3 768

 MAX BEARING DISP. IN Y
 BEARING       TIME          MAX  DISP Y

1         3 560         -3.098
2         3 340         -3 604
3         3 340         -3 604
4         3.560         -3 098

 MAX. TOTAL ACCL. AT CENTER OF MASS OF FLOORS
 FLOOR   ACCL. X       ACCL  Y       ACCL. R

 1     -53.573171     50 457965     - 079591

 MAX STORY SHEAR
 STORY       TIME           X SHEAR       TIME         Y SHEAR

  1           5 540       -33 290       11.800       31.355

 MAX. STRUCTURE SHEAR (TOP OF BASE)
 FORCE X        FORCE Y        Z MOMENT

 -33 290         31.355      -1820 009

 MAX. BASE SHEAR (BEARING LEVEL)
 FORCE X        FORCE Y        Z MOMENT

  56 867         -53 105       3155.411

******** END OF OUTPUT ********
```

APPENDIX D

EXAMPLE 3

EXAMPLE WITH (1) FULL 3D-SUPERSTRUCTURE (BEAM-COLUMN)
(2) ELASTOMERIC ISOLATION SYSTEM
(3) UNIAXIAL EXCITATION
(4) OUTPUT OF PEAK RESPONSE

```
SIX STORY R. C. STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM  (SEE SECTION 6 - NCEER 91-0005)
Units tons-meters
general control information
2 6 6 22 1000 9.81  0
superstructure information
1 1 1
integration control parameters
0.01 0.001 10000 20 1
newmark method
0.5 0.25
earthquake control parameters
1 0.02    90     9.81
******** superstructure info****************
6 story info
3.2 35.665 1561.3 9.15 6.9
5  story info
3.2 35.665 1561.3 9.15 6.9
4  story info
3.2 35.665 1561.7 9.15 6.9
3  story info
3.8 38.245 1718 9.15 6.9
2  story info
3.2 41.918 1835.1 9.15 6.9
1 story info
3.7 36.571 1601 9.15 6.9
frame data
frame control parameters
1 6 36 21 22 6 0 44 0
column line coord
1      0       0
2      0     6.85
3      0     13.5
4   3.45       0
5   3 45     6.85
6   3 45     13.5
7   7.05     0
8   7 05     6.85
9   7 05     13.5
10  9.45     6.85
11 10 65     0
12 10.65     6.85
13 10 65     13.5
14 11.85     6.85
15 14 25     0
16 14 25     6.85
17 14 25     13.5
18 15.55     6.85
19 17 85     0
20 17 85     6.85
21 17 85     8.95
22 17.85     13.5
23 0         0.95
24 0         2.3
25 0         3.1
26 17.85     10.85
27 0         10.85
28 3.45      10.85
29 7.05      10.85
30 10 65     10.85
31 14 25     10.85
32  3 45     3 1
33  7 05     3.1
34 10 64     3.1
35 14.25     3.1
36 17 85     3.1
column properties
1 2600000 .08 .06 .06 .0008203 .0003906 .0005625 0 0
2 2600000  09 .07 .07 .001081   .0004557 .0008923 0 0
3 2600000 .1  .08 .08 .001341   .0005208 .001333  0 0
4 2600000  11 .09 .08 .001602   .0005859 .001898  0 0
5 2600000 .09 .08 .08 .001161   .000675  .000675  0 0
6 2600000  11 .09 .09 .001611   .0007875 .001072  0 0
7 2600000  12 .1  .1  .002061   .0009    .0016    0 0
8 2600000  14 .11 .11 .002511   .001013  .002278  0 0
9 2600000  15 .13  13 .002961   .001125  .003125  0 0
10 2600000  17 .14 .14 .003411   .001238   .004159  0 0
11 2600000 .18  15 .15 .003861   .00135    .0054 0 0
12 2600000  2    16  16 .004311   .001463   .006666 0 0
13 2600000  12 .1   .1  .002151   .001251   .001251 0 0
14 2600000  14 .12 .12 .002865   .001429   .001667 0 0
15 2600000  16  13  13 .00358     001608   .002658 0 0
```

```
16 2600000 .18 .15 .15 .004295  .001786  .003646 0 0
17 2600000 .2  .17 .17 .005803  .002667  .004167 0 0
18 2600000 .23 .19 .19 .007396  .003797  .004688 0 0
19 2600000 .25 .21 .21 .008958  .005208  .005208 0 0
20 2600000 .28 .23 .23 .01104   .006932  .005729 0 0
21 2600000 .3  .25 .25 .01313   .009     .00625  0 0
22 2600000 .33 .27 .27 .01521   .01144   .006771 0 0
beam properties
1 2600000 .13 .001696 .007031 4 4 2 0 0
2 2600000 .19 .005121 .01013  4 4 2 0 0
3 2600000 .36 .01124  .07158 4 4 2 0 0
4 2600000 .2  .005571 .01233  4 4 2 0 0
5 2600000 .21 .006021 .01482  4 4 2 0 0
6 2600000 .17 .005803 .002667 4 4 2 0 0
beam location
1 1 4 2 3 0 0 0
1 1 4 3 0 0 0 0
1 1 4 4 0 0 0 0
1 1 4 5 0 0 0 0
2 2 5 1 5 0 0 0
2 2 5 6 0 0 0 0
3 3 6 2 3 0 0 0
3 3 6 3 0 0 0 0
3 3 6 4 0 0 0 0
3 3 6 5 0 0 0 0
4 4 7 2 3 0 0 0
4 4 7 3 0 0 0 0
4 4 7 4 0 0 0 0
4 4 7 5 0 0 0 0
5 5 8 1 5 0 0 0
5 5 8 6 0 0 0 0
6 6 9 2 3 0 0 0
6 6 9 3 0 0 0 0
6 6 9 4 0 0 0 0
6 6 9 5 0 0 0 0
7 7 11 2 3 0 0 0
7 7 11 3 0 0 0 0
7 7 11 4 0 0 0 0
7 7 11 5 0 0 0 0
8 8 10 1 5 0 0 0
8 8 10 6 0 0 0 0
9 9 13 2 3 0 0 0
9 9 13 3 0 0 0 0
9 9 13 4 0 0 0 0
9 9 13 5 0 0 0 0
10 10 12 1 4 0 0 0
10 10 12 0 0 0 0 0
10 10 12 0 0 0 0 0
11 11 15 2 3 0 0 0
11 11 15 3 0 0 0 0
11 11 15 4 0 0 0 0
11 11 15 5 0 0 0 0
12 12 14 1 4 0 0 0
12 12 14 0 0 0 0 0
12 12 14 0 0 0 0 0
13 13 17 2 3 0 0 0
13 13 17 3 0 0 0 0
13 13 17 4 0 0 0 0
13 13 17 5 0 0 0 0
14 14 16 1 5 0 0 0
14 14 16 6 0 0 0 0
15 15 19 2 3 0 0 0
15 15 19 3 0 0 0 0
15 15 19 4 0 0 0 0
15 15 19 5 0 0 0 0
16 16 18 1 5 0 0 0
16 16 18 6 0 0 0 0
17 17 22 2 3 0 0 0
17 17 22 3 0 0 0 0
17 17 22 4 0 0 0 0
17 17 22 5 0 0 0 0
18 18 20 0 6 0 0 0
19 19 36 2 3 0 0 0
19 19 36 3 0 0 0 0
19 19 36 4 0 0 0 0
19 19 36 5 0 0 0 0
20 20 21 2 3 0 0 0
20 20 21 3 0 0 0 0
20 20 21 4 0 0 0 0
20 20 21 5 0 0 0 0
21 21 26 3 6 0 0 0
```



```
column location
1 9 4 6
2 5 5 3
2 6 5 0
2 7 5 0
2 8 5 0
3 9 6 3
3 11 6 3
4 11 7 3
4 12 7 0
4 14 7 0
4 15 7 0
5 19 8 3
5 22 8 0
5 24 8 0
5 26 8 0
6 9  9 3
6 10 9 0
6 11 9 0
6 12 9 0
7 10 11 3
7 11 11 0
7 14 11 0
7 15 11 0
8 19 10 3
8 21 10 0
8 23 10 0
8 26 10 0
9 9 13 3
9 10 13 0
9 11 13 0
9 12 13 0
10 0 12 6
11 9 15 3
11 11 15 0
11 13 15 0
11 14 15 0
12 19 14 3
12 21 14 0
12 23 14 0
12 25 14 0
13 9 17 4
13 10 17 0
13 12 17 0
14 0 16 6
15 11 19 3
15 12 19 0
15 15 19 0
15 16 19 0
16 17 18 3
16 20 18 0
16 22 18 0
16 25 18 0
17 9 22 3
17 10 22 0
17 11 22 0
17 13 22 0
18 0 20 6
19 9 15 3
19 11 15 0
19 12 15 0
19 13 15 0
20 0 18 6
21 0 31 6
22 0 17 6
23 0 4 6
24 0 32 6
25 0 32 6
26 0 31 6
27 0 28 6
28 0 29 6
29 0 30 6
30 0 31 6
31 0 26 6
32 0 33 6
33 0 34 6
34 0 35 6
35 0 36 6
36 0 35 6
panel info
6 1 23 2600000  0.143 0 0107 0.124  1131000
```

```
5 1 23 2600000  0.143 0.0107 0 124  1131000
4 1 23 2600000  0.143 0.0107 0 124  1131000
3 1 23 2600000  0.143 0.0107 0.124  1131000
2 1 23 2600000  0.143 0.0107 0.124  1131000
1 1 23 2600000  0.143 0.0107 0.124  1131000
6 23 24 2600000  0.203 0.0308 0.176 1131000
5 23 24 2600000  0.203 0.0308 0.176 1131000
4 23 24 2600000  0.203 0.0308 0.176 1131000
3 23 24 2600000  0.203 0.0308 0.176 1131000
2 23 24 2600000  0.203 0.0308 0.176 1131000
1 23 24 2600000  0.203 0.0308 0.176 1131000
6 24 25 2600000 0 12 0.0064 0.104 1131000
5 24 25 2600000 0.12 0 0064 0.104 1131000
4 24 25 2600000 0.12 0.0064 0.104 1131000
3 24 25 2600000 0.12 0.0064 0.104 1131000
2 24 25 2600000 0.12 0 0064 0.104 1131000
1 24 25 2600000 0.12 0.0064 0.104 1131000
6 25 2  2600000 0.563 0.659 0.489 1131000
5 25 2  2600000 0.563 0.659 0.489 1131000
4 25 2  2600000 0.563 0.659 0.489 1131000
3 25 2  2600000 0.563 0.659 0.489 1131000
2 25 2  2600000 0.563 0.659 0.489 1131000
1 25 2  2600000 0.563 0.659 0.489 1131000
3 10 12 2600000 0.24  0.0288 0.209 1131000
2 10 12 2600000 0.24  0.0288 0.209 1131000
1 10 12 2600000 0 24  0.0288 0.209 1131000
3 12 14 2600000 0.36 0.0432 0.313 1131000
2 12 14 2600000 0.36 0.0432 0.313 1131000
1 12 14 2600000 0.36 0 0432 0.313 1131000
6 18 20 2600000 0.46 0.2027 0.4   1131000
5 18 20 2600000 0.46 0.2027 0.4   1131000
4 18 20 2600000 0.46 0.2027 0.4   1131000
3 18 20 2600000 0.69 0.3042 0.6   1131000
2 18 20 2600000 0.69 0.3042 0.6   1131000
1 18 20 2600000 0.69 0 3042 0.6   1131000
2 21 26 2600000 0 285 0 0857 0.248 1131000
1 21 26 2600000 0.285 0.0857 0.248 1131000
6 26 22 2600000 0 398 0.2326 0.346 1131000
5 26 22 2600000 0.398 0.2326 0.346 1131000
4 26 22 2600000 0.398 0.2326 0.346 1131000
3 26 22 2600000 0.398 0.2326 0 346 1131000
2 26 22 2600000 0.398 0.2326 0.346 1131000
1 26 22 2600000 0.398 0.2326 0.346 1131000
frame location card
1 1 0 0 0
superstructure damping
0.05 0 05 0.05 0.05 0.05 0.05
eccn to center of mass
0  0
0  0
0  0
0  0
0  0
0  0
height to different floor and base
20.3 17.1 13.9 10.7 6.9 3.7 0
****************isolation system data ***************
stiffness data for linear elastic isolation system
0 0 0 0 0
mass data of the base
36.571 1601
global damping data
0    0    0  0  0
hysteratic element for elastomeric bearings
3 3
0.14407 5.909 0.004353  0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5 909 0 004353
3 3
0.1465 3.64  0.005232 0.1465 3 64  0.005232
3 3
0 1538  7.732 0.007061 0.1538  7.732 0.007061
3 3
0.14407 5.909 0.004353 0 14407 5.909 0.004353
3 3
0.1538 7 732 0.007061 0.1538 7 732 0.007061
3 3
0.1538 7 732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5 909 0.004353 0.14407 5.909 0.004353
3 3
```



```
0 1465 3.64  0.005232 0.1465 3 64  0 005232
3 3
0 14407 5.909 0 004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0 1465 3.64  0.005232 0.1465 3.64  0.005232
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0 007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5 909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0 14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
coordinates for isolation elements
-9.15 -6.9
-9.15 -0.05
-9.15 6.6
-5.7 -6.9
-5.7 -0.05
-5.7 6.6
-2.1 -6.9
-2.1 -0.05
-2 1 6.6
0.3 -0 05
1 5 -6 9
1.5 -0.05
1.5   6.6
2.7 -0.05
5.1 -6.9
5.1 -0.05
5 1  6.6
6.4 -0.05
8 7 -6 9
8 7 -0 05
8.7  2.1
8 7  6.6
output parameters
1 50 1 2 3 4
interstory drift
9 6.75
-9 -6.75
0 0
0 0
0 0
0 0
load  case definition
0 0 0 1
```

OUTPUT FILE FOR EXAMPLE 3
(EXAMPLE FROM SECTION 8 - NCEER 91-0005)

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

PROGRAM 3D-BASIS-TABS ...A GENERAL PROGRAM FOR NONLINEAR
                         DYNAMIC ANALYSIS OF THREE DIMENSIONAL
                         BASE ISOLATED BUILDINGS

VERSION 2.0 FOR VAX/SUN/PC COMPUTERS, SEPT. 1994

DEVELOPED BY:

ANDREI REINHORN, MICHALAKIS CONSTANTINOU
                    DEPT. OF CIVIL ENGINEERING
                    STATE UNIV. OF NEW YORK AT BUFFALO

SATISH NAGARAJAIAH, DEPT. OF CIVIL ENGINEERING
                    UNIVERSITY OF MISSOURI AT COLUMBIA

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH,BUFFALO
STATE UNIVERSITY OF NEW YORK AT BUFFALO

CONTRIBUTIONS:

PANAGIOTIS TSOPELAS, CHEN LI AND RENFEN LI
                    DEPT. OF CIVIL ENGINEERING
                    STATE UNIV. OF NEW YORK AT BUFFALO

************************************************************ **************


VERSION 1.0 FOR VAX/PC COMPUTERS, AUGUST 1993

DEVELOPED BY ... SATISH NAGARAJAIAH
                 CHEN LI
                 ANDREI M. REINHORN
                 AND MICHALAKIS C. CONSTANTINOU
                 DEPARTMENT OF CIVIL ENGINEERING
                 STATE UNIV. OF NEW YORK AT BUFFALO

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH
STATE UNIVERSITY OF NEW YORK AT BUFFALO

************************************************************** ****************


THIS PROGRAM HAS BEEN DEVELOPED USING:
(1) PROGRAM 3D-BASIS
DEVELOPED BY ... SATISH NAGARAJAIAH
                 ANDREI M. REINHORN
                 AND MICHALAKIS C. CONSTANTINOU
                 DEPARTMENT OF CIVIL ENGINEERING
                 STATE UNIV. OF NEW YORK AT BUFFALO.          VAX VERSION, 1990
(2) PROGRAM ETABS
DEVELOPED BY ... E. L. WILSON
                 H. H. DOVEY
                 AND J. P. HOLLIN,
                 DEPARTMENT OF CIVIL ENGINEERING
                 UNIVERSITY OF CALIFORNIA, BERKELEY.          SEPTEMBER 1974, REVISED MARCH 1979

************************************************************** **************


 ******** MIRROR OF INPUT DATA ********


   SIX STORY R. C. STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM  (SEE SECTION 8 - NCEE
   Units tons-meters
   general control information
   2 6 6 22 1000 9.81 0
   superstructure information
   1 1 1
   integration control parameters
   0.01 0.001 10000 20 1
   newmark method
   0.5 0.25
   earthquake control parameters
   1 0.02    90     9.81
   ******* superstructure info****************
   6 story info
```



```
3.2 35.665 1561.3 9.15 6.9
5  story info
3.2 35.665 1561.3 9.15 6.9
4  story info
3.2 35.665 1561.7 9.15 6.9
3  story info
3.8 39.245 1718 9.15 6.9
2  story info
3.2 41.918 1835.1 9.15 6.9
1 story info
3.7 36.571 1601 9.15 6.9
frame data
frame control parameters
1 6 36 21 22 6 0 44 0
column line coord
1       0       0
2       0     6.85
3       0     13.5
4    3.45       0
5    3.45     6.85
6    3.45     13.5
7    7.05     0
8    7.05     6.85
9    7.05     13.5
10   9.45     6.85
11  10.65     0
12  10.65     6.85
13  10.65     13.5
14  11 85     6.85
15  14.25     0
16  14.25     6.85
17  14.25     13.5
18  15.55     6.85
19  17.85     0
20  17.85     6.85
21  17.85     8.95
22  17.85     13.5
23 0          0.95
24 0    ,     2.3
25 0          3.1
26 17.85      10.85
27 0          10.85
28 3 45       10.85
29 7 05       10.85
30 10.65      10.85
31 14.25      10.85
32  3.45      3.1
33  7.05      3.1
34 10.64      3.1
35 14.25      3.1
36 17.85      3.1
column properties
1 2600000 .08 .06 .06 .0008203 .0003906 .0005625 0 0
2 2600000 .09 .07 .07 .001081  .0004557 .0008923 0 0
3 2600000 .1  .08 .08 .001341  .0005208 .001333  0 0
4 2600000 .11 .09 .09 .001602  .0005859 .001898  0 0
5 2600000 .09 .08 .08 .001161  .000675  .000675  0 0
6 2600000 .11 .09 .09 .001611  .0007875 .001072  0 0
7 2600000 .12 .1  .1  .002061  .0009    .0016    0 0
8 2600000 .14 .11 .11 .002511  .001013  .002278  0 0
9 2600000  15 .13 .13 .002861  .001125  .003125  0 0
10 2600000 .17 .14 .14 .003411  .001238  .004159  0 0
11 2600000 .18 .15 .15 .003861  .00135   .0054 0 0
12 2600000 .2  .16 .16 .004311  .001463  .006866 0 0
13 2600000 .12 .1  .1  .002151  .001251  .001251 0 0
14 2600000 .14 .12 .12 .002865  .001429  .001887 0 0
15 2600000 .16 .13 .13 .00358   .001608  .002658 0 0
16 2600000 .18 .15 .15 .004285  .001786  .003646 0 0
17 2600000 .2  .17 .17 .005803  .002667  .004167 0 0
18 2600000 .23 .19 .19 .007396  .003797  .004688 0 0
19 2600000 .25 .21 .21 .008958  .005208  .005208 0 0
20 2600000  28 .23 .23 .01104   .006932  .005729 0 0
21 2600000 .3  .25 .25 .01313   .009     .00625  0 0
22 2600000 .33 .27 .27 .01521   .01144   .006771 0 0
beam properties
1 2600000 .13 .001696 .007031 4 4 2 0 0
2 2600000 .19 .005121 .01013  4 4 2 0 0
3 2600000 .36 .01124  .07158 4 4 2 0 0
4 2600000 .2  .005571 .01233  4 4 2 0 0
5 2600000 .21  006021 .01482  4 4 2 0 0
6 2600000  17 .005803 .002667 4 4 2 0 0
```

```
beam location
1 1 4 2 3 0 0 0
1 1 4 3 0 0 0 0
1 1 4 4 0 0 0 0
1 1 4 5 0 0 0 0
2 2 5 1 5 0 0 0
2 2 5 6 0 0 0 0
3 3 6 2 3 0 0 0
3 3 6 3 0 0 0 0
3 3 6 4 0 0 0 0
3 3 6 5 0 0 0 0
4 4 7 2 3 0 0 0
4 4 7 3 0 0 0 0
4 4 7 4 0 0 0 0
4 4 7 5 0 0 0 0
5 5 8 1 5 0 0 0
5 5 8 6 0 0 0 0
6 6 9 2 3 0 0 0
6 6 9 3 0 0 0 0
6 6 9 4 0 0 0 0
6 6 9 5 0 0 0 0
7 7 11 2 3 0 0 0
7 7 11 3 0 0 0 0
7 7 11 4 0 0 0 0
7 7 11 5 0 0 0 0
8 8 10 1 5 0 0 0
8 8 10 6 0 0 0 0
9 9 13 2 3 0 0 0
9 9 13 3 0 0 0 0
9 9 13 4 0 0 0 0
9 9 13 5 0 0 0 0
10 10 12 1 4 0 0 0
10 10 12 0 0 0 0 0
10 10 12 0 0 0 0 0
11 11 15 2 3 0 0 0
11 11 15 3 0 0 0 0
11 11 15 4 0 0 0 0
11 11 15 5 0 0 0 0
12 12 14 1 4 0 0 0
12 12 14 0 0 0 0 0
12 12 14 0 0 0 0 0
13 13 17 2 3 0 0 0
13 13 17 3 0 0 0 0
13 13 17 4 0 0 0 0
13 13 17 5 0 0 0 0
14 14 16 1 5 0 0 0
14 14 16 6 0 0 0 0
15 15 19 2 3 0 0 0
15 15 19 3 0 0 0 0
15 15 19 4 0 0 0 0
15 15 19 5 0 0 0 0
16 16 18 1 5 0 0 0
16 16 18 6 0 0 0 0
17 17 22 2 3 0 0 0
17 17 22 3 0 0 0 0
17 17 22 4 0 0 0 0
17 17 22 5 0 0 0 0
18 18 20 0 6 0 0 0
19 19 36 2 3 0 0 0
19 19 36 3 0 0 0 0
19 19 36 4 0 0 0 0
19 19 36 5 0 0 0 0
20 20 21 2 3 0 0 0
20 20 21 3 0 0 0 0
20 20 21 4 0 0 0 0
20 20 21 5 0 0 0 0
21 21 26 3 6 0 0 0
column location
1 9 4 6
2 5 5 3
2 6 5 0
2 7 5 0
2 8 5 0
3 9 6 3
3 11 6 3
4 11 7 3
4 12 7 0
4 14 7 0
4 15 7 0
5 19 8 3
5 22 8 0
```



```
5 24 8 0
5 26 8 0
6 9  9 3
6 10 9 0
6 11 9 0
6 12 9 0
7 10 11 3
7 11 11 0
7 14 11 0
7 15 11 0
8 19 10 3
8 21 10 0
8 23 10 0
8 26 10 0
9 9 13 3
9 10 13 0
9 11 13 0
9 12 13 0
10 0 12 6
11 9 15 3
11 11 15 0
11 13 15 0
11 14 15 0
12 19 14 3
12 21 14 0
12 23 14 0
12 25 14 0
13 9 17 4
13 10 17 0
13 12 17 0
14 0 16 6
15 11 19 3
15 12 19 0
15 15 19 0
15 16 19 0
16 17 18 3
16 20 18 0
16 22 18 0
16 25 18 0
17 9 22 3
17 10 22 0
17 11 22 0
17 13 22 0
18 0 20 6
19 9 15 3
19 11 15 0
19 12 15 0
19 13 15 0
20 0 18 6
21 0 31 6
22 0 17 6
23 0 4 6
24 0 32 6
25 0 32 6
26 0 31 6
27 0 28 6
28 0 29 6
29 0 30 6
30 0 31 6
31 0 26 6
32 0 33 6
33 0 34 6
34 0 35 6
35 0 36 6
36 0 35 6
panel info
6 1 23 2600000  0.143 0.0107 0.124  1131000
5 1 23 2600000  0.143 0.0107 0.124  1131000
4 1 23 2600000  0.143 0.0107 0.124  1131000
3 1 23 2600000  0.143 0.0107 0.124  1131000
2 1 23 2600000  0.143 0.0107 0.124  1131000
1 1 23 2600000  0.143 0.0107 0.124  1131000
6 23 24 2600000  0.203 0.0308 0.176 1131000
5 23 24 2600000  0.203 0.0308 0.176 1131000
4 23 24 2600000  0.203 0.0308 0.176 1131000
3 23 24 2600000  0.203 0.0308 0.176 1131000
2 23 24 2600000  0.203 0.0308 0.176 1131000
1 23 24 2600000  0.203 0.0308 0.176 1131000
6 24 25 2600000 0.12 0.0064 0.104 1131000
5 24 25 2600000 0.12 0.0064 0.104 1131000
4 24 25 2600000 0.12 0.0064 0.104 1131000
```

```
3 24 25 2600000 0.12 0.0064 0.104 1131000
2 24 25 2600000 0.12 0.0064 0.104 1131000
1 24 25 2600000 0.12 0.0064 0.104 1131000
6 25 2  2600000 0.563 0.659 0.489 1131000
5 25 2  2600000 0.563 0.659 0.489 1131000
4 25 2  2600000 0.563 0.659 0.489 1131000
3 25 2  2600000 0.563 0.659 0.489 1131000
2 25 2  2600000 0.563 0.659 0.489 1131000
1 25 2  2600000 0.563 0.659 0.489 1131000
3 10 12 2600000 0.24  0.0288 0.209 1131000
2 10 12 2600000 0.24  0.0288 0.209 1131000
1 10 12 2600000 0.24  0.0288 0.209 1131000
3 12 14 2600000 0.36 0.0432 0.313 1131000
2 12 14 2600000 0.36 0.0432 0.313 1131000
1 12 14 2600000 0.36 0.0432 0.313 1131000
6 18 20 2600000 0.46 0.2027 0.4   1131000
5 18 20 2600000 0.46 0.2027 0.4   1131000
4 18 20 2600000 0.46 0.2027 0.4   1131000
3 18 20 2600000 0.69 0.3042 0.6   1131000
2 18 20 2600000 0.69 0.3042 0.6   1131000
1 18 20 2600000 0.69 0.3042 0.6   1131000
2 21 26 2600000 0.285 0.0857 0.248 1131000
1 21 26 2600000 0.285 0.0857 0.248 1131000
6 26 22 2600000 0.398 0.2326 0.346 1131000
5 26 22 2600000 0.398 0.2326 0.346 1131000
4 26 22 2600000 0.398 0.2326 0.346 1131000
3 26 22 2600000 0.398 0.2326 0.346 1131000
2 26 22 2600000 0.398 0.2326 0.346 1131000
1 26 22 2600000 0.398 0.2326 0.346 1131000
frame location card
1 1 0 0 0
superstructure damping
0.05 0.05 0.05 0.05 0.05 0.05
eccn to center of mass
0  0
0  0
0  0
0  0
0  0
0  0
height to different floor and base
20.3 17.1 13.9 10.7 6.9 3.7 0
***************isolation system data ***************
stiffness data for linear elastic isolation system
0 0 0 0 0
mass data of the base
36.571 1601
global damping data
0    0    0  0  0
hysteretic element for elastomeric bearings
3 3
0.14407 5.909 0.004353  0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3.64  0.005232 0 1465 3 64  0 005232
3 3
0.1538  7.732 0.007061 0.1538  7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7 732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0 007061
3 3
0.14407 5 909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3.64  0.005232 0.1465 3.64  0 005232
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3.64  0.005232 0.1465 3.64  0.005232
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
```



```
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
coordinates for isolation elements
-9.15 -6.9
-9.15 -0.05
-9.15 6.6
-5.7 -6.9
-5.7 -0.05
-5.7 6.6
-2.1 -6.9
-2.1 -0.05
-2.1 6.6
0.3 -0.05
1.5 -6.9
1.5 -0.05
1.5   6.6
2 7 -0.05
5.1 -6.9
5 1 -0.05
5.1  6.6
6.4 -0.05
8.7 -6.9
8.7 -0.05
8.7  2.1
8.7  6.6
output parameters
1 50 1 2 3 4
interstory drift
9 6.75
-9 -6 75
0 0
0 0
0 0
0 0
load  case definition
0 0 0 1


******** END OF MIRROR OF INPUT ********
1

SIX STORY R. C. STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM  (SEE SECTION 8 - NCEE

superstructure information

Units tons-meters

  TOTAL NUMBER OF STORIES......  ....... ..=          6
  NUMBER OF DIFF. FRAMES............ .....=           1
  TOTAL NUMBER OF FRAMES..................=           1
  NUMBER OF LOAD CONDITIONS...............=           1
  NUMBER OF FREQUENCIES...................=           6

  NO. OF FLOORS(EXCL. BASE)...............=           6
  NO. OF BEARINGS.........................=          22
  NO. OF EIGEN VECTORS CONSIDERED.. ......=           6
  INDEX FOR  SUPERSTRUCTURE STIFFNESS DATA=           2

    INDEX = 1 FOR 3D SHEAR BUILDING  REPRES.
    INDEX = 2 FOR FULL 3D REPRESENTATION
    INDEX = 3 FOR REPRESENTATION USING EIGEN DATA

  TIME STEP OF INTEGRATION (NEWMARK)......=       .0100
  INDEX FOR TYPE OF TIME STEP.............=           1

    INDEX = 1 FOR CONSTANT TIME STEP
    INDEX = 2 FOR VARIABLE TIME STEP
```

GAMA FOR NEWMARKS METHOD.... ....= .50
BETA FOR NEWMARKS METHOD ....= .25
TOLERANCE FOR FORCE COMPUTATION.........= .0010
REFERENCE MOMENT OF CONVERGENCE.........= 10000.0
MAX NUMBER OF ITERATIONS WITHIN T.S.....= 20
INDEX FOR GROUND MOTION INPUT...........= 1

INDEX = 1 FOR UNIDIRECTIONAL INPUT
INDEX = 2 FOR BIDIRECTIONAL INPUT

TIME STEP OF RECORD ....= .020
LENGTH OF RECORD........................= 1000
LOAD FACTOR.............................= 9.81
ANGLE OF EARTHQUAKE INCIDENCE...........= 1.57

************** SUPERSTRUCTURE DATA **************

STORY DATA

LEVEL NO. ID	HEIGHT	MASS(M)	MR**2	X(M)	Y(M)	K-X	K-Y
6 story info							
6	3.20	35.66	1561.30	9.15	6.90	.00	.00
5 story info							
5	3.20	35.66	1561.30	9.15	6.90	.00	.00
4 story info							
4	.3.20	35.66	1561.70	9.15	6.90	.00	.00
3 story info							
3	3.80	39.24	1718.00	9.15	6.90	.00	.00
2 story info							
2	3.20	41.92	1835.10	9.15	6.90	.00	.00
1 story info							
1	3.70	36.57	1601.00	9.15	6.90	.00	.00

STRUCTURE LATERAL LOADS...CASES A AND B

LEVEL NO.	FX-A	FY-A	MOM-A	FX-B	FY-B	MOM-B	XA	YA	XB	YB
6	.00	.00	.00	.00	.00	.00	.0	.0	.0	.0
5	.00	.00	.00	.00	.00	.00	.0	.0	.0	.0
4	.00	.00	.00	.00	.00	.00	.0	.0	.0	.0
3	.00	00	.00	.00	.00	.00	.0	.0	.0	.0
2	.00	.00	.00	.00	.00	.00	.0	.0	.0	.0
1	.00	.00	.00	.00	.00	.00	.0	.0	.0	.0

frame control parameters
FRAME ID NUMBER.........................= 1
NUMBER OF STORY LEVELS.............. ...= 6
NUMBER OF COLUMN LINES.. ....= 36
NUMBER OF BAYS..........................= 21
NUMBER OF DIFF. COL. PROP...............= 22
NUMBER OF DIFF. BEAM PROP...............= 6
NUMBER OF DIFF. FEF.....................= 0
NUMBER OF PANEL ELEMENTS................= 44
NUMBER OF BRACING ELEMENTS..............= 0

0COLUMN LINE COORDINATES

LINE	X	Y
1	.00	.00
2	.00	6.85
3	.00	13.50
4	3.45	.00
5	3.45	6.85
6	3.45	13.50
7	7.05	.00
8	7.05	6.85
9	7.05	13.50
10	9.45	6.85
11	10.65	.00
12	10.65	6.85
13	10.65	13.50

14	11.85	6.85
15	14.25	.00
16	14.25	6.85
17	14.25	13.50
18	15.55	6.85
19	17.85	.00
20	17.85	6 85
21	17.85	8.85
22	17.85	13.50
23	.00	.85
24	.00	2.30
25	.00	3.10
26	17.85	10.85
27	.00	10.85
28	3.45	10.85
29	7.05	10.85
30	10.65	10.85
31	14.25	10.85
32	3.45	3.10
33	7.05	3.10
34	10.64	3.10
35	14.25	3.10
36	17.85	3.10

0COLUMN ID	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	RIGID TOP	RIGID BOT
1	2600000.00	.08	.06	.06	.00	.00	.00	.00	.00
2	2600000.00	.09	.07	.07	.00	.00	.00	.00	.00
3	2600000.00	.10	.08	.08	.00	.00	.00	.00	.00
4	2600000.00	.11	.09	.09	.00	.00	.00	.00	.00
5	2600000.00	.09	.08	08	.00	.00	.00	.00	.00
6	2600000.00	.11	09	.09	.00	.00	.00	.00	.00
7	2600000.00	.12	.10	.10	.00	.00	.00	.00	.00
8	2600000.00	.14	.11	.11	.00	.00	.00	.00	.00
9	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
10	2600000.00	.17	.14	.14	.00	.00	.00	.00	.00
11	2600000 00	.18	.15	.15	.00	.00	.01	.00	.00
12	2600000.00	.20	.16	.16	.00	.00	.01	.00	.00
13	2600000.00	.12	.10	.10	.00	.00	.00	.00	.00
14	2600000.00	.14	.12	.12	.00	.00	.00	.00	.00
15	2600000.00	.16	.13	.13	.00	.00	.00	.00	.00
16	2600000.00	.18	.15	.15	.00	.00	.00	.00	.00
17	2600000.00	.20	.17	.17	.01	.00	.00	.00	.00
18	2600000.00	.23	.19	.18	.01	.00	.00	.00	.00
19	2600000.00	.25	21	.21	.01	.01	.01	.00	.00
20	2600000.00	.28	.23	.23	.01	.01	.01	.00	.00
21	2600000.00	.30	.25	.25	.01	.01	.01	.00	.00
22	2600000.00	33	.27	.27	.02	.01	.01	.00	.00

0 BEAM ID	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	RIGID I	RIGID J
1	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00
2	2600000.00	.19	01	.01	4.00	4.00	2.00	.00	00
3	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00
4	2600000.00	20	.01	.01	4.00	4.00	2.00	.00	.00
5	2600000.00	21	.01	.01	4.00	4.00	2.00	.00	.00
6	2600000.00	.17	.01	.00	4.00	4.00	2.00	.00	.00

BEAM LOCATIONS

BAY	LEV	IC	JC	BID	GEN	VL1	VL2	VL3
1	6	1	4	2	3	0	0	0
1	2	1	4	3	0	0	0	0
1	1	1	4	4	0	0	0	0
1	6	1	4	5	0	0	0	0
2	5	2	5	1	5	0	0	0
2	6	2	5	6	0	0	0	0
3	5	3	6	2	3	0	0	0
3	1	3	6	3	0	0	0	0
3	6	3	6	4	0	0	0	0
3	5	3	6	5	0	0	0	0
4	4	4	7	2	3	0	0	0
4	6	4	7	3	0	0	0	0
4	5	4	7	4	0	0	0	0
4	4	4	7	5	0	0	0	0
5	3	5	8	1	5	0	0	0
5	6	5	8	6	0	0	0	0
6	5	6	9	2	3	0	0	0
6	1	6	9	3	.0	0	0	0
6	6	6	9	4	0	0	0	0
6	5	6	9	5	0	0	0	0

7	4	7	11	2	3	0	0	0
7	6	7	11	3	0	0	0	0
7	5	7	11	4	0	0	0	0
7	4	7	11	5	0	0	0	0
8	3	8	10	1	5	0	0	0
8	6	8	10	6	0	0	0	0
9	5	9	13	2	3	0	0	0
9	1	9	13	3	0	0	0	0
9	6	9	13	4	0	0	0	0
9	5	9	13	5	0	0	0	0
10	4	10	12	1	4	0	0	0
10	6	10	12	0	0	0	0	0
10	5	10	12	0	0	0	0	0
11	4	11	15	2	3	0	0	0
11	6	11	15	3	0	0	0	0
11	5	11	15	4	0	0	0	0
11	4	11	15	5	0	0	0	0
12	3	12	14	1	4	0	0	0
12	6	12	14	0	0	0	0	0
12	5	12	14	0	0	0	0	0
13	4	13	17	2	3	0	0	0
13	6	13	17	3	0	0	0	0
13	5	13	17	4	0	0	0	0
13	4	13	17	5	0	0	0	0
14	3	14	16	1	5	0	0	0
14	6	14	16	6	0	0	0	0
15	5	15	19	2	3	0	0	0
15	1	15	19	3	0	0	0	0
15	6	15	19	4	0	0	0	0
15	5	15	19	5	0	0	0	0
16	4	16	18	1	5	0	0	0
16	6	16	18	6	0	0	0	0
17	5	17	22	2	3	0	0	0
17	1	17	22	3	0	0	0	0
17	6	17	22	4	0	0	0	0
17	5	17	22	5	0	0	0	0
18	4	18	20	0	6	0	0	0
19	6	19	36	2	3	0	0	0
19	2	19	36	3	0	0	0	0
19	1	19	36	4	0	0	0	0
19	6	19	36	5	0	0	0	0
20	5	20	21	2	3	0	0	0
20	1	20	21	3	0	0	0	0
20	6	20	21	4	0	0	0	0
20	5	20	21	5	0	0	0	0
21	4	21	26	3	6	0	0	0

GENERATED BEAM LOCATIONS

0STORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
6	2	5	6	4	3	6	4	3	6	4	0	3	0	3	6	4	6	4	2	5	4
5	2	1	2	5	4	2	5	4	2	5	0	4	0	4	2	5	2	5	2	2	5
4	2	1	2	2	5	2	2	5	2	1	2	5	2	5	2	1	2	0	2	2	3
3	2	1	2	2	1	2	2	1	2	1	2	1	2	1	2	1	2	0	2	2	3
2	3	1	2	2	1	2	2	1	2	1	2	1	2	1	2	1	2	0	3	2	3
1	4	1	3	2	1	3	2	1	3	1	2	1	2	1	3	1	3	0	4	3	3

0COLUMN LOCATIONS

0 LINE	LEV	CID	KCOL	GEN
1	6	9	4	6
2	6	5	5	3
2	2	6	5	0
2	1	7	5	0
2	6	8	5	0

3	5	9	6	3
3	1	11	6	3
4	6	11	7	3
4	2	12	7	0
4	1	14	7	0
4	6	15	7	0
5	5	19	8	3
5	1	22	8	0
5	6	24	8	0
5	5	26	8	0
6	4	9	8	3
6	6	10	9	0
6	5	11	9	0
6	4	12	9	0
7	3	10	11	3
7	6	11	11	0
7	5	14	11	0
7	4	15	11	0
8	3	19	10	3
8	6	21	10	0
8	5	23	10	0
8	4	26	10	0
9	3	9	13	3
9	6	10	13	0
9	5	11	13	0
9	4	12	13	0
10	3	0	12	6
11	6	9	15	3
11	2	11	15	0
11	1	13	15	0
11	6	14	15	0
12	5	19	14	3
12	1	21	14	0
12	6	23	14	0
12	5	25	14	0
13	4	9	17	4
13	6	10	17	0
13	5	12	17	0
14	4	0	16	6
15	6	11	19	3
15	2	12	19	0
15	1	15	19	0
15	6	16	18	0
16	5	17	18	3
16	1	20	18	0
16	6	22	18	0
16	5	25	18	0
17	4	9	22	3
17	6	10	22	0
17	5	11	22	0
17	4	13	22	0
18	3	0	20	6
19	6	9	15	3
19	2	11	15	0
19	1	12	15	0
19	6	13	15	0
20	5	0	18	6
21	6	0	31	6
22	6	0	17	6
23	6	0	4	6

24	6	0	32	6
25	6	0	32	6
26	6	0	31	6
27	6	0	28	6
28	6	0	29	6
29	6	0	30	6
30	6	0	31	6
31	6	0	26	6
32	6	0	33	6
33	6	0	34	6
34	6	0	35	6
35	6	0	36	6
36	6	0	35	6

GENERATED COLUMN LOCATIONS

STORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6	9	5	8	11	15	24	10	11	21	10	9	14	0	10	11	16	22	10	9	13	0	0	0	0	0	0	0	0	0	0
5	9	5	9	11	19	26	11	14	0	11	9	19	25	12	11	17	25	11	9	0	0	0	0	0	0	0	0	0	0	0
4	9	5	9	11	19	9	12	15	26	12	9	19	9	0	11	17	9	13	9	0	0	0	0	0	0	0	0	0	0	0
3	9	5	9	11	19	9	10	19	9	0	9	19	9	0	11	17	9	0	9	0	0	0	0	0	0	0	0	0	0	0
2	9	6	9	12	19	9	10	19	9	0	11	19	9	0	12	17	9	0	11	0	0	0	0	0	0	0	0	0	0	0
1	9	7	11	14	22	9	10	19	9	0	13	21	9	0	15	20	9	0	12	0	0	0	0	0	0	0	0	0	0	0

OSTORY	31	32	33	34	35	36
6	0	0	0	0	0	0
5	0	0	0	0	0	0
4	0	0	0	0	0	0
3	0	0	0	0	0	0
2	0	0	0	0	0	0
1	0	0	0	0	0	0

PANEL CARDS

LEVEL	COL I	COL J	E	A	I	SA	G
6	1	23	2600000.00	.14	.01	.12	1131000.00
5	1	23	2600000.00	.14	.01	.12	1131000.00
4	1	23	2600000.00	.14	.01	.12	1131000.00
3	1	23	2600000.00	.14	.01	.12	1131000.00
2	1	23	2600000.00	.14	.01	.12	1131000.00
1	1	23	2600000.00	.14	.01	.12	1131000.00
6	23	24	2600000.00	.20	.03	.18	1131000.00
5	23	24	2600000.00	.20	.03	.18	1131000.00
4	23	24	2600000.00	.20	.03	.18	1131000.00
3	23	24	2600000.00	.20	.03	.18	1131000.00
2	23	24	2600000.00	.20	.03	.18	1131000.00
1	23	24	2600000.00	.20	.03	.18	1131000.00
6	24	25	2600000.00	.12	.01	.10	1131000.00
5	24	25	2600000.00	.12	.01	.10	1131000.00
4	24	25	2600000.00	.12	.01	.10	1131000.00
3	24	25	2600000.00	.12	.01	.10	1131000.00
2	24	25	2600000.00	.12	.01	.10	1131000.00
1	24	25	2600000.00	.12	.01	.10	1131000.00
6	25	2	2600000.00	.56	.66	.49	1131000.00
5	25	2	2600000.00	.56	.66	.49	1131000.00
4	25	2	2600000.00	.56	.66	.49	1131000.00
3	25	2	2600000.00	.56	.66	.49	1131000.00
2	25	2	2600000.00	.56	.66	.49	1131000.00
1	25	2	2600000.00	.56	.66	.49	1131000.00
3	10	12	2600000.00	.24	.03	.21	1131000.00
2	10	12	2600000.00	.24	.03	.21	1131000.00
1	10	12	2600000.00	.24	.03	.21	1131000.00
3	12	14	2600000.00	.36	.04	.31	1131000.00
2	12	14	2600000.00	.36	.04	.31	1131000.00
1	12	14	2600000.00	.36	.04	.31	1131000.00

6	18	20	2600000.00	.46	.20	.40	1131000.00
5	18	20	2600000.00	.46	.20	.40	1131000.00
4	18	20	2600000.00	.46	.20	.40	1131000.00
3	18	20	2600000.00	.69	.30	.60	1131000.00
2	18	20	2600000.00	.69	.30	.60	1131000.00
1	18	20	2600000.00	.69	.30	.60	1131000.00
2	21	26	2600000.00	.28	.09	.25	1131000.00
1	21	26	2600000.00	.28	.09	.25	1131000.00
6	26	22	2600000.00	.40	.23	.35	1131000.00
5	26	22	2600000.00	.40	.23	.35	1131000.00
4	26	22	2600000.00	.40	.23	.35	1131000.00
3	26	22	2600000.00	.40	.23	.35	1131000.00
2	26	22	2600000.00	.40	.23	.35	1131000.00
1	26	22	2600000.00	.40	.23	.35	1131000.00

BEAM PROPERTIES AND LOADS

BAY NUMBERS 1

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.20	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 2

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.21	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000 00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 3

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	17	.01	.00	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000 00	19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 4

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.20	01	.01	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.21	.01	.01	4.00	4.00	2.00	00	.00	0	0	0
4	2600000.00	.19	01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.19	.01	.01	4.00	4.00	2.00	00	.00	0	0	0
2	2600000.00	.19	.01	.01	4 00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 5

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.20	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.21	.01	01	4.00	4.00	2.00	00	.00	0	0	0
3	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 6

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.17	.01	00	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.19	01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 7

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000 00	.20	.01	.01	4.00	4.00	2.00	.00	00	0	0	0
5	2600000.00	21	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	19	.01	.01	4.00	4 00	2.00	.00	.00	0	0	0
3	2600000.00	19	01	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.19	.01	01	4.00	4.00	2 00	00	.00	0	0	0
1	2600000 00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 8

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000 00	36	.01	07	4.00	4 00	2.00	.00	.00	0	0	0
5	2600000.00	.20	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000 00	21	01	.01	4.00	4 00	2 00	.00	.00	0	0	0
3	2600000 00	13	00	01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000 00	13	.00	01	4.00	4.00	2.00	.00	00	0	0	0

1	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 8

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.17	.01	.00	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.18	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 10

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.20	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.21	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	00	0	0	0

BAY NUMBERS 11

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	0	0	0
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	0	0	0
4	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 12

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.20	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.21	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 13

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	.00	.00	.00	.00	.00	.00	.00	.00	00	0	0	0
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	0	0	0
4	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 14

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	00	0	0	0
5	2600000.00	.20	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.21	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.13	.00	.01	4.00	4.00	2.00	00	.00	0	0	0
2	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 15

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.17	.01	.00	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.18	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.18	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.18	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.18	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 16

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.20	.01	.01	4.00	4.00	2.00	00	.00	0	0	0
5	2600000.00	.21	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.13	.00	.01	4.00	4.00	2.00	00	.00	0	0	0
3	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000 00	.13	.00	.01	4.00	4.00	2.00	.00	00	0	0	0
1	2600000.00	.13	.00	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 17

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.17	.01	.00	4.00	4.00	2.00	.00	.00	0	0	0
5	2800000.00	.18	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.18	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.18	.01	.01	4.00	4 00	2.00	.00	.00	0	0	0
2	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	00	0	0	0
1	2600000.00	.36	.01	.07	4 00	4.00	2.00	00	.00	0	0	0

BAY NUMBERS 18

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	20	.01	.01	4.00	4.00	2.00	00	.00	0	0	0
5	2600000.00	.21	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	.00	.00	.00	.00	.00	.00	.00	.00	00	0	0	0
3	.00	.00	00	00	00	.00	.00	.00	.00	0	0	0
2	.00	.00	.00	00	.00	.00	.00	.00	00	0	0	0
1	.00	.00	00	.00	.00	.00	00	00	.00	0	0	0

BAY NUMBERS 19

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.20	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 20

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	.21	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
3	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0

BAY NUMBERS 21

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000 00	.20	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
5	2600000.00	.21	.01	.01	4.00	4.00	2.00	.00	.00	0	0	0
4	2600000.00	.36	.01	.07	4.00	4.00	2.00	00	.00	0	0	0
3	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0
2	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0
1	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00	0	0	0

COLUMN PROPERTIES

COLUMN LINE NO. 1

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.15	13	.13	.00	.00	.00	.00	00
5	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
4	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
3	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
2	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
1	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00

COLUMN LINE NO. 2

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.09	.08	.08	.00	.00	.00	.00	.00
5	2600000.00	.09	.08	.08	.00	.00	.00	.00	.00
4	2600000.00	.09	.08	.08	.00	.00	.00	.00	.00
3	2600000.00	.09	.08	.08	.00	.00	.00	.00	.00
2	2600000.00	.11	.09	.09	.00	.00	.00	.00	.00
1	2600000.00	.12	.10	.10	.00	.00	.00	.00	.00

COLUMN LINE NO. 3

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.14	.11	11	.00	.00	.00	.00	.00
5	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
4	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
3	2600000.00	.15	.13	.13	00	.00	.00	.00	.00
2	2600000.00	.15	.13	13	.00	.00	.00	.00	.00
1	2600000.00	.18	.15	.15	.00	.00	.01	.00	.00

COLUMN LINE NO. 4

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.18	.15	15	.00	.00	.01	00	.00
5	2600000.00	.18	.15	.15	.00	.00	.01	00	.00
4	2600000.00	.18	.15	.15	.00	.00	.01	00	.00
3	2600000.00	18	.15	.15	00	.00	.01	.00	.00
2	2600000.00	.20	.16	.16	.00	.00	.01	.00	.00
1	2600000.00	.14	12	12	.00	.00	.00	.00	.00

COLUMN LINE NO. 5

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.16	.13	.13	.00	.00	.00	.00	.00
5	2600000.00	.25	.21	.21	.01	.01	.01	.00	.00
4	2600000.00	.25	.21	.21	.01	.01	.01	.00	.00
3	2600000.00	.25	.21	.21	.01	.01	.01	.00	.00
2	2600000 00	.25	.21	.21	.01	.01	.01	.00	.00
1	2600000.00	.33	.27	.27	.02	.01	.01	.00	00

COLUMN LINE NO. 6

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000 00	.13	00	.01	4.00	4.00	2.00	.00	.00
5	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00
4	2600000.00	15	.13	.13	00	.00	.00	.00	.00
3	2600000.00	15	.13	13	.00	.00	.00	.00	00
2	2600000 00	15	13	13	00	00	.00	.00	.00

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
1	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
COLUMN LINE NO. 7									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.17	.14	.14	.00	.00	.00	.00	.00
5	2600000.00	.18	.15	.15	.00	.00	.01	.00	.00
4	2600000.00	.20	.16	.16	.00	.00	.01	.00	.00
3	2600000.00	.17	.14	.14	.00	.00	.00	.00	.00
2	2600000.00	.17	.14	.14	.00	.00	.00	.00	.00
1	2600000.00	.17	.14	.14	.00	.00	.00	.00	.00
COLUMN LINE NO. 8									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.18	.15	.15	.00	.00	.01	.00	.00
5	2600000.00	.14	.12	.12	.00	.00	.00	.00	.00
4	2600000.00	.16	.13	.13	.00	.00	.00	.00	.00
3	2600000.00	.25	.21	.21	.01	.01	.01	.00	.00
2	2600000.00	.25	21	.21	.01	.01	.01	.00	.00
1	2600000.00	.25	.21	.21	.01	.01	.01	.00	.00
COLUMN LINE NO. 9									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.30	.25	.25	.01	.01	.01	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	2600000.00	.36	.01	.07	4.00	4.00	2.00	.00	.00
3	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
2	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
1	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
COLUMN LINE NO. 10									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.17	.14	.14	.00	.00	.00	.00	.00
5	2600000.00	.18	.15	.15	.00	.00	.01	.00	.00
4	2600000.00	.20	.16	.16	.00	.00	.01	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00
COLUMN LINE NO. 11									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
5	2600000.00	.15	13	.13	.00	.00	.00	.00	.00
4	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
3	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
2	2600000.00	.18	.15	.15	.00	.00	.01	.00	.00
1	2600000.00	.12	.10	.10	.00	.00	.00	.00	.00
COLUMN LINE NO 12									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.14	.12	.12	.00	.00	.00	.00	.00
5	2600000.00	.25	.21	.21	.01	.01	.01	.00	.00
4	2600000.00	.25	.21	.21	.01	.01	.01	.00	.00
3	2600000.00	.25	.21	.21	.01	.01	.01	.00	.00
2	2600000.00	.25	.21	.21	.01	.01	.01	.00	.00
1	2600000.00	.30	.25	.25	.01	.01	.01	.00	.00
COLUMN LINE NO. 13									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00
4	2600000.00	.15	.13	13	.00	.00	.00	.00	.00
3	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
2	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
1	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
COLUMN LINE NO. 14									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.17	.14	.14	.00	.00	.00	.00	.00
5	2600000.00	.20	.16	.16	.00	.00	.01	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00
COLUMN LINE NO. 15									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.18	.15	.15	.00	.00	.01	.00	.00
5	2600000.00	.18	.15	15	.00	.00	.01	.00	00
4	2600000.00	.18	.15	.15	.00	.00	.01	.00	.00
3	2600000.00	.18	15	.15	00	.00	.01	.00	.00
2	2600000.00	.20	16	16	.00	.00	.01	.00	00

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
1	2600000.00	.18	.13	.13	.00	.00	.00	.00	.00
COLUMN LINE NO. 16									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.18	.15	.15	.00	.00	.00	.00	.00
5	2600000.00	.20	.17	.17	.01	.00	.00	.00	.00
4	2600000.00	.20	.17	.17	.01	.00	.00	.00	.00
3	2600000.00	.20	.17	.17	.01	.00	.00	.00	.00
2	2600000.00	.20	.17	.17	.01	.00	.00	.00	.00
1	2600000.00	.28	.23	.23	.01	.01	.01	.00	.00
COLUMN LINE NO. 17									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.33	.27	.27	.02	.01	.01	.00	.00
5	2600000.00	.19	.01	.01	4.00	4.00	2.00	.00	.00
4	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
3	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
2	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
1	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
COLUMN LINE NO. 18									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.17	.14	.14	.00	.00	.00	.00	.00
5	2600000.00	.18	.15	.15	.00	.00	.01	.00	.00
4	2600000.00	.12	.10	.10	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00
COLUMN LINE NO. 19									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
5	2600000.00	.15	13	.13	.00	.00	.00	.00	.00
4	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
3	2600000.00	.15	.13	.13	.00	.00	.00	.00	.00
2	2600000.00	.18	.15	.15	.00	.00	.01	.00	.00
1	2600000.00	.20	.16	.16	.00	.00	.01	.00	.00
COLUMN LINE NO. 20									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	.12	.10	.10	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	00	.00	.00	.00	.00	.00
COLUMN LINE NO. 21									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00
COLUMN LINE NO. 22									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00
COLUMN LINE NO. 23									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00
COLUMN LINE NO. 24									
LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	00	.00	.00	.00	.00
2	00	.00	.00	.00	.00	.00	.00	.00	.00

1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 25

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 26

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 27

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 28

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 29

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 30

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 31

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 32

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 33

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00

1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 34

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 35

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

COLUMN LINE NO. 36

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	.00	.00	.00	.00	.00	.00	.00	.00

frame location c

FRAME POSITION DATA

FRAME	ID	FORCE CODE	X1	Y1	ANG
1	1	1	.00	.00	.00

SUPERSTRUCTURE DAMPING.......

MODE SHAPE	DAMPING RATIO (%)
1	5.000
2	5.000
3	5.000
4	5.000
5	5.000
6	5.000

HEIGHT..........

FLOOR	HEIGHT
6	20.300
5	17.100
4	13.900
3	10.700
2	6.900
1	3.700
0	.000

************* ISOLATION SYSTEM DATA ************

BASEMAT MASS AT THE CENTER OF MASS OF THE BASE ...

	TRANSL. MASS	ROTATINAL MASS
MASS	36.571	1601.000

BASE ISOLATION DATA:
OPTION ONE: EQUIVALENT GLOBAL DEVICE PROPERTIES

GLOBAL ISOLATION DEVICE AT THE CENTER OF MASS OF THE BASE.....

	X	Y	R	ECX	ECY
LINEAR STIFFNESS(F/L)	.0000	.0000	.0000	.0000	.0000
VISCOUS DAMPING(F/L/T)	.0000	.0000	.0000	.0000	.0000

.....ELEMENT TYPE =

ELASTOMERIC/DAMPER FORCE -DISPLACEMENT LOOP PARAMETERS........

ISOLATOR	ALPFA X	ALPFA Y	YIELD FORCE X	YIELD FORCE Y	YIELD DISPL. X	YIELD DISPL. Y
1	.14407	.14407	5.90900	5.90900	.00435	.00435
2	.14407	.14407	5.90900	5.90900	.00435	.00435
3	.14650	.14650	3.64000	3.64000	.00523	.00523
4	.15380	.15380	7.73200	7.73200	.00706	.00706
5	.14407	.14407	5.90900	5.90900	.00435	00435
6	.15380	.15380	7.73200	7.73200	.00706	.00706
7	.15380	.15380	7.73200	7.73200	.00706	.00706
8	.14407	.14407	5.90900	5.90900	.00435	.00435
9	.14650	.14650	3.64000	3.64000	.00523	.00523
10	.14407	.14407	5.90900	5.90900	.00435	.00435
11	.15380	.15380	7.73200	7.73200	.00706	.00706
12	.14407	.14407	5.90900	5.90900	.00435	.00435
13	.14650	.14650	3.64000	3.64000	.00523	.00523
14	.14407	.14407	5.90900	5.90900	.00435	.00435
15	.15380	.15380	7.73200	7.73200	.00706	.00706
16	.15380	.15380	7.73200	7.73200	.00706	.00706
17	.15380	.15380	7.73200	7.73200	.00706	.00706
18	.14407	.14407	5.90900	5.90900	.00435	.00435
19	.15380	.15380	7.73200	7.73200	.00706	.00706
20	.14407	.14407	5.90900	5.90900	.00435	.00435
21	.14407	.14407	5.90900	5.90900	.00435	.00435
22	.14407	.14407	5.90900	5.90900	.00435	.00435

BEARING LOCATION ....

BEARING	X	Y
1	-9.150	-6.900
2	-9.150	-.050
3	-9.150	6.600
4	-5.700	-6.900
5	-5.700	-.050
6	-5.700	6.600
7	-2.100	-6.900
8	-2.100	-.050
9	-2.100	6.600
10	.300	-.050
11	1.500	-6.900
12	1.500	-.050
13	1.500	6.600
14	2.700	-.050
15	5.100	-6.900
16	5.100	-.050
17	5.100	6.600
18	6.400	-.050
19	8.700	-6.900
20	8.700	-.050
21	8.700	2.100
22	8.700	6.600

************ OUTPUT PARAMETERS *************

TIME HISTORY OPTION ....= 1
INDEX = 0 FOR TIME HISTORY OUTPUT
INDEX = 1 FOR NO TIME HISTORY OUTPUT

NO. OF TIME STEPS AT WHICH TIME HISTORY
OUTPUT IS DESIRED ....= 50
FORCE-DISPLACEMENT TIME HISTORY DESIRED
AT BEARINGS NUMBERED....................= 1 2 3 4

COORDINATES OF COLUMN LINES AT WHICH INTERSTORY DRIFTS ARE DESIRED

COL. LINE	X. CORD.	Y. CORD.
1	9.000	6.750
2	-9.000	-6.750
3	.000	.000
4	.000	.000
5	.000	.000
6	.000	.000

*********************** OUTPUT ******* *****************

MODE SHAPES

LEVEL ID	DIR#	1	2	3	4	5	6
6	X	-.009528	.100807	.004356	.095580	.007090	-.066897
6	Y	.105770	013354	-.042784	.005878	-.077257	.001406
6	ROTN	.005537	000732	.013871	.000123	-.006776	-.000595
5	X	-.009757	.088173	.001446	.022212	.004214	.043552
5	Y	.085108	.009828	-.028679	-.001409	-.000701	.002344
5	ROTN	.004543	.000495	.012522	-.000543	-.001227	.000127
4	X	-.008425	.072651	-.001727	-.048844	-.000281	.084970
4	Y	.063387	.006510	-.016209	-.003708	.059408	.000045
4	ROTN	.003542	.000280	.010885	-.000825	.002696	.000375
3	X	-.007825	.054303	-.003290	-.085458	-.005609	.010653
3	Y	.040315	.003435	-.010052	-.006066	.085899	-.003358
3	ROTN	.002221	.000065	.008281	-.000845	.004670	.000329
2	X	-.004641	.029817	-.002702	-.074492	-.008811	-.087084
2	Y	.016638	.000870	-.007866	-.003074	.065660	-.005079
2	ROTN	.000748	-.000051	.004280	-.000395	.003402	.000233
1	X	-.001665	.011884	-.001170	-.037343	-.003488	-.072194
1	Y	.008200	.000345	-.003584	-.001550	.031908	-.003022
1	ROTN	.000284	-.000016	.001813	-.000188	.001493	.000159

MODE NUMBER	PERIOD
1	.871650
2	.832051
3	.399589
4	.260888
5	.234266
6	.134306

************* MAX. RESPONSE ************

MAX. REL. DISP. AT THE CENTER OF MASS OF FLOORS
(WITH RESPECT TO THE BASE)

FLOOR	X DISP.	Y DISP.	ROTN.(rad)
6	.0013	-.0448	-.0019
5	-.0010	-.0385	-.0016
4	.0010	-.0277	-.0012
3	.0010	-.0181	-.0008
2	.0007	-.0079	-.0002
1	.0003	-.0031	-.0001

MAX INTERSTORY DRIFT

STORY	X DST.	Y DST.	TIME	X DRIFT/FL. HT.(%)	TIME	Y DRIFT/FL. HT.(%)
6	9.00	6.75	13.63	.09	13.62	.36
5	9.00	6.75	13.56	.08	13.58	.37
4	9.00	6.75	13.55	.10	13.56	.43
3	9.00	6.75	13.53	.09	13.55	.39
2	9.00	6.75	2.40	.02	13.54	.19
1	9.00	6.75	2.41	.01	13.53	.10
6	-9.00	-6.75	13.65	.08	13.59	.17
5	-9.00	-6.75	13.63	.08	13.59	.18
4	-9.00	-6.75	13.56	.10	13.58	.17
3	-9.00	-6.75	13.55	.10	13.58	.15
2	-9.00	-6.75	13.54	.04	13.57	.11
1	-9.00	-6.75	13.53	.02	13.57	.06

6	.00	.00	13.56	.02	13.61	.28
5	.00	.00	12.74	.01	13.59	.28
4	.00	.00	15.83	.01	13.57	.30
3	.00	.00	13.58	.01	13.56	.27
2	.00	.00	13.58	.01	13.55	.15
1	.00	.00	13.59	.01	13.55	.08

6	.00	.00	13.56	.02	13.61	.28
5	.00	.00	12.74	.01	13.59	.28
4	.00	.00	15.83	.01	13.57	.30
3	.00	.00	13.58	.01	13.56	.27
2	.00	.00	13.58	.01	13.55	.15
1	.00	.00	13.59	.01	13.55	.08

6	.00	.00	13.56	.02	13.61	.28
5	.00	.00	12.74	.01	13.59	.28
4	.00	.00	15.83	.01	13.57	.30
3	.00	.00	13.58	.01	13.56	.27
2	.00	.00	13.58	.01	13.55	.15
1	.00	.00	13.59	.01	13.55	.08

6	.00	.00	13.56	.02	13.61	.28
5	.00	.00	12.74	.01	13.59	.28
4	.00	.00	15.83	.01	13.57	.30
3	.00	.00	13.58	.01	13.56	.27
2	.00	.00	13.58	.01	13.55	.15
1	.00	.00	13.59	.01	13.55	.08

MAX. DISP. AT THE CENTER OF MASS OF BASE

X DISP.	Y DISP.	ROTN...
.001	-.082	.001

MAX RESULTANT DISP. AT THE CENTER OF MASS OF BASE

TIME	RES. DISP.	X COMP.	Y COMP
13.540	.082	.000	-.082

MAX RESULTANT BEARING DISP.

BEARING	TIME	MAX. DISP	ANG. WITH X AXIS
1	13.550	.092	-1.495
2	13.550	.092	1.568
3	13.550	.092	1.492
4	13.550	.088	-1.492

MAX BEARING DISP. IN X

BEARING	TIME	MAX. DISP X
1	13.610	.008
2	15.680	.001
3	13.610	-.008
4	13.610	.008

MAX BEARING DISP. IN Y

BEARING	TIME	MAX. DISP Y
1	13.550	-.092
2	13.550	-.092
3	13.550	-.092
4	13.550	-.088

MAX. TOTAL ACCL. AT CENTER OF MASS OF FLOORS

FLOOR	ACCL. X	ACCL. Y	ACCL. R
6	.177503	2.463471	-.124193
5	-.108105	1.986852	.088113
4	.079112	1.857468	.083557
3	-.113577	1.621223	-.074281
2	.170117	-1.597475	-.081788

1	.142467	-1.593311	.094029

MAX STORY SHEAR

STORY	TIME	X SHEAR	TIME	Y SHEAR
6	16.370	6.331	13.650	87.860
5	15.840	-9.183	13.630	148.133
4	15.840	-10.449	13.580	208.786
3	15.830	-8.182	13.570	270.147
2	16.180	6.976	13.540	324.615
1	16.180	12.186	13.530	374.671

MAX. STRUCTURE SHEAR (TOP OF BASE)

FORCE X	FORCE Y	Z MOMENT
12.186	374.671	431.481

MAX. BASE SHEAR (BEARING LEVEL)

FORCE X	FORCE Y	Z MOMENT
-14.874	-423.745	-519.519

LOAD CONDITION DEFINITION CARDS

OLOAD	I	II	III	RESPONSE
1	.00	.00	.00	1.00

******** END OF OUTPUT ********

APPENDIX E

EXAMPLE 4

EXAMPLE WITH
(1) 3D-SUPERSTRUCTURE (EIGENVALUES AND EIGENVECTORS)
(2) ELASTOMERIC ISOLATION SYSTEM
(3) UNIAXIAL EXCITATION
(4) OUTPUT OF PEAK RESPONSE AND TIME HISTORIES

```
SIX STORY R. C. STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM  (SEE SECTION 8 - NCEER 91-0005)
Units tons-meters
general control information
3 6 6 22 1000 9.81  0
integration control parameters
0.01 0.001 10000 20 1
newmark method
0.5 0.25
earthquake control parameters
1 0.02    90     9.81
***************superstructure information********************
eigen values
 51.96 57.024 247.246 580.031 710.228 2188.612
eigen vectors
  -0.009522   0.105770   0.005537  -0.009752   0.085108   0.004543
  -0.008420   0.063397   0.003542  -0.007822   0.040315   0.002221
  -0.004639   0.018636   0.000748  -0.001864   0.008200   0.000284
   0.100008   0.013347   0.000731   0.088173   0.009824   0.000495
   0.072651   0.008506   0.000280   0.054303   0.003432   0.000085
   0.029818   0.000869  -0.000051   0.011884   0.000344  -0.000016
   0.004356  -0.042784   0.013871   0.001446  -0.028679   0.012322
  -0.001727  -0.016209   0.010895  -0.003289  -0.010052   0.006281
  -0.002702  -0.007666   0.004280  -0.001170  -0.003564   0.001613
   0.095580   0.005678   0.000123   0.022212  -0.001409  -0.000543
  -0.046944  -0.005707  -0.000925  -0.085458  -0.006086  -0.000845
  -0.074492  -0.003074  -0 000395  -0.037343  -0.001550  -0.000188
   0.007090  -0.077257  -0.008776   0.004214  -0.000701  -0.001227
  -0.000281   0.059408   0.002696  -0.005609   0.085899   0.004670
  -0 006811   0.065880   0.003402  -0.003486   0.031908   0.001493
  -0.066687   0.001408  -0.000585   0.043552   0.002344   0.000127
   0.084970   0.000045   0.000375   0.010653  -0.003358   0.000329
  -0.087084  -0.005079   0.000233  -0.072193  -0.003022   0.000159
supersturcture mass
 35.665 35.665 35.665 39.245 41.918 36.571
 1561.3 1561.3 1561.3 1718 1835.1 1601
superstructure damping
0.05 0 05 0.05 0.05 0.05 0.05
eccn to center of mass
0  0
0  0
0  0
0  0
0  0
0  0
height to different floor and base
20.3 17.1 13.9 10.7 6.9 3.7 0
****************isolation system data ***************
stiffness data for linear elastic isolation system
0 0 0 0 0
mass data of the base
36.571 1601
global damping data
0    0    0  0  0
hysteretic element for elastomeric bearings
3 3
0.14407 5.909 0 004353  0.14407 5.909 0.004353
3 3
0.14407 5.909 0 004353 0.14407 5.909 0.004353
3 3
0.1465 3.64   0.005232 0.1465 3 64   0.005232
3 3
0.1538  7.732 0.007061 0.1538  7.732 0.007061
3 3
0.14407 5.909 0 004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3.64   0.005232 0.1465 3.64   0.005232
3 3
0.14407 5.909 0.004353 0.14407 5 909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5 909 0.004353 0.14407 5.909 0.004353
3 3
0 1465 3 64   0.005232 0.1465 3 64   0.005232
3 3
```

```
0.14407 5.909 0.004353 0 14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5 909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
coordinates for isolation elements
-9.15 -6.9
-9.15 -0.05
-9.15 6.6
-5.7 -6.9
-5.7 -0.05
-5.7 6.6
-2.1 -6.9
-2.1 -0.05
-2 1 6.6
0.3 -0.05
1 5 -6.9
1.5 -0.05
1.5   6.6
2.7 -0.05
5.1 -6.9
5.1 -0.05
5.1  6.6
6.4 -0.05
8.7 -6.9
8.7 -0.05
8.7  2.1
8.7  6.6
output parameters
0 50 1 2 3 4
interstory drift
9 6.75
-9 -6.75
0 0
0 0
0 0
0 0
load  case definition
0 0 0 1
```


OUTPUT FILE FOR EXAMPLE 4
(EXAMPLE FROM SECTION 8 - NCEER 91-0005)

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

PROGRAM 3D-BASIS-TABS ...A GENERAL PROGRAM FOR NONLINEAR
                         DYNAMIC ANALYSIS OF THREE DIMENSIONAL
                         BASE ISOLATED BUILDINGS

VERSION 2.0 FOR VAX/SUN/PC COMPUTERS, SEPT. 1994

DEVELOPED BY:

ANDREI REINHORN, MICHALAKIS CONSTANTINOU
                    DEPT. OF CIVIL ENGINEERING
                    STATE UNIV. OF NEW YORK AT BUFFALO

SATISH NAGARAJAIAH, DEPT. OF CIVIL ENGINEERING
                    UNIVERSITY OF MISSOURI AT COLUMBIA

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH,BUFFALO
STATE UNIVERSITY OF NEW YORK AT BUFFALO

CONTRIBUTIONS:

PANAGIOTIS TSOPELAS, CHEN LI AND RENFEN LI
                    DEPT  OF CIVIL ENGINEERING
                    STATE UNIV. OF NEW YORK AT BUFFALO

************************************************************  *************


VERSION 1.0 FOR VAX/PC COMPUTERS, AUGUST 1993

DEVELOPED BY . . SATISH NAGARAJAIAH
                 CHEN LI
                 ANDREI M. REINHORN
                 AND MICHALAKIS C. CONSTANTINOU
                 DEPARTMENT OF CIVIL ENGINEERING
                 STATE UNIV. OF NEW YORK AT BUFFALO

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH
STATE UNIVERSITY OF NEW YORK AT BUFFALO

************************************************************* ****************


THIS PROGRAM HAS BEEN DEVELOPED USING
(1) PROGRAM 3D-BASIS
DEVELOPED BY ... SATISH NAGARAJAIAH
                 ANDREI M. REINHORN
                 AND MICHALAKIS C. CONSTANTINOU
                 DEPARTMENT OF CIVIL ENGINEERING
                 STATE UNIV  OF NEW YORK AT BUFFALO,         VAX VERSION, 1990
(2) PROGRAM ETABS
DEVELOPED BY ... E. L. WILSON
                 H. H. DOVEY
                 AND J. P. HOLLIN,
                 DEPARTMENT OF CIVIL ENGINEERING
                 UNIVERSITY OF CALIFORNIA, BERKELEY,         SEPTEMBER 1974, REVISED MARCH 1979

************************************************************* *************

1
 ******** MIRROR OF INPUT DATA ********


  SIX STORY R. C. STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM  (SEE SECTION 8 - NCEE
  Units tons-meters
  general control information
  3 6 6 22 1000 9.81  0
  integration control parameters
  0.01 0.001 10000 20 1
  newmark method
  0.5 0.25
  earthquake control parameters
  1 0.02    90     9.81
  *************superstructure information******************
  eigen values
   51 96 57 024 247.246 580 031 719 228 2188.612
  eigen vectors
```

```
  -0.009522   0.105770   0.005537  -0.009752   0.085108   0.004543
  -0.009420   0.063397   0.003542  -0.007822   0.040315   0.002221
  -0.004639   0.016636   0.000748  -0.001884   0.006200   0.000284
   0.100908   0.013347   0.000731   0.088173   0.009824   0.000485
   0.072651   0.006506   0.000280   0.054303   0.003432   0.000085
   0.029818   0.000869  -0.000051   0.011884   0.000344  -0.000016
   0.004356  -0.042784   0.013871   0.001446  -0.028679   0.012522
  -0.001727  -0.016299   0.010895  -0.003289  -0.010052   0.008281
  -0.002702  -0.007866   0.004280  -0.001170  -0.003564   0.001813
   0.095580   0.005878   0.000123   0.022212  -0.001409  -0.000543
  -0.046944  -0.005707  -0.000925  -0.085458  -0.006086  -0.000845
  -0.074492  -0.003074  -0.000395  -0.037343  -0.001550  -0.000188
   0.007090  -0.077257  -0.008776   0.004214  -0.000701  -0.001227
  -0.000281   0.059408   0.002696  -0.005609   0.085899   0.004670
  -0.006811   0.065660   0.003402  -0.003486   0.031808   0.001493
  -0.066697   0.001406  -0.000505   0.043552   0.002344   0.000127
   0.084970   0.000045   0.000375   0.010653  -0.003358   0.000329
  -0.087084  -0.005079   0.000233  -0.072193  -0.003022   0.000159
supersturcture mass
 35.665 35.665 35.665 39.245 41.918 36.571
 1561.3 1561.3 1561.3 1718 1835.1 1601
superstructure damping
0.05 0.05 0.05 0.05 0.05 0.05
eccn to center of mass
0  0
0  0
0  0
0  0
0  0
0  0
height to different floor and base
20.3 17.1 13.9 10.7 6.9 3.7 0
***************isolation system data ***************
stiffness data for linear elastic isolation system
0 0 0 0 0
mass data of the base
36.571 1601
global damping data
0    0    0 0  0
hysteretic element for elastomeric bearings
3 3
0.14407 5.909 0.004353  0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3.64  0.005232 0.1465 3.64  0.005232
3 3
0.1538  7.732 0.007061 0.1538  7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0 1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3.64  0.005232 0.1465 3.64  0.005232
3 3
0 14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3.64  0.005232 0.1465 3.64  0.005232
3 3
0 14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
```



```
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
coordinates for isolation elements
-9.15 -6.9
-9.15 -0.05
-9.15 6.6
-5.7 -6.9
-5.7 -0.05
-5.7 6.6
-2.1 -6.9
-2.1 -0.05
-2 1 6.6
0.3 -0.05
1.5 -6.9
1 5 -0.05
1.5   6.6
2.7 -0.05
5.1 -6.9
5.1 -0.05
5.1  6.6
6.4 -0.05
8.7 -6.9
8.7 -0.05
8.7  2.1
8.7  6.6
output parameters
0 50 1 2 3 4
interstory drift
9 6.75
-9 -6.75
0 0
0 0
0 0
0 0
load  case definition
0 0 0 1


******** END OF MIRROR OF INPUT ********
1

SIX STORY R. C. STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM  (SEE SECTION 8 - NCEE


general control information

Units tons-meters

  TOTAL NUMBER OF STORIES....... .........=            6
  NUMBER OF DIFF. FRAMES... ..............=            0
  TOTAL NUMBER OF FRAMES............. ....=            0
  NUMBER OF LOAD CONDITIONS...............=            0
  NUMBER OF FREQUENCIES...................=            6

  NO. OF FLOORS(EXCL. BASE)...............=            6
  NO. OF BEARINGS........................ .=           22
  NO. OF EIGEN VECTORS CONSIDERED.........=            6
  INDEX FOR  SUPERSTRUCTURE STIFFNESS DATA=            3

    INDEX = 1 FOR 3D SHEAR BUILDING  REPRES.
    INDEX = 2 FOR FULL 3D REPRESENTATION
    INDEX = 3 FOR REPRESENTATION USING EIGEN DATA

  TIME STEP OF INTEGRATION (NEWMARK). ....=        .0100
  INDEX FOR TYPE OF TIME STEP.............=            1

    INDEX = 1 FOR CONSTANT TIME STEP
    INDEX = 2 FOR VARIABLE TIME STEP

  GAMA FOR NEWMARKS  METHOD...............=          .50
  BETA FOR NEWMARKS  METHOD...............=          .25
  TOLERANCE FOR FORCE COMPUTATION.........=        .0010
  REFERENCE MOMENT OF CONVERGENCE.. .... . =     10000.0
  MAX NUMBER OF ITERATIONS WITHIN T.S.....=           20
  INDEX FOR GROUND MOTION INPUT ..........=            1

    INDEX = 1 FOR UNIDIRECTIONAL INPUT
    INDEX = 2 FOR BIDIRECTIONAL INPUT
```

TIME STEP OF RECORD ....=		.020
LENGTH OF RECORD.......................=		1000
LOAD FACTOR............................=		9.81
ANGLE OF EARTHQUAKE INCIDENCE..........=		1.57

EIGENVALUES AND EIGENVECTORS (3D REPRESENTATION)

MODE NUMBER	EIGENVALUE
1	51.860000
2	57.024000
3	247.246000
4	580.031000
5	719.228000
6	2188.612000

MODE SHAPES

FLOOR		1	2	3	4	5	6
6	X	-.0095220	.1008080	.0043560	.0855800	.0070900	-.0666970
6	Y	.1057700	.0133470	-.0427840	.0058780	-.0772570	.0014060
6	R	.0055370	.0007310	.0138710	.0001230	-.0067760	-.0005950
5	X	-.0097520	.0881730	0014460	.0222120	.0042140	.0435520
5	Y	.0851080	0098240	-.0286790	-.0014090	-.0007010	.0023440
5	R	.0045430	0004950	0125220	-.0005430	-.0012270	.0001270
4	X	-.0094200	.0726510	-.0017270	-.0469440	-.0002810	.0849700
4	Y	.0633970	.0065060	-.0162990	-.0057070	.0584080	.0000450
4	R	.0035420	.0002800	.0108950	-.0009250	.0026960	.0003750
3	X	-.0078220	.0543030	-.0032890	-.0854580	-.0056090	.0106530
3	Y	0403150	0034320	-.0100520	-.0060660	.0858990	-.0033580
3	R	.0022210	0000850	.0082810	-.0008450	.0046700	0003290
2	X	-.0046390	.0298180	-.0027020	-.0744920	-.0068110	-.0870840
2	Y	.0166360	.0008690	-.0078660	-.0030740	.0656600	-.0050790
2	R	.0007480	-.0000510	.0042800	-.0003950	.0034020	.0002330
1	X	-.0018640	.0118840	-.0011700	-.0373430	-.0034860	-.0721930
1	Y	.0062000	.0003440	-.0035640	-.0015500	.0319080	-.0030220
1	R	.0002840	-.0000160	.0018130	-.0001880	.0014830	.0001590

SUPERSTRUCTURE MASS..........

FLOOR	TRANSL. MASS	ROTATIONAL MASS
6	35.665	1561.300
5	35.665	1561.300
4	35.665	1561.300
3	39.245	1718.000
2	41.818	1835 100
1	36.571	1601.000

SUPERSTRUCTURE MASS........

FLOOR	ECCENT X	ECCENT Y
6	.000	.000
5	.000	.000
4	.000	.000
3	.000	.000
2	.000	.000
1	.000	.000

SUPERSTRUCTURE DAMPING.......

MODE SHAPE	DAMPING RATIO (%)
1	5.000
2	5.000
3	5.000
4	5.000
5	5.000
6	5.000

HEIGHT.........

FLOOR	HEIGHT
6	20.300
5	17.100
4	13.900
3	10.700
2	6.900
1	3.700
0	.000

************* ISOLATION SYSTEM DATA ************

BASEMAT MASS AT THE CENTER OF MASS OF THE BASE ...

	TRANSL. MASS	ROTATINAL MASS
MASS	36.571	1601.000

BASE ISOLATION DATA.
OPTION ONE: EQUIVALENT GLOBAL DEVICE PROPERTIES

GLOBAL ISOLATION DEVICE AT THE CENTER OF MASS OF THE BASE.....

	X	Y	R	ECX	ECY
LINEAR STIFFNESS[F/L]	.0000	.0000	.0000	.0000	.0000
VISCOUS DAMPING[F/L/T]	.0000	.0000	.0000	.0000	.0000

......ELEMENT TYPE =

ELASTOMERIC/DAMPER FORCE -DISPLACEMENT LOOP PARAMETERS........

ISOLATOR	ALPFA X	ALPFA Y	YIELD FORCE X	YIELD FORCE Y	YIELD DISPL. X	YIELD DISPL. Y
1	.14407	.14407	5.80800	5.80800	.00435	.00435
2	.14407	.14407	5.80800	5.80800	.00435	.00435
3	.14650	14650	3.64000	3.64000	.00523	.00523
4	.15380	.15380	7.73200	7.73200	.00706	.00706
5	.14407	.14407	5.80800	5.80800	.00435	.00435
6	15380	.15380	7.73200	7.73200	.00706	.00706
7	.15380	.15380	7.73200	7.73200	.00706	.00706
8	.14407	.14407	5.80800	5.80800	.00435	.00435
9	.14650	.14650	3.64000	3.64000	.00523	.00523
10	.14407	.14407	5.80800	5.80800	.00435	.00435
11	.15380	.15380	7.73200	7.73200	.00706	.00706
12	.14407	.14407	5.80800	5.80800	.00435	.00435
13	.14650	.14650	3.64000	3.64000	.00523	.00523
14	.14407	.14407	5.80800	5.80800	.00435	.00435
15	15380	.15380	7.73200	7.73200	.00706	.00706
16	.15380	15380	7.73200	7.73200	.00706	.00706
17	.15380	15380	7.73200	7.73200	.00706	.00706
18	14407	.14407	5.80800	5.80800	.00435	.00435
19	.15380	.15380	7.73200	7.73200	.00706	.00706
20	.14407	.14407	5.80800	5.80800	.00435	.00435
21	.14407	.14407	5.80800	5.80800	.00435	.00435
22	.14407	.14407	5.80800	5.80800	.00435	.00435

BEARING LOCATION ....

BEARING	X	Y
1	-9.150	-6.900
2	-9 150	-.050

3	-9.150	6 600
4	-5 700	-6.900
5	-5.700	-.050
6	-5.700	6.600
7	-2.100	-6.900
8	-2.100	-.050
9	-2.100	6.600
10	.300	-.050
11	1.500	-6.900
12	1.500	-.050
13	1.500	6.600
14	2.700	-.050
15	5.100	-6.900
16	5.100	-.050
17	5.100	6.600
18	6.400	-.050
19	8.700	-6.900
20	8.700	-.050
21	8.700	2.100
22	8.700	6.600

************* OUTPUT PARAMETERS *************

TIME HISTORY OPTION ....= 0
 INDEX = 0 FOR TIME HISTORY OUTPUT
 INDEX = 1 FOR NO TIME HISTORY OUTPUT

NO. OF TIME STEPS AT WHICH TIME HISTORY
OUTPUT IS DESIRED ....= 50
FORCE-DISPLACEMENT TIME HISTORY DESIRED
AT BEARINGS NUMBERED....................= 1 2 3 4

COORDINATES OF COLUMN LINES AT WHICH INTERSTORY DRIFTS ARE DESIRED

COL. LINE	X. CORD.	Y. CORD.
1	9.000	6.750
2	-9.000	-6.750
3	.000	.000
4	.000	.000
5	.000	.000
6	.000	.000

********* TIME HISTORY RESPONSE *******

DISPLACEMENT AT FLOOR DEGREE OF FREEDOM....

TIME	1	2	3	4	5	6
.010	-.5768E-21	.1284E-20	.2621E-22	-.4674E-21	.5778E-21	-.1271E-22
.510	-.6416E-04	-.2273E-02	-.1364E-03	-.2041E-04	-.1897E-02	-.1175E-03
1.010	2221E-04	- 4503E-02	-.2197E-03	.6391E-04	-.4242E-02	-.2243E-03
1.510	.4433E-03	.2727E-01	.1162E-02	.1725E-04	.2151E-01	.8089E-03
2.010	.4212E-04	-.6135E-03	-.2324E-04	.2462E-04	.1139E-03	.2540E-04
2.510	-.1180E-03	.2540E-01	.1093E-02	-.3351E-03	.2109E-01	.9328E-03
3.010	-.4563E-03	-.1842E-01	-.8487E-03	-.1751E-03	-.1523E-01	-.7198E-03
3.510	.5633E-03	.4894E-02	.2452E-03	.3718E-03	.2856E-02	.1216E-03
4.010	-.2043E-03	-.7294E-02	-.6168E-03	-.5026E-04	-.5815E-02	-.5125E-03
4.510	.2901E-03	-.8564E-02	-.1894E-03	.3009E-03	-.7300E-02	-.1733E-03
5.010	.8704E-04	-.7680E-02	-.2743E-03	.1650E-03	-.6964E-02	-.2754E-03
5.510	-.3033E-03	-.8270E-02	-.5652E-03	-.1239E-03	-.6741E-02	-.4756E-03
6.010	-.4432E-04	-.5143E-02	-.1795E-03	.3820E-04	-.3618E-02	-.1052E-03
6.510	-.1081E-03	.2205E-02	-.6211E-04	-.5393E-04	.2575E-02	-.7472E-06
7.010	-.5249E-03	.7639E-02	.3319E-03	-.4951E-03	.5907E-02	.2519E-03
7.510	.8227E-03	.9598E-02	.3905E-03	.5352E-03	.7151E-02	.2730E-03
8.010	-.3042E-03	.1584E-01	.7322E-03	-.4557E-03	.1301E-01	.6154E-03
8.510	-.9417E-04	-.1159E-01	-.5671E-03	.9632E-04	-.9420E-02	-.4698E-03
9.010	.1963E-04	-.2113E-01	-.8220E-03	.2446E-03	-.1732E-01	-.6843E-03
9.510	.4359E-05	-.1245E-02	-.1129E-03	.9874E-05	-.1109E-02	-.1026E-03
10.010	-.1762E-03	.2177E-02	.3979E-04	-.1522E-03	.1425E-02	.5678E-05
10.510	.2132E-03	-.1706E-01	-.6841E-03	.3779E-03	-.1349E-01	-.5343E-03
11.010	-.3178E-03	.1669E-01	.7144E-03	-.4533E-03	.1365E-01	.5942E-03
11.510	-.9808E-05	.3135E-01	.1135E-02	-.3663E-03	.2538E-01	.9190E-03
12 010	-.1268E-03	-.2053E-01	-.8926E-03	.1475E-03	-.1621E-01	-.7007E-03

12.510	-.4142E-03	-.5344E-02	- 3835E-03	-.2069E-03	-.3578E-02	-.2664E-03
13.010	-.2467E-03	.3664E-02	.1656E-03	- 2183E-03	.3508E-02	.1754E-03
13.510	-.3039E-04	- 4352E-01	-.1852E-02	.4657E-03	-.3562E-01	-.1542E-02
14.010	.3057E-03	.2150E-01	.9970E-03	7903E-05	1736E-01	.8163E-03
14.510	-.3039E-03	- 2264E-01	-.1086E-02	.4251E-04	-.1740E-01	-.8259E-03
15.010	-.1820E-03	.1693E-01	.9585E-03	-.3456E-03	.1365E-01	.7810E-03
15.510	.4276E-03	-.3786E-02	-.2701E-03	.3817E-03	-.2086E-02	-.1552E-03
16.010	-.7353E-03	.1294E-01	.4837E-03	-.6838E-03	.1098E-01	.4300E-03
16.510	.6818E-03	.9339E-02	.5151E-03	.3459E-03	6840E-02	.3739E-03
17.010	.2158E-03	-.1105E-01	-.4745E-03	.3038E-03	- 9608E-02	-.4365E-03
17.510	-.2281E-03	- 4577E-02	- 2608E-03	-.7767E-04	- 3103E-02	-.1724E-03
18.010	-.3664E-03	-.7223E-02	-.2957E-03	- 2219E-03	-.5831E-02	-.2398E-03
18.510	.6057E-03	.3656E-02	.2027E-03	4550E-03	.2837E-02	.1589E-03
19.010	-.3997E-03	-.4980E-03	-.5046E-04	- 3409E-03	- 4825E-03	-.4828E-04
19.510	1894E-03	-.1257E-03	- 3461E-04	.1890E-03	1213E-03	-.1355E-04

DISPLACEMENT AT FLOOR DEGREE OF FREEDOM..

TIME	7	8	9	10	11	12
.010	-.4251E-21	- 1401E-22	-.3956E-22	-.4723E-21	-.3521E-21	-.5076E-22
.510	.2062E-04	- 1480E-02	- 9656E-04	.4075E-04	-.9891E-03	-.6520E-04
1.010	.1073E-03	-.3762E-02	-.2120E-03	.1289E-03	-.2872E-02	-.1635E-03
1.510	-.3311E-03	.1562E-01	.6676E-03	-.4368E-03	.9668E-02	.3761E-03
2.010	- 6153E-05	6757E-03	.5766E-04	- 4342E-04	8956E-03	.6814E-04
2.510	-.4880E-03	.1636E-01	.7552E-03	-.4678E-03	1096E-01	.4892E-03
3.010	.7581E-04	- 1175E-01	- 5796E-03	.1913E-03	- 7811E-02	-.3751E-03
3.510	2060E-03	1077E-02	2701E-04	.1182E-03	- 1425E-03	-.3996E-04
4.010	.8483E-04	-.4273E-02	-.4072E-03	1273E-03	-.2615E-02	-.2690E-03
4.510	.2954E-03	-.5844E-02	-.1476E-03	2594E-03	-.4096E-02	-.9485E-04
5 010	.2288E-03	- 5948E-02	-.2560E-03	2388E-03	-.4413E-02	-.1911E-03
5.510	.4573E-04	- 5102E-02	-.3820E-03	.1313E-03	-.3278E-02	-.2530E-03
6.010	9752E-04	- 2194E-02	- 4541E-04	.1028E-03	-.1019E-02	.4903E-05
6.510	-.4427E-05	2702E-02	4020E-04	.1748E-04	.2379E-02	.5365E-04
7.010	-.4205E-03	.4168E-02	.1783E-03	- 2829E-03	2481E-02	.9436E-04
7.510	.2644E-03	4777E-02	.1713E-03	8870E-04	2629E-02	.6935E-04
8.010	- 5549E-03	.9956E-02	.4911E-03	-.5117E-03	6562E-02	.3143E-03
8.510	.2542E-03	-.7111E-02	-.3695E-03	2953E-03	-.4605E-02	-.2332E-03
9.010	4128E-03	-.1323E-01	-.5388E-03	.4240E-03	- 8733E-02	-.3332E-03
9 510	1435E-04	- 9289E-03	- 8886E-04	.1127E-04	- 6606E-03	-.6459E-04
10.010	- 1145E-03	7466E-03	- 1924E-04	-.6704E-04	.2420E-03	-.3422E-04
10.510	4788E-03	-.9832E-02	-.3914E-03	.4316E-03	-.6126E-02	-.2178E-03
11.010	-.5375E-03	.1038E-01	.4683E-03	- 4894E-03	6808E-02	.2928E-03
11.510	-.6361E-03	1908E-01	.7004E-03	- 6675E-03	.1238E-01	.4098E-03
12 010	.3658E-03	- 1178E-01	-.5173E-03	.4116E-03	-.7295E-02	-.2944E-03
12 510	-.2648E-04	- 1961E-02	- 1677E-03	.5239E-04	- 6672E-03	-.7503E-04
13.010	- 1861E-03	.3158E-02	.1700E-03	-.1457E-03	.2444E-02	.1335E-03
13.510	.8514E-03	-.2714E-01	-.1217E-02	9022E-03	-.1783E-01	-.7619E-03
14.010	-.2485E-03	.1301E-01	.6332E-03	- 3426E-03	8354E-02	.3903E-03
14.510	.3208E-03	-.1217E-01	- 5874E-03	3883E-03	-.7133E-02	-.3180E-03
15.010	-.4638E-03	.1018E-01	.6209E-03	-.4392E-03	6473E-02	.3950E-03
15.510	.2944E-03	-.6154E-03	- 6538E-04	.1574E-03	.3685E-03	.3460E-05
16 010	- 5840E-03	8748E-02	3613E-03	-.4159E-03	.6052E-02	.2420E-03
16.510	.4082E-04	.4442E-02	.2504E-03	-.1193E-03	.2304E-02	.1236E-03
17.010	.3660E-03	-.7859E-02	-.3792E-03	3476E-03	- 5577E-02	-.2670E-03
17.510	4404E-04	-.1749E-02	- 9934E-04	.8121E-04	- 6629E-03	-.3373E-04
18 010	- 8482E-04	- 4365E-02	- 1836E-03	1668E-05	- 2812E-02	- 1098E-03
18.510	2919E-03	2013E-02	1175E-03	1506E-03	1198E-02	.6878E-04
19.010	- 2685E-03	- 4384E-03	- 4364E-04	- 1875E-03	- 3354E-03	-.3313E-04
19 510	1809E-03	3076E-03	1711E-05	1541E-03	3734E-03	.1041E-04

DISPLACEMENT AT FLOOR DEGREE OF FREEDOM...

TIME	13	14	15	16	17	18
.010	- 4389E-21	-.3463E-21	-.3486E-22	- 2449E-21	- 1814E-21	-.1531E-22
.510	3537E-04	-.4333E-03	-.2550E-04	1552E-04	-.1684E-03	-.1014E-04
1.010	.9818E-04	- 1482E-02	-.7406E-04	.3950E-04	-.6267E-03	-.3030E-04
1 510	-.3232E-03	.3890E-02	.8954E-04	-.1364E-03	.1425E-02	.2980E-04
2 010	-.4875E-04	.6533E-03	.4387E-04	- 2270E-04	.3141E-03	.1902E-04
2 510	-.2878E-03	.4923E-02	.1661E-03	-.9958E-04	1934E-02	.6321E-04
3.010	.1676E-03	-.3459E-02	-.1294E-03	6842E-04	-.1349E-02	-.4957E-04
3 510	.5406E-04	-.5636E-03	-.5060E-04	.1488E-04	-.3346E-03	-.2333E-04
4.010	.9162E-04	- 9589E-03	-.1073E-03	.3458E-04	- 3331E-03	- 4302E-04
4 510	.1670E-03	-.1985E-02	- 2433E-04	6727E-04	- 8093E-03	-.8134E-05
5.010	.1619E-03	-.2238E-02	- 7943E-04	6214E-04	- 9365E-03	-.3177E-04
5 510	1219E-03	- 1340E-02	- 9828E-04	5526E-04	- 5001E-03	-.3907E-04
6.010	7043E-04	- 2116E-03	2631E-04	3285E-04	-.2587E-04	.1284E-04
6 510	2401E-04	1429E-02	3012E-04	.2042E-04	6411E-03	.1262E-04

7.010	-.1209E-03	.9357E-03	.1805E-04	-.3307E-04	.3263E-03	.5272E-05
7.510	-.9230E-05	.8611E-03	-.5267E-05	-.1858E-04	.2652E-03	-.5212E-05
8.010	-.3179E-03	.2872E-02	.1063E-03	-.1228E-03	.1111E-02	.4044E-04
8.510	.2100E-03	-.1980E-02	-.7784E-04	.8757E-04	-.7463E-03	-.2960E-04
9.010	.2793E-03	-.3867E-02	-.9889E-04	.1075E-03	-.1505E-02	-.3598E-04
9.510	.3698E-05	-.3035E-03	-.2808E-04	-.1600E-05	-.1220E-03	-.1194E-04
10.010	-.2614E-04	-.2511E-04	-.2838E-04	-.8987E-05	-.4166E-04	-.1275E-04
10.510	.2580E-03	-.2500E-02	-.4801E-04	.8861E-04	-.8228E-03	-.1527E-04
11.010	-.3036E-03	.2873E-02	.9223E-04	-.1174E-03	.1148E-02	.3426E-04
11.510	-.4540E-03	.5384E-02	.1010E-03	-.1847E-03	.2070E-02	.3380E-04
12.010	.2820E-03	-.2934E-02	-.7315E-04	.1238E-03	-.1074E-02	-.2484E-04
12.510	.5754E-04	.1053E-03	-.8388E-05	.3048E-04	.1311E-03	-.1863E-05
13.010	-.8092E-04	.1282E-02	.6124E-04	-.2589E-04	.5455E-03	.2510E-04
13.510	.6102E-03	-.7809E-02	-.2401E-03	.2409E-03	-.3021E-02	-.8928E-04
14.010	-.2675E-03	.3527E-02	.1222E-03	-.1146E-03	.1335E-02	.4546E-04
14.510	.2787E-03	-.2595E-02	-.7078E-04	.1201E-03	-.8819E-03	-.2292E-04
15.010	-.2786E-03	.2650E-02	.1388E-03	-.1080E-03	.8658E-03	.5363E-04
15.510	.3749E-04	.6361E-03	.2737E-04	.3249E-05	.3558E-03	.1324E-04
16.010	-.1865E-03	.2843E-02	.8443E-04	-.5469E-04	.1143E-02	.3226E-04
16.510	-.1400E-03	.6251E-03	.2094E-04	-.7424E-04	.1540E-03	.5758E-05
17.010	.2219E-03	-.2680E-02	-.1049E-03	.8373E-04	-.1083E-02	-.4148E-04
17.510	.5962E-04	.6677E-05	.6360E-05	.2729E-04	.7115E-04	.4349E-05
18.010	.3606E-04	-.1201E-02	-.3048E-04	.1898E-04	-.4579E-03	-.1085E-04
18.510	.3784E-04	.4403E-03	.2027E-04	.2811E-05	.1520E-03	.7482E-05
19.010	-.8382E-04	-.1667E-03	-.1562E-04	-.3558E-04	-.7025E-04	-.6519E-05
19.510	.9820E-04	.2695E-03	.8462E-05	.4491E-04	.1281E-03	.3770E-05

DISPLACEMENT AT FLOOR DEGREE OF FREEDOM....

TIME	19	20	21	22	23	24
.010	-.6933E-13	-.2587E-05	.2356E-22			
.510	.2736E-04	-.9882E-03	-.3766E-04			
1.010	-.2552E-04	-.5552E-02	-.4244E-04			
1.510	.7515E-04	.1138E-01	-.4377E-03			
2.010	-.1336E-03	.2505E-01	-.4784E-04			
2.510	.3702E-03	.4864E-01	-.1256E-03			
3.010	-.3380E-03	-.1655E-01	-.5069E-04			
3.510	-.2866E-03	-.2588E-01	-.6696E-04			
4.010	-.4118E-03	-.2106E-01	-.2340E-03			
4.510	.2364E-04	-.1268E-01	.2824E-03			
5.010	-.2438E-03	-.2772E-01	.2463E-03			
5.510	-.3838E-04	-.2514E-01	.2151E-03			
6.010	-.2579E-04	-.8968E-02	.9304E-04			
6.510	.2627E-03	.2583E-01	-.2008E-03			
7.010	.2105E-03	.2479E-01	-.1909E-03			
7.510	-.4649E-04	.2074E-01	-.4054E-03			
8.010	.1582E-03	.2759E-01	-.2612E-03			
8.510	.3437E-03	.2886E-02	-.2800E-03			
9.010	-.1755E-03	-.2846E-01	.8524E-03			
9.510	-.1703E-03	-.2610E-01	.5146E-03			
10.010	-.1338E-03	-.1668E-01	.4218E-03			
10.510	-.9972E-04	-.2293E-01	.6476E-03			
11.010	.1796E-03	.2181E-02	.3823E-04			
11.510	.2474E-04	.5195E-01	-.9834E-03			
12.010	-.8477E-05	.7822E-02	.3399E-03			
12.510	.7677E-04	-.1599E-02	.3551E-03			
13.010	.1471E-03	.1699E-01	-.2916E-03			
13.510	-.2360E-03	-.8066E-01	.6843E-03			
14.010	-.2558E-03	.5723E-02	.1763E-03			
14.510	-.1043E-03	-.4019E-02	.4550E-04			
15.010	-.1620E-03	.1225E-01	.3947E-03			
15.510	-.1536E-03	.1256E-01	.4381E-04			
16.010	.3806E-03	.2522E-01	.5386E-04			
16.510	-.1836E-03	.1128E-01	-.2292E-04			
17.010	-.4174E-04	-.1364E-01	-.9583E-04			
17.510	.8203E-04	-.8480E-02	-.4034E-04			
18.010	.6667E-04	-.1124E-01	.8912E-05			
18.510	-.5680E-04	-.9381E-02	-.4460E-04			
19.010	-.4024E-04	-.8472E-02	-.6795E-04			
19.510	.1704E-03	-.5689E-02	-.2984E-04			

ABSOLUTE ACCL. AT FLOOR DEGREE OF FREEDOM.. ..

TIME	1	2	3	4	5	6
.010	-.6160E-17	.5551E-16	.1991E-17	-.1784E-17	.2776E-16	.4339E-18
.510	.6501E-02	.5472E-01	.9331E-02	.5448E-02	.6112E-01	.8276E-02
1.010	.1624E-03	-.2557E+00	-.2082E-01	.1548E-01	.1568E+00	.5448E-02

1.510	-.5753E-01	-.1787E+01	-.4232E-01	-.9059E-02	-.1202E+01	-.1197E-01
2.010	-.1874E-01	.4867E+00	.8452E-02	-.1658E-01	.2001E+00	.3281E-02
2.510	.3702E-01	-.9519E+00	.2293E-01	.2092E-01	-.1132E+01	-.4393E-02
3.010	.2881E-01	.6714E+00	.7717E-02	.2569E-01	.7477E+00	.1575E-01
3.510	-.6586E-01	-.1008E+01	-.5118E-01	-.2920E-02	-.2994E+00	-.1285E-01
4.010	.1508E-01	.2550E+00	.7386E-01	.4118E-02	.1375E+00	.5837E-01
4.510	-.3601E-01	.3830E+00	-.3573E-01	-.3524E-02	.5078E+00	-.2332E-01
5.010	.1798E-01	-.1952E+00	-.4681E-01	.1154E-01	.3322E+00	-.1160E-01
5.510	.3795E-01	.7200E-01	.2757E-01	.2617E-01	.2348E+00	.3933E-01
6.010	.1268E-01	.5610E+00	-.2030E-02	-.5007E-02	.2840E+00	-.5765E-02
6.510	.4103E-01	.1420E+00	.4851E-01	.4554E-02	-.2510E-01	.3994E-01
7.010	.7731E-01	-.7382E+00	-.4761E-01	.5313E-01	-.3048E+00	-.1010E-01
7.510	-.7939E-01	-.1052E+01	-.5311E-01	-.4329E-01	-.3737E+00	-.3225E-02
8.010	.2281E-01	-.6243E+00	-.1677E-01	.2601E-01	-.5863E+00	-.1487E-01
8.510	.3060E-01	.5744E+00	.2431E-01	.2511E-02	.4633E+00	.1664E-01
9.010	-.5970E-02	.9480E+00	-.7927E-03	-.4107E-02	.9108E+00	-.4039E-02
9.510	-.2029E-01	.5301E-01	.2262E-01	-.8264E-02	-.7172E-01	.8158E-02
10.010	.4037E-01	-.3478E+00	-.3942E-02	.2020E-01	-.1013E+00	.8525E-02
10.510	-.1255E-01	.1054E+01	.1341E-01	-.3031E-01	.7765E+00	.9580E-03
11.010	.2044E-01	-.7714E+00	.5374E-02	.1530E-01	-.8457E+00	-.8508E-02
11.510	-.1353E-01	-.1655E+01	.1644E-01	-.2852E-02	-.1416E+01	.2433E-01
12.010	.1736E-01	.1305E+01	.2340E-01	.4140E-02	.9663E+00	.1267E-01
12.510	.7702E-01	.4394E+00	.5900E-01	.9303E-02	.1552E+00	.3803E-01
13.010	.2952E-01	.2327E+00	.1584E-01	.5747E-02	-.1161E+00	-.3467E-02
13.510	-.4700E-02	.1973E+01	.2245E-01	-.3709E-02	.1869E+01	.1856E-01
14.010	-.1624E-01	-.9946E+00	-.1588E-01	-.2020E-01	-.9003E+00	-.1938E-01
14.510	.2163E-01	.1812E+01	.7639E-01	-.4191E-02	.9380E+00	.2931E-01
15.010	.4150E-01	-.8188E+00	-.6645E-01	.1357E-01	-.6695E+00	-.5483E-01
15.510	-.8844E-01	.9488E+00	.8062E-01	-.6283E-01	.1468E+00	.2650E-01
16.010	.1047E+00	-.3017E+00	.2730E-01	.5843E-01	-.6561E+00	.2253E-02
16.510	-.1454E+00	-.7506E+00	-.4589E-01	-.4265E-01	-.4312E+00	-.2865E-01
17.010	.7673E-03	.1368E+00	-.1384E-01	.3054E-02	.5137E+00	.9472E-02
17.510	.5259E-01	.6506E+00	.4864E-01	-.4620E-02	.1639E+00	.1488E-01
18.010	.2753E-01	.3665E+00	.5401E-02	.1974E-01	.2900E+00	.1325E-02
18.510	-.5331E-01	-.2794E+00	-.1125E-01	-.4446E-01	-.2277E+00	-.1206E-01
19.010	.2477E-01	.1425E-01	.4950E-02	.2592E-01	.2525E-01	.5268E-02
19.510	-.2614E-02	.8926E-01	.1095E-01	-.5762E-02	-.1435E-01	.5677E-02

ABSOLUTE ACCL. AT FLOOR DEGREE OF FREEDOM.. .

TIME	7	8	9	10	11	12
.010	-.9378E-18	.0000E+00	-.6401E-18	-.1981E-17	-.1388E-16	-.1088E-17
.510	.2345E-02	.7104E-01	.7437E-02	-.2656E-02	.8635E-01	.6801E-02
1.010	.1629E-01	.4949E+00	.2400E-01	-.2869E-02	.6771E+00	.3335E-01
1.510	.2629E-01	-.6746E+00	.1127E-01	.3334E-01	-.2796E+00	.2788E-01
2.010	-.1088E-01	-.1198E+00	-.3276E-02	.7215E-03	-.4872E+00	-.1463E-01
2.510	-.5193E-02	-.1237E+01	-.2539E-01	-.3628E-01	-.1206E+01	-.4017E-01
3.010	.1698E-01	.7939E+00	.2109E-01	.2189E-02	.7823E+00	.2287E-01
3.510	.3645E-01	.3486E+00	.1764E-01	.2910E-01	.8560E+00	.4235E-01
4.010	-.7136E-02	.3122E-01	.4393E-01	-.8755E-02	-.5899E-01	.2728E-01
4.510	.1803E-01	.6107E+00	-.1304E-01	.1300E-01	.6735E+00	-.3763E-02
5.010	-.4197E-02	.7569E+00	.1320E-01	-.2430E-01	.9683E+00	.2544E-01
5.510	.5887E-02	.3222E+00	.4417E-01	-.1874E-01	.2568E+00	.3722E-01
6.010	-.1995E-01	.8216E-02	-.9698E-02	-.2580E-01	-.2862E+00	-.1534E-01
6.510	-.3416E-01	-.2736E+00	.2509E-01	-.5644E-01	-.6797E+00	-.6193E-02
7.010	.1556E-01	.2100E-01	.1719E-01	-.3331E-01	.1340E+00	.3300E-01
7.510	-.8080E-02	.1443E+00	.3108E-01	.2035E-01	.3373E+00	.4558E-01
8.010	.2342E-01	-.5515E+00	-.1341E-01	.1086E-01	-.5242E+00	-.1230E-01
8.510	-.1975E-01	.3722E+00	.1101E-01	-.2655E-01	.3213E+00	.7622E-02
9.010	-.1331E-02	.8734E+00	-.7118E-02	.3068E-02	.8376E+00	-.1078E-01
9.510	.8438E-02	-.1252E+00	-.8906E-04	.2417E-01	-.4080E-01	.1187E-02
10.010	-.8291E-03	.1082E+00	.1896E-01	-.1475E-01	.2363E+00	.2350E-01
10.510	-.3122E-01	.5038E+00	-.9928E-02	-.6051E-02	.2504E+00	-.2125E-01
11.010	.1440E-01	-.8373E+00	-.1751E-01	.1573E-01	-.6737E+00	-.1458E-01
11.510	.1070E-01	-.1191E+01	.3004E-01	.2578E-01	-.1004E+01	.3330E-01
12.010	-.9342E-02	.6159E+00	.2455E-02	-.2071E-01	.2594E+00	-.9924E-02
12.510	-.4242E-01	-.1463E+00	.1648E-01	-.4919E-01	-.4816E+00	-.1263E-01
13.010	-.1266E-01	-.4059E+00	-.1650E-01	-.1914E-01	-.5680E+00	-.2141E-01
13.510	-.3590E-02	.1751E+01	.1384E-01	-.4294E-02	.1608E+01	.6133E-02
14.010	-.1509E-01	-.7694E+00	-.2040E-01	.5376E-02	-.5774E+00	-.1696E-01
14.510	-.1949E-01	.1689E+00	-.5610E-02	-.1806E-01	-.3652E+00	-.2772E-01
15.010	-.6060E-02	-.5080E+00	-.4258E-01	-.1098E-01	-.3241E+00	-.2552E-01
15.510	-.2142E-01	-.5232E+00	-.1385E-01	.3309E-01	-.9170E+00	-.3986E-01
16.010	.5114E-02	-.9095E+00	-.1318E-01	-.4748E-01	-.9581E+00	-.1459E-01
16.510	.4782E-01	-.8789E-01	-.1263E-01	.8910E-01	.2955E+00	.1102E-01
17.010	-.4365E-03	.8094E+00	.2462E-01	-.7255E-02	.9354E+00	.2865E-01
17.510	-.4174E-01	-.2401E+00	-.1030E-01	-.3613E-01	-.4744E+00	-.2658E-01
18.010	.1212E-01	.2293E+00	-.1122E-02	.2960E-02	.2025E+00	-.1164E-02
18.510	-.2209E-01	-.1491E+00	-.1089E-01	.1545E-01	-.2269E-01	-.5649E-02

19.010	.2240E-01	4120E-01	5940E-02	.1122E-01	.6658E-01	.7544E-02
19.510	-.1362E-01	- 1157E+00	.9742E-03	-.2495E-01	- 2089E+00	-.3993E-02

ABSOLUTE ACCL AT FLOOR DEGREE OF FREEDOM.....

TIME	13	14	15	16	17	18
.010	-.6422E-18	-.1388E-16	-.4521E-18	7115E-17	-.1388E-16	.3297E-18
.510	-.7361E-02	1103E+00	.6322E-02	-.7912E-02	.1278E+00	.5916E-02
1.010	-.1328E-01	.6451E+00	.2688E-01	.4732E-03	.5225E+00	.1670E-01
1.510	.2843E-01	-.7104E-01	.2883E-01	.2851E-01	-.6742E-01	.2128E-01
2.010	.2475E-01	-.9120E+00	-.2840E-01	.4966E-01	-.1141E+01	-.3093E-01
2.510	-.6605E-01	-.9712E+00	-.4556E-01	-.7125E-01	-.7344E+00	-.4606E-01
3.010	-.7111E-02	.6910E+00	.1949E-01	-.2751E-02	.6063E+00	.1652E-01
3.510	.6213E-02	.1157E+01	5206E-01	.3848E-02	1188E+01	.4573E-01
4.010	.6488E-02	-.1061E+00	.9186E-02	.2811E-01	-.8289E-01	.9612E-03
4.510	-.1014E-01	.6722E+00	.3029E-02	-.2425E-01	.6285E+00	.4891E-02
5.010	-.1378E-01	.8851E+00	.1637E-01	2122E-01	.6962E+00	.2810E-02
5.510	-.3005E-01	-.2509E-02	1411E-01	-.2064E-01	-.2075E+00	-.1007E-02
6.010	-.1257E-01	-.6271E+00	- 1994E-01	.1111E-01	-.8039E+00	-.1782E-01
6.510	-.4445E-01	-.1261E+01	- 5557E-01	-.1043E-01	-.1586E+01	-.7967E-01
7.010	-.6100E-01	-.5544E-01	.2998E-01	-.5158E-01	-.3104E+00	.2163E-01
7.510	.5889E-01	.8444E-01	.2842E-01	.8454E-01	- 2610E+00	.8358E-02
8.010	-.1005E-01	-.5074E+00	-.1202E-01	-.2328E-01	-.5045E+00	- 1245E-01
8.510	-.2326E-01	.3266E+00	.8117E-02	- 2077E-01	.3585E+00	1013E-01
9.010	.7851E-02	.8082E+00	-.1475E-01	.1030E-01	8020E+00	-.1631E-01
9.510	.1709E-01	.2274E+00	.1542E-01	-.8650E-02	.4438E+00	2502E-01
10.010	-.1128E-01	.2534E+00	.1819E-01	.7642E-03	.2078E+00	.1278E-01
10.510	.2188E-01	.3113E-01	- 2991E-01	.2257E-01	-.5086E-01	-.2999E-01
11.010	-.5178E-02	-.3034E+00	.2344E-02	- 4064E-01	- 2636E-01	.1250E-01
11.510	.3158E-01	-.8677E+00	.3084E-01	.2024E-01	-.8216E+00	.2548E-01
12.010	-.2796E-01	-.9819E-01	- 2097E-01	-.2516E-01	-.2658E+00	-.2119E-01
12.510	-.2633E-01	-.8302E+00	-.4787E-01	-.1222E-01	-.8679E+00	-.6252E-01
13.010	-.1974E-01	-.5626E+00	-.1255E-01	-.1780E-01	-.4804E+00	-.2069E-02
13.510	-.5086E-02	.1439E+01	- 3989E-02	-.3738E-02	.1354E+01	-.7726E-02
14.010	3120E-01	-.3042E+00	- 9323E-02	.3879E-01	-.1321E+00	-.7020E-02
14.510	-.2154E-01	-.5722E+00	-.2429E-01	-.2961E-01	-.5063E+00	-.8090E-02
15.010	-.8884E-02	- 1308E+00	-.4433E-02	-.1449E-01	-.5625E-01	.4652E-02
15.510	.6454E-01	-.9179E+00	- 3927E-01	.5855E-01	-.7080E+00	-.2611E-01
16.010	-.9140E-01	-.7354E+00	.4904E-02	-.9968E-01	-.5025E+00	.2108E-01
16.510	.7851E-01	.7109E+00	.3930E-01	.5249E-01	9024E+00	.4947E-01
17.010	.2609E-02	.8344E+00	.1485E-01	.2341E-01	.6793E+00	.1237E-02
17.510	-.1248E-01	-.4681E+00	- 2672E-01	-.5696E-02	-.3363E+00	-.1909E-01
18.010	-.1768E-01	.2187E+00	.2600E-02	-.3953E-01	.2474E+00	5960E-02
18.510	.4898E-01	.1632E+00	3902E-02	.5014E-01	.2765E+00	8116E-02
19.010	-.4791E-02	.1030E+00	.1016E-01	-.1281E-01	1242E+00	.1141E-01
19.510	-.2860E-01	- 2869E+00	-.8104E-02	-.1757E-01	-.3130E+00	-.8660E-02

ABSOLUTE ACCL. AT FLOOR DEGREE OF FREEDOM ...

TIME	19	20	21	22	23	24
.010	.1691E-16	.0000E+00	9422E-18			
.510	- 6259E-02	.1412E+00	.5590E-02			
1.010	.1871E-01	.3973E+00	.8668E-02			
1.510	.3080E-01	- 1086E+00	.1399E-01			
2.010	.6737E-01	-.1285E+01	-.3198E-01			
2.510	-.6026E-01	-.5326E+00	-.4631E-01			
3.010	.4848E-02	.5349E+00	1429E-01			
3.510	1208E-01	.1156E+01	3975E-01			
4.010	.4871E-01	-.5005E-01	- 4770E-02			
4.510	-.3011E-01	.5828E+00	6017E-02			
5.010	.5310E-01	.5109E+00	-.7625E-02			
5.510	-.8947E-02	-.3741E+00	-.1206E-01			
6.010	.3247E-01	-.8217E+00	-.1560E-01			
6 510	.1736E-01	-.1813E+01	-.8645E-01			
7.010	-.3502E-01	-.5427E+00	.1500E-01			
7.510	.8897E-01	-.5782E+00	- 7074E-02			
8.010	-.3010E-01	-.5052E+00	-.1286E-01			
8.510	-.1968E-01	3916E+00	.1178E-01			
9.010	.1112E-01	.8013E+00	-.1736E-01			
9.510	-.3189E-01	.6190E+00	.3198E-01			
10.010	.1046E-01	.1548E+00	.7729E-02			
10.510	.9063E-02	-.9228E-01	-.2942E-01			
11.010	-.7004E-01	1919E+00	.1971E-01			
11 510	2726E-02	-.8025E+00	2112E-01			
12.010	-.2009E-01	-.3681E+00	- 2056E-01			
12.510	-.1214E-01	-.1045E+01	- 7242E-01			
13.010	-.1235E-01	- 3924E+00	6094E-02			

13.510	-.2926E-02	1297E+01	- 1015E-01
14.010	3842E-01	- 6009E-02	-.5674E-02
14.510	- 3273E-01	-.3903E+00	.5212E-02
15.010	-.2272E-01	- 1547E-01	.1088E-01
15.510	.4625E-01	- 4827E+00	-.1526E-01
16.010	- 8494E-01	-.2987E+00	.3320E-01
16.510	.3205E-01	1021E+01	.5601E-01
17.010	.3936E-01	.5335E+00	-.9163E-02
17.510	-.6661E-02	-.1964E+00	- 1274E-01
18.010	-.5670E-01	.2735E+00	8492E-02
18.510	.3831E-01	3590E+00	1098E-01
19.010	- 1486E-01	.1393E+00	.1227E-01
19.510	- 2069E-02	-.3243E+00	-.8844E-02

STRUCTURE SHEAR AT TOP OF BASE

.010	-.1311E-15	.1336E-14	.6147E-15
.510	- 1891E+00	.1935E+02	7186E+02
1.010	.4872E+00	.8684E+02	.1468E+03
1.510	.2184E+01	-.1471E+03	.6956E+02
2.010	.1234E+01	-.7885E+02	-.1136E+03
2.510	-.4917E+01	- 2334E+03	-.2371E+03
3.010	.2237E+01	.1608E+03	.1711E+03
3.510	.3900E+00	.9134E+02	.1691E+03
4.010	.1423E+01	.5319E+01	.3403E+03
4.510	- 1569E+01	.1311E+03	- 1056E+03
5.010	.1481E+00	1324E+03	.7802E+01
5.510	-.2528E+00	2482E+02	.2616E+03
6.010	- 1571E+01	-.3653E+02	- 1188E+03
6.510	-.4052E+01	-.1431E+03	-.6289E+02
7.010	-.5438E+00	-.4487E+02	8307E+02
7.510	.1695E+01	-.3846E+02	1044E+03
8.010	1734E+01	- 1231E+03	-.1334E+03
8.510	-.2300E+01	.8969E+02	.1253E+03
9 010	4192E+00	.1936E+03	-.9038E+02
9.510	.6309E+00	.1903E+02	.1183E+03
10.010	.1107E+01	1534E+02	1344E+03
10.510	- 1136E+01	9253E+02	- 1325E+03
11.010	7021E+00	-.1277E+03	-.3452E+02
11 510	.2870E+01	-.2578E+03	.2651E+03
12 010	- 2471E+01	9930E+02	-.2931E+02
12 510	- 1915E+01	-.7311E+02	-.3242E+02
13.010	- 1423E+01	-.7380E+02	-.6958E+02
13.510	- 9464E+00	3724E+03	.7648E+02
14 010	.1100E+01	-.1353E+03	- 1444E+03
14.510	- 2767E+01	4728E+02	5113E+02
15.010	4147E+00	-.9145E+02	-.3004E+03
15.510	- 1391E-01	-.7994E+02	-.3671E+02
16.010	- 3340E+01	-.1534E+03	.4325E+02
16.510	3748E+01	.2912E+02	.3260E+02
17 010	.8015E+00	1486E+03	1101E+03
17.510	- 1927E+01	- 3005E+02	-.4218E+02
18.010	4722E-01	.5779E+02	.2106E+02
18.510	.2188E+00	-.7339E+01	-.4295E+02
19.010	.2378E+01	1435E+02	.7511E+02
19.510	- 3605E+01	- 3312E+02	- 8113E+01

FORCE AND DISPL. IN X DIR AND Y DIR. AT BEARING NUMBURED: 1

TIME	FORC X	DISP X	VELC. X	FORC. Y	DISP. Y	VELC. Y	
.0100	- 9411E-10	-.6933E-13	-.1387E-10	-.3512E-02	-.2587E-05	-.5175E-03	
5100	- 3392E+00	-.2325E-03	-.4041E-02	-.6849E+00	-.6446E-03	-.7662E-02	
1.0100	- 7597E+00	-.3184E-03	-.8990E-02	-.4070E+01	-.5163E-02	-.1006E-01	
1.5100	- 1437E+01	-.2845E-02	.9884E-02	.7887E+01	.1530E-01	.3411E-01	
2.0100	.2165E+00	-.4637E-03	.7620E-02	.6099E+01	.2548E-01	.8507E-01	
2.5100	.1456E+01	-.4866E-03	-.4041E-02	.1149E+02	.4878E-01	-.5328E-01	
3.0100	- 5055E+00	-.6858E-03	-.1268E-01	-.8191E+01	-.1609E-01	-.1529E+00	
3 5100	- 6934E+00	-.7486E-03	.5145E-02	-.5092E+01	-.2527E-01	-.3912E-01	
4.0100	-.1549E+01	-.2026E-02	-.2239E-01	.1202E+01	-.1892E-01	.1098E+00	
4.5100	1141E+01	.1972E-02	1825E-01	-.7983E+01	-.1527E-01	-.1291E+00	
5.0100	4742E-01	.1455E-02	.1801E-01	-.8228E+01	-.2997E-01	-.1111E-01	
5 5100	- 1200E+01	.1446E-02	-.3841E-01	-.4728E+00	-.2711E-01	.1215E+00	
6 0100	.9609E+00	6162E-03	-.2575E-01	.1784E+01	-.1082E-01	.1073E+00	
6.5100	.1047E+01	-.1123E-02	.9100E-02	.1029E+02	.2766E-01	.8322E-01	
7.0100	- 5613E-01	-.1107E-02	- 2692E-01	.4306E+01	.2654E-01	-.8971E-02	
7.5100	- 1297E+01	- 2844E-02	1203E-02	.4288E+01	.2445E-01	.4138E-01	
8 0100	1332E+00	- 1644E-02	1359E-01	.6149E+01	.2998E-01	-.3572E-01	
8 5100	- 5128E-01	- 1588E-07	5241E-02	-.3966E+01	.5547E-02	-.7172E-01	

9.0100	.1853E+01	5706E-02	3274E-02	-.1229E+02	-.3726E-01	-.4434E-01
9.5100	-.3979E+00	.3381E-02	.8656E-03	-.1356E+01	-.3081E-01	.3887E-01
10.0100	-.8904E+00	.2777E-02	- 7496E-02	-.1015E+01	-.2054E-01	-.2079E-01
10.5100	.1534E+01	.4369E-02	-.4302E-02	- 5836E+01	-.2886E-01	.3334E-01
11.0100	-.1041E+01	.4435E-03	-.1972E-01	.5280E+01	.1841E-02	.9981E-01
11.5100	-.3248E+01	-.6761E-02	-.6480E-02	.1660E+02	.6095E-01	.4394E-01
12.0100	.1001E+01	.2337E-02	.8268E-02	-.4107E+01	4712E-02	-.1365E+00
12.5100	.7251E-01	2527E-02	-.2423E-01	.4091E+01	-.4848E-02	.1460E+00
13.0100	.9077E+00	-.1865E-02	-.1194E-01	.3656E+01	.1966E-01	-.4407E-01
13.5100	.2018E+01	.5866E-02	.2873E-01	-.2234E+02	-.8875E-01	-.1360E+00
14.0100	.8386E-01	.9605E-03	-.2661E-02	.5860E+01	.4110E-02	1092E+00
14.5100	.3229E+00	.2097E-03	-.1326E-01	-.2358E+00	- 4436E-02	.3719E-01
15.0100	.1878E+01	.2562E-02	-.1018E-01	.2445E+01	.8639E-02	.6910E-02
15.5100	-.3092E+00	.1487E-03	.1263E-01	.4583E+01	.1216E-01	4730E-01
16.0100	-.7301E+00	7522E-03	-.2542E-01	.9692E+01	.2472E-01	.2408E-03
16.5100	-.8208E+00	- 3417E-03	- 7056E-02	-.2713E+01	.1149E-01	-.9256E-01
17.0100	.8547E+00	-.7030E-03	2692E-01	-.7448E+01	-.1277E-01	-.6252E-01
17.5100	1830E+00	-.1963E-03	.1623E-02	.2476E+01	-.8111E-02	.4193E-01
18.0100	.3638E+00	.1282E-03	-.1913E-01	-.3887E+01	-.1132E-01	-.9981E-02
18.5100	-.1470E+00	-.3646E-03	-.3339E-02	-.4899E+00	-.8972E-02	.6651E-02
19.0100	-.3988E+00	- 5091E-03	.3243E-02	-.4027E+00	-.7850E-02	.3778E-02
19.5100	8999E-01	-.3549E-04	- 7754E-02	.2274E+01	- 5416E-02	.1429E-01

FORCE AND DISPL. IN X DIR. AND Y DIR. AT BEARING NUMBURED: 2

TIME	FORC. X	DISP. X	VELC. X	FORC Y	DISP. Y	VELC. Y
.0100	-.9411E-10	-.6933E-13	-.1387E-10	- 3512E-02	-.2587E-05	-.5175E-03
.5100	.3583E-01	.2548E-04	-.3725E-04	-.6932E+00	-.6446E-03	- 7662E-02
1.0100	-.3068E-01	-.2765E-04	-.7594E-03	-.4222E+01	- 5163E-02	-.1006E-01
1.5100	-.1054E+00	5326E-04	-.7295E-03	.8064E+01	1539E-01	.3411E-01
2.0100	-.1900E+00	-.1360E-03	.1711E-02	.6100E+01	.2548E-01	.8507E-01
2.5100	.3307E+00	.3639E-03	-.2107E-03	.1172E+02	.4979E-01	-.5328E-01
3.0100	- 9283E-01	- 3385E-03	-.7080E-03	-.8204E+01	-.1608E-01	-.1529E+00
3.5100	-.3868E-01	-.2899E-03	-.2772E-02	-.5107E+01	-.2527E-01	-.3912E-01
4.0100	-.3855E-01	-.4235E-03	.2796E-02	.1321E+01	-.1892E-01	.1098E+00
4.5100	- 2941E-01	.3776E-04	-.1519E-02	-.8037E+01	-.1527E-01	-.1291E+00
5.0100	-.9948E-01	-.2316E-03	-.1854E-04	-.8626E+01	-.2997E-01	-.1111E-01
5.5100	4487E-01	-.2762E-04	.9484E-03	-.2530E+00	-.2711E-01	.1215E+00
6.0100	- 3898E-02	-.2114E-04	.1138E-03	.1982E+01	- 1082E-01	.1073E+00
6.5100	.1064E+00	.2526E-03	.8574E-03	.1045E+02	.2766E-01	.8322E-01
7 0100	.1925E-01	.2010E-03	-.1007E-02	4466E+01	.2654E-01	-.9971E-02
7.5100	-.1969E+00	-.6677E-04	-.1558E-02	.4215E+01	2445E-01	4138E-01
8.0100	-.3849E-01	.1452E-03	.2554E-02	.6218E+01	2998E-01	- 3572E-01
8.5100	.1280E+00	.3297E-03	- 2974E-03	-.3972E+01	5547E-02	-.7172E-01
9.0100	-.1760E+00	-.1329E-03	-.1845E-02	-.1234E+02	-.3726E-01	- 4434E-01
9.5100	.3706E-01	- 1446E-03	.2157E-03	-.1278E+01	-.3081E-01	3887E-01
10.0100	- 4354E-01	-.1128E-03	8752E-03	- 8359E+00	-.2054E-01	-.2079E-01
10 5100	.1881E-01	- 6734E-04	.2021E-02	-.5862E+01	-.2886E-01	.3334E-01
11.0100	.5377E-01	1816E-03	-.2749E-02	.5417E+01	.1841E-02	.9981E-01
11.5100	-.4164E-01	- 2443E-04	- 3785E-03	.1698E+02	.6095E-01	.4394E-01
12.0100	.6899E-01	.8519E-05	2184E-02	-.4136E+01	.4712E-02	- 1365E+00
12.5100	8337E-01	.8452E-04	.1668E-02	.4108E+01	-.4848E-02	1460E+00
13.0100	1132E+00	.1325E-03	-.1485E-02	.4034E+01	.1966E-01	-.4407E-01
13.5100	- 6719E-01	- 1818E-03	- 1205E-02	-.2241E+02	-.8875E-01	-.1360E+00
14.0100	-.1176E+00	-.2470E-03	-.1003E-02	.5861E+01	.4110E-02	.1092E+00
14.5100	.2457E+00	-.1020E-03	.4489E-02	-.3143E+00	-.4436E-02	3719E-01
15.0100	- 7458E-01	-.1423E-03	-.4657E-02	.2822E+01	8639E-02	.6910E-02
15.5100	3690E-01	-.1514E-03	.3021E-02	.4719E+01	1216E-01	.4730E-01
16.0100	.3476E+00	.3832E-03	.2581E-03	.9841E+01	.2472E-01	.2408E-03
16.5100	-.2341E+00	-.1847E-03	-.4645E-02	-.2762E+01	.1149E-01	- 9256E-01
17.0100	-.3472E-01	-.4653E-04	.3068E-02	-.7553E+01	-.1277E-01	-.6252E-01
17 5100	.1137E+00	.8002E-04	.1306E-02	.2362E+01	- 8111E-02	.4193E-01
18.0100	.4038E-01	.6711E-04	-.1617E-02	-.4038E+01	-.1132E-01	-.9981E-02
18.5100	-.1193E+00	-.5913E-04	-.1249E-04	-.7259E+00	-.8972E-02	.6651E-02
19.0100	-.8769E-01	-.4363E-04	.1080E-02	-.4610E+00	-.7850E-02	.3778E-02
19.5100	1677E+00	.1688E-03	-.7473E-04	.2255E+01	-.5416E-02	.1429E-01

FORCE AND DISPL. IN X DIR. AND Y DIR. AT BEARING NUMBURED: 3

TIME	FORC. X	DISP. X	VELC. X	FORC. Y	DISP. Y	VELC. Y
0100	-.4823E-10	-.6933E-13	- 1387E-10	-.1800E-02	-.2587E-05	-.5175E-03
.5100	.2014E+00	.2759E-03	.3849E-02	-.3777E+00	-.6446E-03	-.7662E-02
1.0100	.3166E+00	.2546E-03	.7231E-02	-.2352E+01	-.5163E-02	- 1006E-01
1.5100	.7301E+00	.2964E-02	-.1103E-01	.4569E+01	.1539E-01	3411E-01
2.0100	-.3231E+00	.1822E-03	-.4025E-02	.3010E+01	2548E-01	.8507E-01
2.5100	-.4422E+00	.1199E-02	.3508E-02	.6504E+01	.4979E-01	- 5329E-01
3.0100	.1824E+00	-.1413E-05	1093E-01	-.4741E+01	- 1609E-01	-.1529E+00
3.5100	2393E+00	.1554E-03	- 1046E-01	-.2847E+01	- 2527E-01	-.3912E-01
4.0100	.8796E+00	1132E-02	2724E-01	1028E+01	- 1892E-01	1098E+00

4.5100	- 7320E+00	- 1840E-02	- 2168E-01	-.4603E+01	-.1527E-01	- 1291E+00
5.0100	-.1077E+00	-.1869E-02	-.1752E-01	- 4676E+01	-.2997E-01	-.1111E-01
5.5100	.7775E+00	-.1458E-02	.3918E-01	.1837E+00	-.2711E-01	.1215E+00
6.0100	-.5545E+00	-.6398E-03	.2522E-01	.1238E+01	-.1082E-01	.1073E+00
6 5100	-.5311E+00	.1588E-02	-.7144E-02	5829E+01	.2766E-01	.8322E-01
7.0100	-.6673E-01	1470E-02	.2415E-01	.2483E+01	.2654E-01	-.9971E-02
7.5100	.4772E+00	2629E-02	- 4238E-02	.2061E+01	.2445E-01	.4138E-01
8.0100	-.8286E-01	.1882E-02	-.8163E-02	3543E+01	2998E-01	-.3572E-01
8.5100	.1621E+00	.2192E-02	-.5674E-02	-.2540E+01	.5547E-02	-.7172E-01
9.0100	-.1209E+01	-.5801E-02	- 6814E-02	-.6842E+01	-.3726E-01	-.4434E-01
9.5100	.3378E+00	-.3567E-02	-.4153E-03	-.5080E+00	-.3081E-01	.3887E-01
10.0100	.4268E+00	-.2918E-02	.9002E-02	-.7030E-01	-.2054E-01	-.2079E-01
10.5100	-.7379E+00	-.4374E-02	.8160E-02	-.3384E+01	-.2886E-01	.3334E-01
11.0100	6613E+00	-.7270E-04	.1373E-01	.3222E+01	.1841E-02	9981E-01
11 5100	.1738E+01	.6515E-02	.5543E-02	.9127E+01	.6095E-01	.4394E-01
12.0100	-.4978E+00	-.2252E-02	-.3723E-02	-.2615E+01	.4712E-02	-.1365E+00
12.5100	.5465E-01	-.2267E-02	.2681E-01	.2595E+01	- 4848E-02	.1460E+00
13.0100	-.3291E+00	2072E-02	.8668E-02	.2413E+01	.1966E-01	-.4407E-01
13.5100	- 1159E+01	-.6072E-02	- 3124E-01	-.1210E+02	-.8875E-01	-.1360E+00
14.0100	- 1646E+00	- 1419E-02	.6053E-03	.3526E+01	4110E-02	.1092E+00
14 5100	.8799E-01	- 4046E-03	.2172E-01	-.5434E+00	- 4436E-02	3719E-01
15.0100	-.1118E+01	- 2767E-02	.7017E-03	.1778E+01	8639E-02	6910E-02
15.5100	.2460E+00	-.4427E-03	- 6311E-02	.2589E+01	.1216E-01	4730E-01
16.0100	.6618E+00	.2507E-04	.2519E-01	5471E+01	.2472E-01	.2408E-03
16.5100	2295E+00	-.3234E-04	-.2305E-02	-.1846E+01	.1149E-01	-.9256E-01
17 0100	-.4648E+00	.5907E-03	-.2009E-01	-.4359E+01	-.1277E-01	- 6252E-01
17.5100	- 2668E-01	.3483E-03	.9975E-03	.1204E+01	-.8111E-02	.4183E-01
18.0100	-.2028E+00	7852E-05	1538E-01	- 1877E+01	-.1132E-01	-.9981E-02
18 5100	-.5745E-01	.2375E-03	.3217E-02	-.2119E+00	-.8972E-02	.6651E-02
19.0100	.9543E-01	.4083E-03	-.9984E-03	-.3101E-01	- 7850E-02	.3778E-02
19.5100	.1041E+00	3674E-03	.7381E-02	.1341E+01	-.5416E-02	1429E-01

FORCE AND DISPL. IN X DIR AND Y DIR. AT BEARING NUMBURED: 4

TIME	FORC. X	DISP. X	VELC. X	FORC. Y	DISP. Y	VELC. Y
0100	- 7592E-10	-.6933E-13	-.1387E-10	- 2833E-02	-.2587E-05	-.5175E-03
.5100	-.2611E+00	-.2325E-03	-.4041E-02	-.7976E+00	- 7745E-03	- 8977E-02
1.0100	-.4722E+00	- 3184E-03	-.8990E-02	-.4583E+01	-.5310E-02	- 1276E-01
1.5100	- 1786E+01	-.2945E-02	9884E-02	8543E+01	.1388E-01	3760E-01
2.0100	.9369E-01	-.4637E-03	7620E-02	.5094E+01	2532E-01	8701E-01
2 5100	.1310E+01	-.4966E-03	-.4041E-02	.1231E+02	4936E-01	- 5454E-01
3 0100	- 5370E+00	-.6858E-03	- 1269E-01	-.9268E+01	- 1626E-01	-.1568E+00
3.5100	- 3516E+00	-.7486E-03	5145E-02	-.6084E+01	-.2550E-01	-.3652E-01
4.0100	-.2143E+01	-.2026E-02	- 2239E-01	1960E+01	-.1972E-01	1015E+00
4.5100	1868E+01	1972E-02	.1925E-01	-.8450E+01	- 1429E-01	-.1223E+00
5.0100	1072E-01	.1455E-02	.1801E-01	-.8732E+01	-.2912E-01	-.5189E-02
5.5100	-.1744E+01	.1446E-02	-.3841E-01	1240E+01	-.2637E-01	1086E+00
6.0100	.6183E+00	6162E-03	-.2575E-01	.3632E+01	- 1050E-01	9884E-01
6 5100	.1141E+01	-.1123E-02	.9100E-02	.1088E+02	2697E-01	.8593E-01
7 0100	9956E-01	-.1107E-02	-.2692E-01	4831E+01	.2588E-01	- 1848E-01
7 5100	- 1322E+01	-.2844E-02	.1203E-02	.2881E+01	2305E-01	.4229E-01
8 0100	1109E-01	- 1644E-02	.1359E-01	.6824E+01	.2908E-01	- 3210E-01
8.5100	- 3882E-03	-.1588E-02	.5241E-02	-.5743E+01	.4582E-02	-.6990E-01
9.0100	2115E+01	5706E-02	.3274E-02	- 1222E+02	-.3432E-01	-.4266E-01
9.5100	-.7865E+00	.3381E-02	.8656E-03	-.1434E+01	- 2903E-01	3908E-01
10 0100	- 8344E+00	2777E-02	-.7496E-02	.8791E+00	-.1909E-01	-.2354E-01
10.5100	1196E+01	4369E-02	- 4302E-02	- 5650E+01	-.2663E-01	3126E-01
11.0100	- 1250E+01	4435E-03	- 1972E-01	.6735E+01	.1973E-02	.9424E-01
11.5100	-.3549E+01	-.6761E-02	-.6480E-02	1578E+02	.5755E-01	4193E-01
12 0100	1245E+01	.2337E-02	.8268E-02	-.5496E+01	.5885E-02	-.1345E+00
12 5100	.1510E+00	.2527E-02	-.2423E-01	.5828E+01	-.3623E-02	.1375E+00
13.0100	.4186E+00	-.1865E-02	-.1194E-01	.5545E+01	.1865E-01	-.4750E-01
13.5100	.2119E+01	.5866E-02	2873E-01	-.2088E+02	-.8570E-01	-.1259E+00
14.0100	.8715E-02	.9605E-03	-.2661E-02	.7336E+01	.4718E-02	.1087E+00
14.5100	1621E+00	2097E-03	-.1326E-01	-.2411E+01	-.4278E-02	3136E-01
15.0100	.1788E+01	.2562E-02	-.1018E-01	.4578E+01	.1000E-01	.5087E-02
15 5100	-.4805E+00	.1487E-03	.1263E-01	.4930E+01	.1231E-01	.5045E-01
16 0100	-.3573E+00	.7522E-03	-.2542E-01	.1014E+02	.2491E-01	-.8195E-02
16.5100	-.9266E+00	-.3417E-03	-.7056E-02	-.4027E+01	.1141E-01	- 9335E-01
17.0100	.5850E+00	- 7030E-03	.2692E-01	-.8664E+01	-.1310E-01	-.5468E-01
17.5100	.3278E+00	- 1963E-03	1623E-02	.1174E+01	-.8250E-02	.4203E-01
18 0100	.5445E+00	.1282E-03	- 1913E-01	-.2802E+01	- 1129E-01	- 1573E-01
18 5100	.3016E-01	- 3646E-03	-.3339E-02	-.3628E+00	-.9126E-02	5559E-02
19 0100	- 1924E+00	- 5091E-03	.3243E-02	.4522E-01	-.8084E-02	.4485E-02
19 5100	.2338E+00	- 3549E-04	- 7754E-02	2442E+01	-.5518E-02	.1176E-01

************* MAX. RESPONSE ************

MAX. REL. DISP. AT THE CENTER OF MASS OF FLOORS
(WITH RESPECT TO THE BASE)

FLOOR	X DISP	Y DISP.	ROTN.(rad)
6	.0013	-.0448	-.0019
5	-.0010	-.0365	-.0016
4	.0010	-.0277	-.0012
3	.0010	-.0181	-.0008
2	.0007	-.0078	-.0002
1	.0003	-.0031	-.0001

MAX INTERSTORY DRIFT

STORY	X DST.	Y DST.	TIME	X DRIFT/FL. HT.(%)	TIME	Y DRIFT/FL. HT.(%)
6	9.00	6.75	13.63	09	13.62	.36
5	9.00	6.75	13.56	.08	13.58	.37
4	9.00	6.75	13.55	.10	13.56	.43
3	9.00	6.75	13.53	.09	13.55	.39
2	9.00	6.75	2.40	.02	13.54	.19
1	9.00	6.75	2.41	.01	13.53	.10
6	-9.00	-6.75	13.65	.06	13.59	.17
5	-9.00	-6.75	13.63	.06	13.59	.18
4	-9.00	-6.75	13.56	.10	13.58	.17
3	-9.00	-6.75	13.55	.10	13.58	.15
2	-9.00	-6.75	13.54	.04	13.57	.11
1	-9.00	-6.75	13.53	.02	13.57	.06
6	.00	.00	13.56	02	13.61	.26
5	.00	.00	12.74	.01	13.59	.28
4	.00	.00	15.83	.01	13.57	.30
3	.00	.00	13.58	.01	13.56	.27
2	.00	.00	13.58	.01	13.55	.15
1	.00	.00	13.59	.01	13.55	.08
6	.00	.00	13.56	.02	13.61	.26
5	.00	.00	12.74	.01	13.59	.28
4	.00	.00	15.83	01	13.57	.30
3	.00	.00	13.58	.01	13.56	.27
2	.00	.00	13.58	.01	13.55	.15
1	.00	.00	13.59	.01	13.55	.08
6	.00	.00	13.56	.02	13.61	.26
5	.00	.00	12.74	.01	13.59	.28
4	.00	.00	15.83	.01	13.57	.30
3	.00	.00	13.58	.01	13.56	.27
2	.00	.00	13.58	01	13.55	.15
1	.00	.00	13.59	.01	13.55	.08
6	.00	.00	13.56	.02	13.61	.26
5	.00	.00	12.74	.01	13.59	.28
4	.00	.00	15.83	.01	13.57	.30
3	.00	.00	13.58	.01	13.56	.27
2	.00	.00	13.58	.01	13.55	.15
1	.00	.00	13.59	.01	13.55	.08

MAX. DISP. AT THE CENTER OF MASS OF BASE

X DISP.	Y DISP.	ROTN...
.001	-.082	.001

MAX RESULTANT DISP. AT THE CENTER OF MASS OF BASE

TIME	RES. DISP.	X COMP.	Y COMP
13.540	.082	.000	-.082

MAX RESULTANT BEARING DISP.

BEARING	TIME	MAX. DISP	ANG. WITH X AXIS
1	13.550	.092	-1.485
2	13.550	.092	1.568
3	13.550	.092	1.492
4	13 550	.088	-1.492

MAX BEARING DISP. IN X

BEARING	TIME	MAX. DISP X
1	13.610	.008
2	15.680	.001
3	13.610	-.008
4	13.610	.008

MAX BEARING DISP. IN Y

BEARING	TIME	MAX. DISP Y
1	13.550	-.092
2	13.550	-.092
3	13.550	-.092
4	13.550	-.088

MAX. TOTAL ACCL. AT CENTER OF MASS OF FLOORS

FLOOR	ACCL. X	ACCL. Y	ACCL. R
6	.177478	2.463459	-.124195
5	-.108085	1.986848	.068117
4	.079109	1.857462	063564
3	-.113572	1 621227	-.074280
2	.170082	-1.597477	-.081764
1	.142431	-1.593311	.094039

MAX STORY SHEAR

STORY	TIME	X SHEAR	TIME	Y SHEAR
6	16.370	6.330	13.650	87.859
5	15.840	-9.161	13.630	148.132
4	15.840	-10.447	13.580	208.786
3	15.830	-8.180	13.570	270.147
2	16.180	6.975	13.540	324.615
1	16.180	12.184	13.530	374.671

MAX. STRUCTURE SHEAR (TOP OF BASE)

FORCE X	FORCE Y	Z MOMENT
12.184	374.671	431.488

MAX BASE SHEAR (BEARING LEVEL)

FORCE X	FORCE Y	Z MOMENT
-14 871	-423.744	-519.536

******** END OF OUTPUT ********

APPENDIX F

EXAMPLE 5

EXAMPLE WITH (1) SINGLE STORY STRUCTURE
(2) SLIDING BEARINGS
(3) UNIAXIAL EXCITATION
(4) OUTPUT OF PEAK RESPONSE

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VERIFICATION OF HYSTERETIC ELEMENT
UNIT IN-KIPS-SEC
GENERAL CONTROL INFORMATION
  1 1 3 8 100 386.2
INTEGRATION CONTROL PARAMETERS
  0.001 0.001 1000 20 1
NEWMARK METHOD CONTROL PARAMETERS (DEFAULT VALUES: 0.5 AND 0.25)
  0 0
EARTHQUAKE CONTROL PARAMETERS
  3 0.02 0.0 386.2
SUPERSTRUCTURE INFORMATION
ONE STORY-GENERAL DATA
0.1
0.1
200000.0
ECCENTRICITIES
0.0
0.0
MASSES
0.01
20000.00
SUPERSTRUCTURE DAMPING
0.0
0.0
0.0
ECCENTRICITIES
0.0 0.0
HEIGHTS
100.0
0.0
** BASE ISOLATION SYSTEM DATA **
STIFFNESS DATA FOR LINEAR ELASTIC BEARING
  0.0 0.0 0.0 0.0 0.0 0.0
MASS OF BASE
      101.32 200000000.0
GLOBAL DAMPING
  0.0 0.0 0.0 0.0 0.0 0.0
BEARNG DATA
  3 5
  0.1 0.03 23 6 0.000254 0.1 0.03 23.6 0.000254 282.85
  3 5
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 282.85
  3 5
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 282.85
  3 5
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 282.85
  3 5
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 282.85
  3  6
  82.4  0.105  0.03  0.8  0.2  0.105  0.03  0.8  0.02  4017.625
  3  6
  82.4  0.105  0.03  0.8  0.2  0.105  0.03  0.8  0.02  4017.625
  3  6
  82.4  0.105  0.03  0.8  0.2  0.105  0.03  0.8  0.02  4017.625
  3  6
  82.4  0.105  0.03  0.8  0.2  0.105  0.03  0.8  0.02  4017.625
COORDINATES OF BEARING
1000.0 1000.0
-1000.0 1000.0
-1000.0 -1000.0
1000.0 -1000.0
 1000.0 1000.0
-1000.0 1000.0
-1000.0 -1000.0
1000.0 -1000.0
OUTPUT CONTROL PARAMETERS
  1 10 1 2 3 4
COORDINATES OF DESIRED INTERSTORY DRIFT
  0 0
  0 0
  0 0
  0 0
  0 0
  0 0
LOAD CASE DATA
  0 0 0 1
```

OUTPUT FILE FOR EXAMPLE 5

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

PROGRAM 3D-BASIS-TABS ...A GENERAL PROGRAM FOR NONLINEAR
                        DYNAMIC ANALYSIS OF THREE DIMENSIONAL
                        BASE ISOLATED BUILDINGS

VERSION 2.0 FOR VAX/SUN/PC COMPUTERS, SEPT. 1994

DEVELOPED BY:

ANDREI REINHORN, MICHALAKIS CONSTANTINOU
                    DEPT. OF CIVIL ENGINEERING
                    STATE UNIV. OF NEW YORK AT BUFFALO

SATISH NAGARAJAIAH, DEPT. OF CIVIL ENGINEERING
                    UNIVERSITY OF MISSOURI AT COLUMBIA

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH,BUFFALO
STATE UNIVERSITY OF NEW YORK AT BUFFALO

CONTRIBUTIONS:

PANAGIOTIS TSOPELAS, CHEN LI AND RENFEN LI
                    DEPT. OF CIVIL ENGINEERING
                    STATE UNIV. OF NEW YORK AT BUFFALO

************************************************************ **************


VERSION 1.0 FOR VAX/PC COMPUTERS, AUGUST 1993

DEVELOPED BY ... SATISH NAGARAJAIAH
                 CHEN LI
                 ANDREI M. REINHORN
                 AND MICHALAKIS C. CONSTANTINOU
                 DEPARTMENT OF CIVIL ENGINEERING
                 STATE UNIV. OF NEW YORK AT BUFFALO

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH
STATE UNIVERSITY OF NEW YORK AT BUFFALO

************************************************************** ****************


THIS PROGRAM HAS BEEN DEVELOPED USING:
(1) PROGRAM 3D-BASIS
DEVELOPED BY ... SATISH NAGARAJAIAH
                 ANDREI M. REINHORN
                 AND MICHALAKIS C. CONSTANTINOU
                 DEPARTMENT OF CIVIL ENGINEERING
                 STATE UNIV. OF NEW YORK AT BUFFALO,          VAX VERSION, 1990
(2) PROGRAM ETABS
DEVELOPED BY ... E. L. WILSON
                 H. H. DOVEY
                 AND J. P. HOLLIN,
                 DEPARTMENT OF CIVIL ENGINEERING
                 UNIVERSITY OF CALIFORNIA, BERKELEY,          SEPTEMBER 1974, REVISED MARCH 1979

************************************************************** **************

1
 ******** MIRROR OF INPUT DATA ********


   VERIFICATION OF HYSTERETIC ELEMENT
   UNIT IN-KIPS-SEC
   GENERAL CONTROL INFORMATION
     1 1 3 8 100 386.2
   INTEGRATION CONTROL PARAMETERS
     0.001 0.001 1000 20 1
   NEWMARK METHOD CONTROL PARAMETERS (DEFAULT VALUES: 0.5 AND 0.25)
    0 0
   EARTHQUAKE CONTROL PARAMETERS
    3 0.02 0.0 386.2
   SUPERSTRUCTURE INFORMATION
   ONE STORY-GENERAL DATA
   0.1
   0.1
```



```
200000.0
ECCENTRICITIES
0.0
0.0
MASSES
0.01
20000.00
SUPERSTRUCTURE DAMPING
0.0
0.0
0.0
ECCENTRICITIES
0.0 0.0
HEIGHTS
100.0
0.0
** BASE ISOLATION SYSTEM DATA **
STIFFNESS DATA FOR LINEAR ELASTIC BEARING
  0.0 0.0 0.0 0.0 0.0
MASS OF BASE
      101.32 200000000.0
GLOBAL DAMPING
  0.0 0.0 0.0 0.0 0.0
BEARNG DATA
  3 5
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 5
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 5
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3 5
  0.1 0.07 23.6 0.000254 0.1 0.07 23.6 0.000254 292.85
  3  6
  82.4  0.105  0.03  0.8  0.02  0.105  0.03  0.8  0.02  4017.625
  3  6
  82.4  0.105  0.03  0.8  0.02  0.105  0.03  0.8  0.02  4017.625
  3  6
  82.4  0.105  0.03  0.8  0.02  0.105  0.03  0.8  0.02  4017.625
  3  6
  82.4  0.105  0.03  0.8  0.02  0.105  0.03  0.8  0.02  4017.625
COORDINATES OF BEARING
1000.0 1000.0
-1000.0 1000.0
-1000.0 -1000.0
1000.0 -1000.0
 1000.0 1000.0
-1000.0 1000.0
-1000.0 -1000.0
1000.0 -1000.0
OUTPUT CONTROL PARAMETERS
  1 10 1 2 3 4
COORDINATES OF DESIRED INTERSTORY DRIFT
  0 0
  0 0
  0 0
  0 0
  0 0
  0 0
LOAD CASE DATA
  0 0 0 1


******** END OF MIRROR OF INPUT ********
1

THREE STOREY BUILDING IN ITALY


GENERAL CONTROL INFORMATION

UNIT IN-KIPS-SEC

  TOTAL NUMBER OF STORIES....... .........=          1
  NUMBER OF DIFF. FRAMES..................=          0
  TOTAL NUMBER OF FRAMES..... ............=          0
  NUMBER OF LOAD CONDITIONS...............=          0
  NUMBER OF FREQUENCIES...................=          3

  NO. OF FLOORS(EXCL. BASE).. ...........=           1
```

```
NO. OF BEARINGS.........................=          8
NO. OF EIGEN VECTORS CONSIDERED.........=          3
INDEX FOR  SUPERSTRUCTURE STIFFNESS DATA=          1

  INDEX = 1 FOR 3D SHEAR BUILDING  REPRES.
  INDEX = 2 FOR FULL 3D REPRESENTATION
  INDEX = 3 FOR REPRESENTATION USING EIGEN DATA

TIME STEP OF INTEGRATION (NEWMARK)......=      .0010
INDEX FOR TYPE OF TIME STEP.............=          1

  INDEX = 1 FOR CONSTANT TIME STEP
  INDEX = 2 FOR VARIABLE TIME STEP

GAMA FOR NEWMARKS  METHOD...............=        .50
BETA FOR NEWMARKS  METHOD...............=        .25
TOLERANCE FOR FORCE COMPUTATION.........=      .0010
REFERENCE MOMENT OF CONVERGENCE.........=     1000.0
MAX NUMBER OF ITERATIONS WITHIN T.S.....=         20
INDEX FOR GROUND MOTION INPUT...........=          3

  INDEX = 1 FOR UNIDIRECTIONAL INPUT
  INDEX = 2 FOR BIDIRECTIONAL INPUT

TIME STEP OF RECORD ....................=       .020
LENGTH OF RECORD........................=        100
LOAD FACTOR.............................=     386.20
ANGLE OF EARTHQUAKE INCIDENCE...........=        .00


SUPERSTRUCTURE STIFFNESS DATA.........

 STIFFNESS (THREE DIMENSIONAL SHEAR BUILDING) ....
FLOOR            STIFF  X            STIFF  Y            STIFF  R        ECCENT  X      ECCENT  Y

   1                 .100                .100         200000.000            .000           .000

SUPERSTRUCTURE MASS..........
FLOOR          TRANSL  MASS      ROTATIONAL MASS

   1                 .010          20000.000                 .000             .000

SUPERSTRUCTURE DAMPING.......
MODE SHAPE     DAMPING RATIO (%)

   1               .000
   2               .000
   3               .000

HEIGHT.........
FLOOR          HEIGHT

   1          100.000
   0             .000


************* ISOLATION SYSTEM DATA ************

BASEMAT MASS AT THE CENTER OF MASS OF THE BASE ...
            TRANSL. MASS   ROTATINAL MASS

MASS            101.320   200000000.000

BASE ISOLATION DATA:
OPTION ONE: EQUIVALENT GLOBAL DEVICE PROPERTIES

GLOBAL ISOLATION DEVICE AT THE CENTER OF MASS       OF THE BASE.....
                                  X            Y            R            ECX          ECY

LINEAR STIFFNESS[F/L]          .0000        .0000        .0000        .0000        .0000
VISCOUS DAMPING[F/L/T]         .0000        .0000        .0000        .0000        .0000
```



```
......ELEMENT TYPE =

 SLIDING BEARING PARAMETERS.......
 ISOLATOR   FMAX  X   FMAX  Y   FMIN  X   FMIN  Y     PA X     PA Y  YIELD DISPL. X  YIELD DISPL. Y   NORMAL FORCE

     1     .10000    .10000    .07000    .07000    23.600   23.600       .00025          .00025       292.85000
     2     .10000    .10000    .07000    .07000    23.600   23.600       .00025          .00025       292.85000
     3     .10000    .10000    .07000    .07000    23.600   23.600       .00025          .00025       292.85000
     4     .10000    .10000    .07000    .07000    23.600   23.600       .00025          .00025       292.85000

......ELEMENT TYPE =

 F. P. S. BEARING PARAMETERS.......
 ISOLATOR    RADIUS    FMAX  X   FMAX  Y   FMIN  X   FMIN  Y     PA X     PA Y  YIELD DISPL. X  YIELD DISPL. Y   NORMAL FORCE

     5     82.4000    .10500    .10500    .03000    .03000     .800     .800      .02000          .02000       4017.62500
     6     82.4000    .10500    .10500    .03000    .03000     .800     .800      .02000          .02000       4017.62500
     7     82.4000    .10500    .10500    .03000    .03000     .800     .800      .02000          .02000       4017.62500
     8     82.4000    .10500    .10500    .03000    .03000     .800     .800      .02000          .02000       4017.62500

 BEARING LOCATION .........
 BEARING     X          Y

     1   1000.000   1000.000
     2  -1000.000   1000.000
     3  -1000.000  -1000.000
     4   1000.000  -1000.000
     5   1000.000   1000.000
     6  -1000.000   1000.000
     7  -1000.000  -1000.000
     8   1000.000  -1000.000

 ************ OUTPUT PARAMETERS ************

 TIME HISTORY OPTION ....................=            1
  INDEX = 0 FOR TIME HISTORY OUTPUT
  INDEX = 1 FOR NO TIME HISTORY OUTPUT

 NO. OF TIME STEPS AT WHICH TIME HISTORY
 OUTPUT IS DESIRED ......................=          10
 FORCE-DISPLACEMENT TIME HISTORY DESIRED
 AT BEARINGS NUMBERED....................=    1    2    3    4

 COORDINATES OF COLUMN LINES AT WHICH INTERSTORY DRIFTS ARE DESIRED
 COL. LINE     X. CORD.     Y. CORD.
    1            .000         .000
    2            .000         .000
    3            .000         .000
    4            .000         .000
    5            .000         .000
    6            .000         .000

 ***************OUTPUT***************

 ******** EIGENVALUES AND EIGEN VECTORS (FOR          THREE DIMENSIONAL SHEAR BUILDING REPRESENTATION) *******

 EIGEN VALUES

 COLUMN:   1
 ROW  1    10.000
 ROW  2    10.000
 ROW  3    10.000

 EIGEN VECTORS
```

COLUMN:	1	2	3
ROW 1	.00000	10.000	.00000
ROW 2	.00000	.00000	10.000
ROW 3	.70711E-02	.00000	.00000

************* MAX. RESPONSE ************

MAX. REL. DISP. AT THE CENTER OF MASS OF FLOORS (WITH RESPECT TO THE BASE)

FLOOR	X DISP.	Y DISP.	ROTN.(rad)
1	-3.0166	.0000	.0000

MAX INTERSTORY DRIFT

STORY	X DST.	Y DST.	TIME	X DRIFT/FL. HT.(%)	TIME	Y DRIFT/FL. HT.(%)
1	.00	.00	1.84	3.02	.00	.00
1	.00	.00	1.84	3.02	.00	.00
1	.00	.00	1.84	3.02	.00	.00
1	.00	.00	1.84	3.02	.00	.00
1	.00	.00	1.84	3.02	.00	.00
1	.00	.00	1.84	3.02	.00	.00

MAX. DISP. AT THE CENTER OF MASS OF BASE

X_DISP.	Y DISP.	ROTN...
-1.676	.000	.000

MAX RESULTANT DISP. AT THE CENTER OF MASS OF BASE

TIME	RES. DISP.	X COMP.	Y COMP
1.720	1.676	-1.676	.000

MAX RESULTANT BEARING DISP.

BEARING	TIME	MAX. DISP	ANG. WITH X AXIS
1	1.720	1.676	.000
2	1.720	1.676	.000
3	1.720	1.676	.000
4	1.720	1.676	.000

MAX BEARING DISP. IN X

BEARING	TIME	MAX. DISP X
1	1.720	-1.676
2	1.720	-1.676
3	1.720	-1.676
4	1.720	-1.676

MAX BEARING DISP. IN Y

BEARING	TIME	MAX. DISP Y
1	.000	.000
2	.000	.000
3	.000	.000
4	.000	.000

MAX. TOTAL ACCL. AT CENTER OF MASS OF FLOORS

FLOOR	ACCL. X	ACCL. Y	ACCL. R
1	30.166023	.000000	.000000

MAX STORY SHEAR

STORY	TIME	X SHEAR	TIME	Y SHEAR
1	1.838	.302	.000	.000

MAX. STRUCTURE SHEAR (TOP OF BASE)

FORCE X	FORCE Y	Z MOMENT
.302	.000	.000

MAX. BASE SHEAR (BEARING LEVEL)

FORCE X	FORCE Y	Z MOMENT
56557.610	.000	.000

******** END OF OUTPUT ********

APPENDIX G

EXAMPLE 6

EXAMPLE WITH (1) 3D-SUPERSTRUCTURE (EIGENVALUES AND
(2) EIGENVECTORS)
(3) ELASTOMERIC ISOLATION SYSTEM
(4) NONLINEAR VISCOUS ISOLATION SYSTEM
OUTPUT OF PEAK RESPONSE AND TIME HISTORIES

```
SIX STORY R. C. STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM  (SEE SECTION 8 - MCEER 01-0005)
Units tons-meters
general control information
2 6 6 26 1000 9.81 0
superstructure information
1 1 1
integration control parameters
0.01 0.1 10000 20 1
newmark method
0.5 0.25
earthquake control parameters
1 0.02   90      9.81
******** superstructure info****************
6 story info
3.2 35 665 1561 3 9 15 6.9
5  story info
3 2 35 665 1561.3 9 15 6.9
4  story info
3.2 35.665 1561.7 9.15 6.9
3  story info
3.8 39.245 1718 9.15 6 9
2  story info
3 2 41.918 1835 1 9.15 6.9
1 story info
3.7 36.571 1601 9 15 6.9
frame data
frame control parameters
1 6 36 21 22 6 0 44 0
column line coord
1      0      0
2      0    6.85
3      0    13.5
4    3.45     0
5    3.45   6.85
6    3.45   13.5
7    7 05   0
8    7 05   6.85
9    7.05   13.5
10   9 45   6 85
11 10 65    0
12 10 65    6.85
13 10.65    13 5
14 11 85    6.85
15 14 25    0
16 14.25    6.85
17 14.25    13.5
18 15 55    6.85
19 17.85    0
20 17.85    6.85
21 17.85    8.95
22 17.85    13.5
23 0        0.95
24 0        2.3
25 0        3.1
26 17.85    10.85
27 0        10.85
28 3 45     10.85
29 7.05     10.85
30 10 65    10.85
31 14 25    10.85
32  3.45    3.1
33  7 05    3.1
34 10.64    3 1
35 14.25    3.1
36 17 85    3.1
column properties
1 2600000 .08 .06  06 .0008203 .0003806 .0005625 0 0
2 2600000 .09 .07 .07 .001081  .0004557 .0008923 0 0
3 2600000  1  .08 .08 .001341  .0005208 .001333  0 0
4 2600000  11 .09 .09 .001602  .0005859 .001898  0 0
5 2600000  08 .08  08 .001161  .000675  .000675  0 0
6 2600000  11 .09  09 .001611  .0007875 .001072  0 0
7 2600000  12  1   1  .002081  .0009    .0016    0 0
8 2600000  14  11 .11  002511  .001013  .002278  0 0
9 2600000  15 .13  13 .002961  .001125  003125   0 0
10 2600000  17 .14  14 .003411  001238  .004159  0 0
11 2600000  18  15  15  003861 .00135   .0054 0 0
12 2600000  2   16  16 .004311  .001463  .006866 0 0
13 2600000  12  1   1  .002151  .001251  .001251 0 0
14 2600000  14  12 .12 .002865   001429  .001867 0 0
15 2600000  16  13 .13 .00338    001608  .002658 0 0
```

```
16 2600000 .18 .15 .15 .004295  .001786  .003648 0 0
17 2600000 .2  .17 .17 .005803  .002667  .004167 0 0
18 2600000 .23 .18 .18 .007396  .003797  .004688 0 0
19 2600000 .25 .21 .21 .008958  .005208  .005208 0 0
20 2600000 .28 .23 .23  01104   .006932  .005729 0 0
21 2600000 .3  .25 .25 .01313   .009     .00625  0 0
22 2600000 .33 .27 .27 .01521   .01144   .006771 0 0
beam properties
1 2600000 .13 .001686 .007031 4 4 2 0 0
2 2600000 .18 .005121 .01013  4 4 2 0 0
3 2600000 .36 .01124  .07158 4 4 2 0 0
4 2600000 .2  .005571 .01233  4 4 2 0 0
5 2600000 .21 .006021 .01482  4 4 2 0 0
6 2600000 .17 .005803 .002667 4 4 2 0 0
beam location
1 1 4 2 3 0 0 0
1 1 4 3 0 0 0 0
1 1 4 4 0 0 0 0
1 1 4 5 0 0 0 0
2 2 5 1 5 0 0 0
2 2 5 6 0 0 0 0
3 3 6 2 3 0 0 0
3 3 6 3 0 0 0 0
3 3 6 4 0 0 0 0
3 3 6 5 0 0 0 0
4 4 7 2 3 0 0 0
4 4 7 3 0 0 0 0
4 4 7 4 0 0 0 0
4 4 7 5 0 0 0 0
5 5 8 1 5 0 0 0
5 5 8 6 0 0 0 0
5 6 9 2 3 0 0 0
5 6 9 3 0 0 0 0
5 6 9 4 0 0 0 0
5 6 9 5 0 0 0 0
7 7 11 2 3 0 0 0
7 7 11 3 0 0 0 0
7 7 11 4 0 0 0 0
7 7 11 5 0 0 0 0
8 8 10 1 5 0 0 0
8 8 10 6 0 0 0 0
9 9 13 2 3 0 0 0
9 9 13 3 0 0 0 0
9 9 13 4 0 0 0 0
9 9 13 5 0 0 0 0
10 10 12 1 4 0 0 0
10 10 12 0 0 0 0 0
10 10 12 0 0 0 0 0
11 11 15 2 3 0 0 0
11 11 15 3 0 0 0 0
11 11 15 4 0 0 0 0
11 11 15 5 0 0 0 0
12 12 14 1 4 0 0 0
12 12 14 0 0 0 0 0
12 12 14 0 0 0 0 0
13 13 17 2 3 0 0 0
13 13 17 3 0 0 0 0
13 13 17 4 0 0 0 0
13 13 17 5 0 0 0 0
14 14 16 1 5 0 0 0
14 14 16 6 0 0 0 0
15 15 19 2 3 0 0 0
15 15 19 3 0 0 0 0
15 15 19 4 0 0 0 0
15 15 19 5 0 0 0 0
16 16 18 1 5 0 0 0
16 16 18 6 0 0 0 0
17 17 22 2 3 0 0 0
17 17 22 3 0 0 0 0
17 17 22 4 0 0 0 0
17 17 22 5 0 0 0 0
18 18 20 0 6 0 0 0
19 19 36 2 3 0 0 0
19 19 36 3 0 0 0 0
19 19 36 4 0 0 0 0
19 19 36 5 0 0 0 0
20 20 21 2 3 0 0 0
20 20 21 3 0 0 0 0
20 20 21 4 0 0 0 0
20 20 21 5 0 0 0 0
21 21 26 3 6 0 0 0
```



```
column location
1 9 4 6
2 5 5 3
2 6 5 0
2 7 5 0
2 8 5 0
3 9 6 3
3 11 6 3
4 11 7 3
4 12 7 0
4 14 7 0
4 15 7 0
5 19 8 3
5 22 8 0
5 24 8 0
5 26 8 0
6 9  9 3
6 10 9 0
6 11 9 0
6 12 9 0
7 10 11 3
7 11 11 0
7 14 11 0
7 15 11 0
8 19 10 3
8 21 10 0
8 23 10 0
8 26 10 0
9 9 13 3
9 10 13 0
9 11 13 0
9 12 13 0
10 0 12 6
11 9 15 3
11 11 15 0
11 13 15 0
11 14 15 0
12 19 14 3
12 21 14 0
12 23 14 0
12 25 14 0
13 9 17 4
13 10 17 0
13 12 17 0
14 0 16 6
15 11 19 3
15 12 19 0
15 15 19 0
15 16 19 0
16 17 18 3
16 20 18 0
16 22 18 0
16 25 18 0
17 9 22 3
17 10 22 0
17 11 22 0
17 13 22 0
18 0 20 6
19 9 15 3
19 11 15 0
19 12 15 0
19 13 15 0
20 0 18 6
21 0 31 6
22 0 17 6
23 0 4 6
24 0 32 6
25 0 32 6
26 0 31 6
27 0 28 6
28 0 29 6
29 0 30 6
30 0 31 6
31 0 26 6
32 0 33 6
33 0 34 6
34 0 35 6
35 0 36 6
36 0 35 6
panel info
6 1 23 2600000  0.143 0 0107 0.124  1131000
```

```
5 1 23 2600000  0.143 0.0107 0.124  1131000
4 1 23 2600000  0.143 0.0107 0.124  1131000
3 1 23 2600000  0.143 0.0107 0.124  1131000
2 1 23 2600000  0.143 0.0107 0.124  1131000
1 1 23 2600000  0.143 0.0107 0.124  1131000
6 23 24 2600000  0.203 0.0308 0.176 1131000
5 23 24 2600000  0.203 0 0308 0.176 1131000
4 23 24 2600000  0.203 0.0308 0.176 1131000
3 23 24 2600000  0.203 0.0308 0.176 1131000
2 23 24 2600000  0.203 0.0308 0.176 1131000
1 23 24 2600000  0.203 0.0308 0.176 1131000
6 24 25 2600000 0.12 0 0064 0.104 1131000
5 24 25 2600000 0.12 0.0064 0.104 1131000
4 24 25 2600000 0.12 0.0064 0.104 1131000
3 24 25 2600000 0.12 0.0064 0.104 1131000
2 24 25 2600000 0.12 0.0064 0.104 1131000
1 24 25 2600000 0.12 0.0064 0.104 1131000
6 25 2  2600000 0.563 0.659 0.489 1131000
5 25 2  2600000 0.563 0 659 0.489 1131000
4 25 2  2600000 0.563 0 659 0.489 1131000
3 25 2  2600000 0.563 0.659 0.489 1131000
2 25 2  2600000 0.563 0.659 0.489 1131000
1 25 2  2600000 0.563 0.659 0.489 1131000
3 10 12 2600000 0.24  0.0288 0.209 1131000
2 10 12 2600000 0.24  0.0288 0.209 1131000
1 10 12 2600000 0.24  0.0288 0.209 1131000
3 12 14 2600000 0.36 0.0432 0.313 1131000
2 12 14 2600000 0.36 0.0432 0.313 1131000
1 12 14 2600000 0.36 0.0432 0.313 1131000
6 18 20 2600000 0.46 0.2027 0.4   1131000
5 18 20 2600000 0.46 0.2027 0.4   1131000
4 18 20 2600000 0.46 0.2027 0.4   1131000
3 18 20 2600000 0.69 0.3042 0.6   1131000
2 18 20 2600000 0.69 0.3042 0.6   1131000
1 18 20 2600000 0.69 0.3042 0.6   1131000
2 21 26 2600000 0.285 0.0857 0.248 1131000
1 21 26 2600000 0.285 0.0857 0.248 1131000
6 26 22 2600000 0.398 0.2326 0.346 1131000
5 26 22 2600000 0.398 0.2326 0.346 1131000
4 26 22 2600000 0.398 0.2326 0.346 1131000
3 26 22 2600000 0.398 0.2326 0.346 1131000
2 26 22 2600000 0.398 0.2326 0 346 1131000
1 26 22 2600000 0.398 0.2326 0.346 1131000
frame location card
1 1 0 0 0
superstructure damping
0.05 0.05 0.05 0.05 0.05 0.05
eccn to center of mass
0  0
0  0
0  0
0  0
0  0
0  0
height to different floor and base
20.3 17.1 13.9 10.7 6 9 3.7 0
****************isolation system data ***************
stiffness data for linear elastic isolation system
0 0 0 0 0
mass data of the base
36.571 1601
global damping data
0    0    0 0  0
hysteretic element for elastomeric bearings
3 3
0.14407 5.909 0.004353  0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3.64  0.005232 0 1465 3.64  0.005232
3 3
0 1538  7 732 0.007061 0.1538  7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7 732 0.007061 0.1538 7.732 0.007061
3 3
0 1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5 909 0 004353 0.14407 5.909 0.004353
3 3
```



```
0.1465 3.64  0.005232 0.1465 3.64  0.005232
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0 007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3.64  0.005232 0.1465 3.64  0.005232
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7 732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 8
7.0 10.0 87.7 18.26 0.1 87.7 18.26 0 1 1.0 0.5 20.0 0.002 0.0 90.0
3 8
7.0 10.0 87.7 18.26 0.1 87.7 18.26 0.1 1.0 0.5 20.0 0.002 0.0 90.0
3 8
7.0 10.0 87.7 18.26 0.1 87.7 18.26 0.1 1.0 0.5 20.0 0.002 0.0 90.0
3 8
7.0 10.0 87.7 18.26 0.1 87.7 18.26 0 1 1.0 0.5 20.0 0.002 0.0 90.0
coordinates for isolation elements
-9.15 -6.9
-9.15 -0.05
-9.15 6.6
-5.7 -6.9
-5.7 -0.05
-5.7 6.6
-2.1 -6.9
-2.1 -0.05
-2.1 6.6
0 3 -0.05
1 5 -6.9
1.5 -0.05
1.5   6.6
2.7 -0.05
5.1 -6.9
5.1 -0.05
5.1  6.6
6.4 -0.05
8.7 -6.9
8.7 -0.05
8.7  2.1
8 7  6.6
-5.7 6.6
-5.7 -6.9
5.1 6.6
5.1 -6.9
output parameters
1 50 1 2 3 4
interstory drift
9 6.75
-9 -6.75
0 0
0 0
0 0
0 0
load  case definition
0 0 0 1
```

OUTPUT FILE FOR EXAMPLE 6
(EXAMPLE FROM SECTION 4.3 - NCEER 94-0018

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

PROGRAM 3D-BASIS-TABS  ..A GENERAL PROGRAM FOR NONLINEAR
                        DYNAMIC ANALYSIS OF THREE DIMENSIONAL
                        BASE ISOLATED BUILDINGS

VERSION 2.0 FOR VAX/SUN/PC COMPUTERS, SEPT. 1994

DEVELOPED BY:

ANDREI REINHORN, MICHALAKIS CONSTANTINOU
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SATISH NAGARAJAIAH, DEPT. OF CIVIL ENGINEERING
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CONTRIBUTIONS:

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*********************************************************** **************


VERSION 1.0 FOR VAX/PC COMPUTERS, AUGUST 1993

DEVELOPED BY ..  SATISH NAGARAJAIAH
                 CHEN LI
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************************************************************ ****************


THIS PROGRAM HAS BEEN DEVELOPED USING:
(1) PROGRAM 3D-BASIS
DEVELOPED BY ... SATISH NAGARAJAIAH
                 ANDREI M. REINHORN
                 AND MICHALAKIS C. CONSTANTINOU
                 DEPARTMENT OF CIVIL ENGINEERING
                 STATE UNIV. OF NEW YORK AT BUFFALO,          VAX VERSION, 1990
(2) PROGRAM ETABS
DEVELOPED BY ..  E. L. WILSON
                 H  H. DOVEY
                 AND J. P. HOLLIN,
                 DEPARTMENT OF CIVIL ENGINEERING
                 UNIVERSITY OF CALIFORNIA, BERKELEY,          SEPTEMBER 1974, REVISED MARCH 1979

************************************************************ **************
1

 ******** MIRROR OF INPUT DATA ********


   SIX STORY R. C. STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM  (SEE SECTION 8 - NCEE
   Units tons-meters
   general control information
   2 6 6 26 1000 9.81 0
   superstructure information
   1 1 1
   integration control parameters
   0.01 0.1 10000 20 1
   newmark method
   0.5 0.25
   earthquake control parameters
   1 0.02     90     9.81
   ******* superstructure info***************
   6 story info
```



```
3.2 35.665 1561.3 9.15 6 9
5  story info
3.2 35.665 1561.3 9.15 6.9
4  story info
3.2 35.665 1561.7 9.15 6.9
3  story info
3.8 39.245 1718 9.15 6.9
2  story info
3 2 41 918 1835.1 9.15 6.9
1 story info
3.7 36.571 1601 9.15 6.9
frame data
frame control parameters
1 6 36 21 22 6 0 44 0
column line coord
1      0      0
2      0     6.85
3      0     13.5
4   3.45      0
5   3.45     6 85
6   3.45     13.5
7   7.05     0
8   7.05     6.85
9   7.05     13.5
10  9.45     6.85
11 10.65     0
12 10 65     6.85
13 10.65     13.5
14 11.85     6.85
15 14.25     0
16 14.25     6.85
17 14.25     13.5
18 15.55     6.85
19 17.85     0
20 17.85     6.85
21 17 85     8.95
22 17.85     13.5
23 0         0.95
24 0         2.3
25 0         3.1
26 17.85     10.85
27 0         10.85
28 3.45      10.85
29 7.05      10.85
30 10 65     10.85
31 14.25     10.85
32  3.45     3 1
33  7.05     3.1
34 10 64     3.1
35 14.25     3.1
36 17 85     3.1
column properties
1 2600000 .08 .06 .06  0008203 .0003906 .0005625 0 0
2 2600000 .09 .07 .07 .001081  .0004557 .0008923 0 0
3 2600000  1  .08 .08 .001341  .0005208 .001333  0 0
4 2600000 .11  09  09  001602  .0005859 .001888  0 0
5 2600000 .09 .08 .08 .001161  .000675  .000675  0 0
6 2600000  11 .09 .09 .001611  .0007875 .001072  0 0
7 2600000  12 .1  .1  .002061  .0009    .0016    0 0
8 2600000 .14 .11 .11 .002511  .001013  .002278  0 0
9 2600000 .15 .13 .13 .002961  .001125  .003125  0 0
10 2600000 .17 .14 .14 .003411  .001238  .004159  0 0
11 2600000 .18 .15 .15 .003861  .00135   .0054 0 0
12 2600000 .2  .16 .16 .004311  .001463  .006866 0 0
13 2600000 .12 .1  .1  .002151  .001251  .001251 0 0
14 2600000 .14 .12 .12 .002865  .001429  .001867 0 0
15 2600000 .16 .13 .13 .00358   .001608  .002658 0 0
16 2600000 .18 .15 .15 .004295  .001786  .003646 0 0
17 2600000  2  .17 .17 .005803  .002667  .004167 0 0
18 2600000  23 .19 .19 .007396  .003797  .004688 0 0
19 2600000 .25 .21 .21 .008958  .005208   005208 0 0
20 2600000  28 .23 .23 .01104   .006932  .005729 0 0
21 2600000  3  .25 .25  01313   .009     .00625  0 0
22 2600000 .33 .27 .27 .01521   .01144   .006771 0 0
beam properties
1 2600000 .13 .001696 .007031 4 4 2 0 0
2 2600000  19 .005121 .01013  4 4 2 0 0
3 2600000  36 .01124  .07158 4 4 2 0 0
4 2600000 .2  .005571  01233  4 4 2 0 0
5 2600000 .21 .006021 .01482  4 4 2 0 0
6 2600000  17  005803 .002667 4 4 2 0 0
```

```
beam location
1 1 4 2 3 0 0 0
1 1 4 3 0 0 0 0
1 1 4 4 0 0 0 0
1 1 4 5 0 0 0 0
2 2 5 1 5 0 0 0
2 2 5 6 0 0 0 0
3 3 6 2 3 0 0 0
3 3 6 3 0 0 0 0
3 3 6 4 0 0 0 0
3 3 6 5 0 0 0 0
4 4 7 2 3 0 0 0
4 4 7 3 0 0 0 0
4 4 7 4 0 0 0 0
4 4 7 5 0 0 0 0
5 5 8 1 5 0 0 0
5 5 8 6 0 0 0 0
6 6 9 2 3 0 0 0
6 6 9 3 0 0 0 0
6 6 9 4 0 0 0 0
6 6 9 5 0 0 0 0
7 7 11 2 3 0 0 0
7 7 11 3 0 0 0 0
7 7 11 4 0 0 0 0
7 7 11 5 0 0 0 0
8 8 10 1 5 0 0 0
8 8 10 6 0 0 0 0
9 9 13 2 3 0 0 0
9 9 13 3 0 0 0 0
9 9 13 4 0 0 0 0
9 9 13 5 0 0 0 0
10 10 12 1 4 0 0 0
10 10 12 0 0 0 0 0
10 10 12 0 0 0 0 0
11 11 15 2 3 0 0 0
11 11 15 3 0 0 0 0
11 11 15 4 0 0 0 0
11 11 15 5 0 0 0 0
12 12 14 1 4 0 0 0
12 12 14 0 0 0 0 0
12 12 14 0 0 0 0 0
13 13 17 2 3 0 0 0
13 13 17 3 0 0 0 0
13 13 17 4 0 0 0 0
13 13 17 5 0 0 0 0
14 14 16 1 5 0 0 0
14 14 16 6 0 0 0 0
15 15 19 2 3 0 0 0
15 15 19 3 0 0 0 0
15 15 19 4 0 0 0 0
15 15 19 5 0 0 0 0
16 16 18 1 5 0 0 0
16 16 18 6 0 0 0 0
17 17 22 2 3 0 0 0
17 17 22 3 0 0 0 0
17 17 22 4 0 0 0 0
17 17 22 5 0 0 0 0
18 18 20 0 6 0 0 0
19 19 36 2 3 0 0 0
19 19 36 3 0 0 0 0
19 19 36 4 0 0 0 0
19 19 36 5 0 0 0 0
20 20 21 2 3 0 0 0
20 20 21 3 0 0 0 0
20 20 21 4 0 0 0 0
20 20 21 5 0 0 0 0
21 21 26 3 6 0 0 0
column location
1 9 4 6
2 5 5 3
2 6 5 0
2 7 5 0
2 8 5 0
3 9 6 3
3 11 6 3
4 11 7 3
4 12 7 0
4 14 7 0
4 15 7 0
5 19 8 3
5 22 8 0
```



```
5 24 8 0
5 26 8 0
6 9 9 3
6 10 9 0
6 11 9 0
6 12 9 0
7 10 11 3
7 11 11 0
7 14 11 0
7 15 11 0
8 19 10 3
8 21 10 0
8 23 10 0
8 26 10 0
9 9 13 3
9 10 13 0
9 11 13 0
9 12 13 0
10 0 12 6
11 9 15 3
11 11 15 0
11 13 15 0
11 14 15 0
12 19 14 3
12 21 14 0
12 23 14 0
12 25 14 0
13 9 17 4
13 10 17 0
13 12 17 0
14 0 16 6
15 11 19 3
15 12 19 0
15 15 19 0
15 16 19 0
16 17 18 3
16 20 18 0
16 22 18 0
16 25 18 0
17 9 22 3
17 10 22 0
17 11 22 0
17 13 22 0
18 0 20 6
19 9 15 3
19 11 15 0
19 12 15 0
19 13 15 0
20 0 18 6
21 0 31 6
22 0 17 6
23 0 4 6
24 0 32 6
25 0 32 6
26 0 31 6
27 0 28 6
28 0 29 6
29 0 30 6
30 0 31 6
31 0 26 6
32 0 33 6
33 0 34 6
34 0 35 6
35 0 36 6
36 0 35 6
panel info
6 1 23 2600000  0.143 0.0107 0.124  1131000
5 1 23 2600000  0.143 0.0107 0.124  1131000
4 1 23 2600000  0.143 0.0107 0.124  1131000
3 1 23 2600000  0.143 0.0107 0.124  1131000
2 1 23 2600000  0.143 0.0107 0.124  1131000
1 1 23 2600000  0.143 0.0107 0.124  1131000
6 23 24 2600000  0.203 0.0308 0.176 1131000
5 23 24 2600000  0.203 0.0308 0.176 1131000
4 23 24 2600000  0.203 0.0308 0.176 1131000
3 23 24 2600000  0.203 0.0308 0.176 1131000
2 23 24 2600000  0.203 0.0308 0.176 1131000
1 23 24 2600000  0.203 0.0308 0.176 1131000
6 24 25 2600000 0.12 0.0064 0.104 1131000
5 24 25 2600000 0.12 0.0064 0.104 1131000
4 24 25 2600000 0.12 0.0064 0.104 1131000
```

```
3 24 25 2600000 0.12 0.0064 0.104 1131000
2 24 25 2600000 0.12 0.0064 0.104 1131000
1 24 25 2600000 0.12 0.0064 0.104 1131000
6 25 2  2600000 0.563 0.659 0.489 1131000
5 25 2  2600000 0.563 0.659 0.489 1131000
4 25 2  2600000 0.563 0.659 0.489 1131000
3 25 2  2600000 0.563 0.659 0.489 1131000
2 25 2  2600000 0 563 0.659 0.489 1131000
1 25 2  2600000 0.563 0.659 0.489 1131000
3 10 12 2600000 0.24  0.0288 0.209 1131000
2 10 12 2600000 0.24  0.0288 0.209 1131000
1 10 12 2600000 0.24  0.0288 0.209 1131000
3 12 14 2600000 0.36 0 0432 0.313 1131000
2 12 14 2600000 0.36 0.0432 0.313 1131000
1 12 14 2600000 0.36 0.0432 0.313 1131000
6 18 20 2600000 0.46 0.2027 0.4   1131000
5 18 20 2600000 0.46 0.2027 0.4   1131000
4 18 20 2600000 0.46 0.2027 0.4   1131000
3 18 20 2600000 0.69 0.3042 0.6   1131000
2 18 20 2600000 0.69 0.3042 0.6   1131000
1 18 20 2600000 0.69 0.3042 0.6   1131000
2 21 26 2600000 0.285 0.0857 0.248 1131000
1 21 26 2600000 0.285 0.0857 0.248 1131000
6 26 22 2600000 0 398 0.2326 0.346 1131000
5 26 22 2600000 0.398 0.2326 0.346 1131000
4 26 22 2600000 0.398 0.2326 0.346 1131000
3 26 22 2600000 0.398 0.2326 0.346 1131000
2 26 22 2600000 0.398 0.2326 0.346 1131000
1 26 22 2600000 0.398 0.2326 0.346 1131000
frame location card
1 1 0 0 0
superstructure damping
0.05 0.05 0.05 0.05 0.05 0.05
eccn to center of mass
0  0
0  0
0  0
0  0
0  0
0  0
height to different floor and base
20.3 17.1 13.9 10.7 6.9 3.7 0
****************isolation system data ***************
stiffness data for linear elastic isolation system
0 0 0 0 0
mass data of the base
36.571 1601
global damping data
0    0    0  0  0
hysteretic element for elastomeric bearings
3 3
0.14407 5.909 0.004353  0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0 1465 3.64  0.005232 0.1465 3.64  0.005232
3 3
0.1538  7.732 0.007061 0.1538  7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0 1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0 14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3.64  0.005232 0.1465 3.64  0.005232
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7 732 0.007061 0.1538 7.732 0.007061
3 3
0 14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1465 3 64  0.005232 0.1465 3.64  0.005232
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0 1538 7.732 0.007061 0.1538 7.732 0 007061
3 3
```



```
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.1538 7.732 0.007061 0.1538 7.732 0.007061
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 3
0.14407 5.909 0.004353 0.14407 5.909 0.004353
3 8
7.0 10.0 87.7 18.26 0.1 87.7 18.26 0.1 1.0 0.5 20.0 0.002 0.0 90.0
3 8
7.0 10.0 87.7 18.26 0.1 87.7 18.26 0.1 1.0 0.5 20.0 0.002 0.0 90.0
3 8
7.0 10.0 87.7 18.26 0.1 87.7 18.26 0.1 1.0 0.5 20.0 0.002 0.0 90.0
3 8
7.0 10.0 87.7 18.26 0.1 87.7 18.26 0.1 1.0 0.5 20.0 0.002 0.0 90.0
coordinates for isolation elements
-9.15 -6.9
-9.15 -0.05
-9.15 6.6
-5.7 -6.9
-5.7 -0.05
-5.7 6.6
-2.1 -6.9
-2.1 -0.05
-2.1 6.6
0.3 -0.05
1.5 -6.9
1.5 -0.05
1.5   6.6
2.7 -0.05
5.1 -6.9
5.1 -0.05
5.1  6.6
6 4 -0.05
8 7 -6.9
8 7 -0.05
8.7  2.1
8 7  6 6
-5.7 6.6
-5.7 -6 9
5 1 6.6
5.1 -6.9
output parameters
1 50 1 2 3 4
interstory drift
9 6.75
-9 -6.75
0 0
0 0
0 0
0 0
load  case definition
0 0 0 1


******** END OF MIRROR OF INPUT ********
1
SIX STORY R. C. STRUCTURE WITH LEAD-RUBBER BEARING ISOLATION SYSTEM  (SEE SECTION 8 - NCEE

superstructure information

Units tons-meters

  TOTAL NUMBER OF STORIES..................=          6
  NUMBER OF DIFF. FRAMES...................=          1
  TOTAL NUMBER OF FRAMES...................=          1
  NUMBER OF LOAD CONDITIONS.... ...........=          1
  NUMBER OF FREQUENCIES....................=          6

  NO. OF FLOORS(EXCL. BASE)..... .... ....=          6
  NO. OF BEARINGS.........................=         26
  NO. OF EIGEN VECTORS CONSIDERED... . .. =          6
```

INDEX FOR SUPERSTRUCTURE STIFFNESS DATA= 2

INDEX = 1 FOR 3D SHEAR BUILDING REPRES.
INDEX = 2 FOR FULL 3D REPRESENTATION
INDEX = 3 FOR REPRESENTATION USING EIGEN DATA

TIME STEP OF INTEGRATION (NEWMARK)......= 0.0100
INDEX FOR TYPE OF TIME STEP............= 1

INDEX = 1 FOR CONSTANT TIME STEP
INDEX = 2 FOR VARIABLE TIME STEP

GAMA FOR NEWMARKS METHOD...............= 0.50
BETA FOR NEWMARKS METHOD...............= 0.25
TOLERANCE FOR FORCE COMPUTATION.........= 0.1000
REFERENCE MOMENT OF CONVERGENCE.........= 10000.0
MAX NUMBER OF ITERATIONS WITHIN T.S.....= 20
INDEX FOR GROUND MOTION INPUT...........= 1

INDEX = 1 FOR UNIDIRECTIONAL INPUT
INDEX = 2 FOR BIDIRECTIONAL INPUT

TIME STEP OF RECORD ....= 0.020
LENGTH OF RECORD........................= 1000
LOAD FACTOR.............................= 9.81
ANGLE OF EARTHQUAKE INCIDENCE. ....= 1.57

************** SUPERSTRUCTURE DATA **************

STORY DATA

LEVEL NO.	ID	HEIGHT	MASS(M)	MR**2	X(M)	Y(M)	K-X	K-Y
6 story info								
6		3.20	35.66	1561.30	9.15	6.90	0.00	0.00
5 story info								
5		3.20	35.66	1561.30	9.15	6.90	0.00	0.00
4 story info								
4		3.20	35.66	1561.70	9.15	6.90	0.00	0.00
3 story info								
3		3.80	39.24	1718.00	9.15	6.90	0.00	0.00
2 story info								
2		3.20	41.92	1835.10	9.15	6.90	0.00	0.00
1 story info								
1		3.70	36.57	1601.00	9.15	6.90	0.00	0.00

STRUCTURE LATERAL LOADS, CASES A AND B

LEVEL NO.	FX-A	FY-A	MOM-A	FX-B	FY-B	MOM-B	XA	YA	XB	YB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
5	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
4	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
3	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0

frame control parameters
FRAME ID NUMBER.........................= 1
NUMBER OF STORY LEVELS..................= 6
NUMBER OF COLUMN LINES..................= 36
NUMBER OF BAYS..........................= 21
NUMBER OF DIFF. COL. PROP...............= 22
NUMBER OF DIFF. BEAM PROP.......... ....= 6
NUMBER OF DIFF. FEF............... ....= 0
NUMBER OF PANEL ELEMENTS................= 44
NUMBER OF BRACING ELEMENTS..............= 0

0COLUMN LINE COORDINATES

LINE	X	Y
1	0.00	0.00
2	0.00	6.85
3	0.00	13.50
4	3.45	0.00
5	3.45	6.85
6	3.45	13.50
7	7.05	0.00
8	7.05	6.85
9	7.05	13.50
10	9.45	6.85
11	10.65	0.00
12	10.65	6.85
13	10.65	13.50
14	11.85	6.85
15	14.25	0.00
16	14.25	6.85
17	14.25	13.50
18	15.55	6.85
19	17.85	0.00
20	17.85	6.85
21	17.85	8.95
22	17.85	13.50
23	0.00	0.95
24	0.00	2.30
25	0.00	3.10
26	17.85	10.85
27	0.00	10.85
28	3.45	10.85
29	7.05	10.85
30	10.65	10.85
31	14.25	10.85
32	3.45	3.10
33	7.05	3.10
34	10.64	3.10
35	14.25	3.10
36	17.85	3.10

0COLUMN ID	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	RIGID TOP	RIGID BOT
1	2600000.00	0.08	0.06	0.06	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.09	0.07	0.07	0.00	0.00	0.00	0.00	0.00
3	2600000.00	0.10	0.08	0.08	0.00	0.00	0.00	0.00	0.00
4	2600000.00	0.11	0.09	0.09	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.09	0.08	0.08	0.00	0.00	0.00	0.00	0.00
6	2600000.00	0.11	0.09	0.09	0.00	0.00	0.00	0.00	0.00
7	2600000.00	0.12	0.10	0.10	0.00	0.00	0.00	0.00	0.00
8	2600000.00	0.14	0.11	0.11	0.00	0.00	0.00	0.00	0.00
9	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
10	2600000.00	0.17	0.14	0.14	0.00	0.00	0.00	0.00	0.00
11	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
12	2600000.00	0.20	0.16	0.16	0.00	0.00	0.01	0.00	0.00
13	2600000.00	0.12	0.10	0.10	0.00	0.00	0.00	0.00	0.00
14	2600000.00	0.14	0.12	0.12	0.00	0.00	0.00	0.00	0.00
15	2600000.00	0.16	0.13	0.13	0.00	0.00	0.00	0.00	0.00
16	2600000.00	0.18	0.15	0.15	0.00	0.00	0.00	0.00	0.00
17	2600000.00	0.20	0.17	0.17	0.01	0.00	0.00	0.00	0.00
18	2600000.00	0.23	0.19	0.19	0.01	0.00	0.00	0.00	0.00
19	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00
20	2600000.00	0.28	0.23	0.23	0.01	0.01	0.01	0.00	0.00
21	2600000.00	0.30	0.25	0.25	0.01	0.01	0.01	0.00	0.00
22	2600000.00	0.33	0.27	0.27	0.02	0.01	0.01	0.00	0.00

0 BEAM ID	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	RIGID I	RIGID J
1	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00
2	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00
3	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00
4	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00
5	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00
6	2600000.00	0.17	0.01	0.00	4.00	4.00	2.00	0.00	0.00

BEAM LOCATIONS

BAY	LEV	IC	JC	BID	GEN	VL1	VL2	VL3
1	6	1	4	2	3	0	0	0
1	2	1	4	3	0	0	0	0
1	1	1	4	4	0	0	0	0
1	6	1	4	5	0	0	0	0
2	5	2	5	1	5	0	0	0
2	6	2	5	6	0	0	0	0
3	5	3	6	2	3	0	0	0
3	1	3	6	3	0	0	0	0
3	6	3	6	4	0	0	0	0
3	5	3	6	5	0	0	0	0
4	4	4	7	2	3	0	0	0

4	6	4	7	3	0	0	0	0
4	5	4	7	4	0	0	0	0
4	4	4	7	5	0	0	0	0
5	3	5	8	1	5	0	0	0
5	6	5	8	6	0	0	0	0
6	5	6	9	2	3	0	0	0
6	1	6	9	3	0	0	0	0
6	6	6	9	4	0	0	0	0
6	5	6	9	5	0	0	0	0
7	4	7	11	2	3	0	0	0
7	6	7	11	3	0	0	0	0
7	5	7	11	4	0	0	0	0
7	4	7	11	5	0	0	0	0
8	3	8	10	1	5	0	0	0
8	6	8	10	6	0	0	0	0
9	5	9	13	2	3	0	0	0
9	1	9	13	3	0	0	0	0
9	6	9	13	4	0	0	0	0
9	5	9	13	5	0	0	0	0
10	4	10	12	1	4	0	0	0
10	6	10	12	0	0	0	0	0
10	5	10	12	0	0	0	0	0
11	4	11	15	2	3	0	0	0
11	6	11	15	3	0	0	0	0
11	5	11	15	4	0	0	0	0
11	4	11	15	5	0	0	0	0
12	3	12	14	1	4	0	0	0
12	6	12	14	0	0	0	0	0
12	5	12	14	0	0	0	0	0
13	4	13	17	2	3	0	0	0
13	6	13	17	3	0	0	0	0
13	5	13	17	4	0	0	0	0
13	4	13	17	5	0	0	0	0
14	3	14	16	1	5	0	0	0
14	6	14	16	6	0	0	0	0
15	5	15	19	2	3	0	0	0
15	1	15	19	3	0	0	0	0
15	6	15	19	4	0	0	0	0
15	5	15	19	5	0	0	0	0
16	4	16	18	1	5	0	0	0
16	6	16	18	6	0	0	0	0
17	5	17	22	2	3	0	0	0
17	1	17	22	3	0	0	0	0
17	6	17	22	4	0	0	0	0
17	5	17	22	5	0	0	0	0
18	4	18	20	0	6	0	0	0
19	6	19	36	2	3	0	0	0
19	2	19	36	3	0	0	0	0
19	1	19	36	4	0	0	0	0
19	6	19	36	5	0	0	0	0
20	5	20	21	2	3	0	0	0
20	1	20	21	3	0	0	0	0
20	6	20	21	4	0	0	0	0
20	5	20	21	5	0	0	0	0
21	4	21	26	3	6	0	0	0

GENERATED BEAM LOCATIONS

STORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
6	2	5	6	4	3	6	4	3	6	4	0	3	0	3	6	4	6	4	2	5	4
5	2	1	2	5	4	2	5	4	2	5	0	4	0	4	2	5	2	5	2	2	5
4	2	1	2	2	5	2	2	5	2	1	2	5	2	5	2	1	2	0	2	2	3

3	2	1	2	2	1	2	2	1	2	1	2	1	2	1	2	1	2	0	2	2	3
2	3	1	2	2	1	2	2	1	2	1	2	1	2	1	2	1	2	0	3	2	3
1	4	1	3	2	1	3	2	1	3	1	2	1	2	1	3	1	3	0	4	3	3

0COLUMN LOCATIONS

0 LINE LEV CID KCOL GEN

1	6	9	4	6
2	6	5	5	3
2	2	6	5	0
2	1	7	5	0
2	6	8	5	0
3	5	9	6	3
3	1	11	6	3
4	6	11	7	3
4	2	12	7	0
4	1	14	7	0
4	6	15	7	0
5	5	19	8	3
5	1	22	8	0
5	6	24	8	0
5	5	26	8	0
6	4	9	9	3
6	6	10	9	0
6	5	11	9	0
6	4	12	9	0
7	3	10	11	3
7	6	11	11	0
7	5	14	11	0
7	4	15	11	0
8	3	18	10	3
8	6	21	10	0
8	5	23	10	0
8	4	26	10	0
9	3	9	13	3
9	6	10	13	0
9	5	11	13	0
9	4	12	13	0
10	3	0	12	6
11	6	9	15	3
11	2	11	15	0
11	1	13	15	0
11	6	14	15	0
12	5	19	14	3
12	1	21	14	0
12	6	23	14	0
12	5	25	14	0
13	4	9	17	4
13	6	10	17	0
13	5	12	17	0
14	4	0	16	6
15	6	11	19	3
15	2	12	19	0
15	1	15	19	0
15	6	16	19	0
16	5	17	18	3
16	1	20	18	0
16	6	22	18	0
16	5	25	18	0
17	4	9	22	3
17	6	10	22	0
17	5	11	22	0
17	4	13	22	0
18	3	0	20	6
19	6	9	15	3

19	2	11	15	0
19	1	12	15	0
19	6	13	15	0
20	5	0	18	6
21	6	0	31	6
22	6	0	17	6
23	6	0	4	6
24	6	0	32	6
25	6	0	32	6
26	6	0	31	6
27	6	0	28	6
28	6	0	29	6
29	6	0	30	6
30	6	0	31	6
31	6	0	26	6
32	6	0	33	6
33	6	0	34	6
34	6	0	35	6
35	6	0	36	6
36	6	0	35	6

GENERATED COLUMN LOCATIONS

0STORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6	9	5	8	11	15	24	10	11	21	10	9	14	0	10	11	16	22	10	9	13	0	0	0	0	0	0	0	0	0	0
5	9	5	9	11	19	26	11	14	0	11	9	19	25	12	11	17	25	11	9	0	0	0	0	0	0	0	0	0	0	0
4	9	5	9	11	19	9	12	15	26	12	9	19	9	0	11	17	9	13	9	0	0	0	0	0	0	0	0	0	0	0
3	9	5	9	11	19	9	10	19	9	0	9	19	9	0	11	17	9	0	9	0	0	0	0	0	0	0	0	0	0	0
2	9	6	9	12	19	9	10	19	9	0	11	19	9	0	12	17	9	0	11	0	0	0	0	0	0	0	0	0	0	0
1	9	7	11	14	22	9	10	19	9	0	13	21	9	0	15	20	9	0	12	0	0	0	0	0	0	0	0	0	0	0

0STORY	31	32	33	34	35	36
6	0	0	0	0	0	0
5	0	0	0	0	0	0
4	0	0	0	0	0	0
3	0	0	0	0	0	0
2	0	0	0	0	0	0
1	0	0	0	0	0	0

PANEL CARDS

LEVEL	COL I	COL J	E	A	I	SA	G
6	1	23	2600000.00	0.14	0.01	0.12	1131000.00
5	1	23	2600000.00	0.14	0.01	0.12	1131000.00
4	1	23	2600000.00	0.14	0.01	0.12	1131000.00
3	1	23	2600000.00	0.14	0.01	0.12	1131000.00
2	1	23	2600000.00	0.14	0.01	0.12	1131000.00
1	1	23	2600000.00	0.14	0.01	0.12	1131000.00
6	23	24	2600000.00	0.20	0.03	0.18	1131000.00
5	23	24	2600000.00	0.20	0.03	0.18	1131000.00
4	23	24	2600000.00	0.20	0.03	0.18	1131000.00
3	23	24	2600000.00	0.20	0.03	0.18	1131000.00
2	23	24	2600000.00	0.20	0.03	0.18	1131000.00
1	23	24	2600000.00	0.20	0.03	0.18	1131000.00
6	24	25	2600000.00	0.12	0.01	0.10	1131000.00
5	24	25	2600000.00	0.12	0.01	0.10	1131000.00
4	24	25	2600000.00	0.12	0.01	0.10	1131000.00
3	24	25	2600000.00	0.12	0.01	0.10	1131000.00
2	24	25	2600000.00	0.12	0.01	0.10	1131000.00
1	24	25	2600000.00	0.12	0.01	0.10	1131000.00

6	25	2	2600000.00	0.56	0.66	0.49	1131000.00
5	25	2	2600000.00	0.56	0.66	0.49	1131000.00
4	25	2	2600000.00	0.56	0.66	0.49	1131000.00
3	25	2	2600000.00	0.56	0.66	0.49	1131000.00
2	25	2	2600000.00	0.56	0.66	0.49	1131000.00
1	25	2	2600000.00	0.56	0.66	0.49	1131000.00
3	10	12	2600000.00	0.24	0.03	0.21	1131000.00
2	10	12	2600000.00	0.24	0.03	0.21	1131000.00
1	10	12	2600000.00	0.24	0.03	0.21	1131000.00
3	12	14	2600000.00	0.36	0.04	0.31	1131000.00
2	12	14	2600000.00	0.36	0.04	0.31	1131000.00
1	12	14	2600000.00	0.36	0.04	0.31	1131000.00
6	18	20	2600000.00	0.46	0.20	0.40	1131000.00
5	18	20	2600000.00	0.46	0.20	0.40	1131000.00
4	18	20	2600000.00	0.46	0.20	0.40	1131000.00
3	18	20	2600000.00	0.69	0.30	0.60	1131000.00
2	18	20	2600000.00	0.69	0.30	0.60	1131000.00
1	18	20	2600000.00	0.69	0.30	0.60	1131000.00
2	21	26	2600000.00	0.28	0.09	0.25	1131000.00
1	21	26	2600000.00	0.28	0.09	0.25	1131000.00
6	26	22	2600000.00	0.40	0.23	0.35	1131000.00
5	26	22	2600000.00	0.40	0.23	0.35	1131000.00
4	26	22	2600000.00	0.40	0.23	0.35	1131000.00
3	26	22	2600000.00	0.40	0.23	0.35	1131000.00
2	26	22	2600000.00	0.40	0.23	0.35	1131000.00
1	26	22	2600000.00	0.40	0.23	0.35	1131000.00

BEAM PROPERTIES AND LOADS

BAY NUMBERS 1

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 2

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 3

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.17	0.01	0.00	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 4

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 5

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 6

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.17	0.01	0.00	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 7

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
5	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.18	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 8

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 9

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.17	0.01	0.00	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 10

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 11

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
4	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.18	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 12

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 13

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
4	2600000.00	0.18	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.18	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 14

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 15

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.17	0.01	0.00	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.18	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.18	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.18	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 16

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 17

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.17	0.01	0.00	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
4	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	
3	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	
2	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	
1	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	

BAY NUMBERS 18

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0

BAY NUMBERS 19

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 20

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0

BAY NUMBERS 21

LEVEL	E	SA	TORS I	FLEX I	KII	KJJ	KIJ	WI	WJ	VERT1	VERT2	VERT3
6	2600000.00	0.20	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
5	2600000.00	0.21	0.01	0.01	4.00	4.00	2.00	0.00	0.00	0	0	0
4	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0
3	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0
2	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0
1	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00	0	0	0

COLUMN PROPERTIES

COLUMN LINE NO. 1

LEVEL	E	A	MAJ SA	MIN SA	TORS,I	MAJ I	MIN I	DT	DB
6	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
4	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
3	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
1	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 2

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.09	0.08	0.08	0.00	0.00	0.00	0 00	0.00
5	2600000.00	0 09	0.08	0.08	0.00	0.00	0.00	0.00	0.00
4	2600000.00	0.09	0.08	0.08	0.00	0.00	0.00	0.00	0.00
3	2600000.00	0.09	0.08	0.08	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.11	0.09	0.09	0.00	0.00	0.00	0.00	0.00
1	2600000.00	0.12	0.10	0.10	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 3

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.14	0.11	0.11	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
4	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
3	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
1	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00

COLUMN LINE NO. 4

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.18	0 15	0.15	0.00	0.00	0.01	0.00	0.00
5	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
4	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
3	2600000.00	0.18	0.15	0 15	0.00	0.00	0.01	0.00	0 00
2	2600000.00	0 20	0.16	0.16	0.00	0.00	0.01	0.00	0.00
1	2600000.00	0.14	0.12	0 12	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 5

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.16	0.13	0 13	0 00	0 00	0.00	0.00	0.00
5	2600000 00	0 25	0.21	0.21	0 01	0 01	0.01	0.00	0 00

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
4	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00
3	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00
2	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00
1	2600000.00	0.33	0.27	0.27	0.02	0.01	0.01	0.00	0.00

COLUMN LINE NO. 6

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.13	0.00	0.01	4.00	4.00	2.00	0.00	0.00
5	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00
4	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
3	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
1	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 7

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.17	0.14	0.14	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
4	2600000.00	0.20	0.16	0.16	0.00	0.00	0.01	0.00	0.00
3	2600000.00	0.17	0.14	0.14	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.17	0.14	0.14	0.00	0.00	0.00	0.00	0.00
1	2600000.00	0.17	0.14	0.14	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 8

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
5	2600000.00	0.14	0.12	0.12	0.00	0.00	0.00	0.00	0.00
4	2600000.00	0.16	0.13	0.13	0.00	0.00	0.00	0.00	0.00
3	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00
2	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00
1	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00

COLUMN LINE NO. 9

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.30	0.25	0.25	0.01	0.01	0.01	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	2600000.00	0.36	0.01	0.07	4.00	4.00	2.00	0.00	0.00
3	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
1	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 10

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.17	0.14	0.14	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
4	2600000.00	0.20	0.16	0.16	0.00	0.00	0.01	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 11

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
4	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
3	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
1	2600000.00	0.12	0.10	0.10	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 12

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.14	0.12	0.12	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00
4	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00
3	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00
2	2600000.00	0.25	0.21	0.21	0.01	0.01	0.01	0.00	0.00
1	2600000.00	0.30	0.25	0.25	0.01	0.01	0.01	0.00	0.00

COLUMN LINE NO. 13

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00
4	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
3	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
1	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 14

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.17	0.14	0.14	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.20	0.16	0.16	0.00	0.00	0.01	0.00	0.00

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 15

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
5	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
4	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
3	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
2	2600000.00	0.20	0.16	0.16	0.00	0.00	0.01	0.00	0.00
1	2600000.00	0.16	0.13	0.13	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 16

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.18	0.15	0.15	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.20	0.17	0.17	0.01	0.00	0.00	0.00	0.00
4	2600000.00	0.20	0.17	0.17	0.01	0.00	0.00	0.00	0.00
3	2600000.00	0.20	0.17	0.17	0.01	0.00	0.00	0.00	0.00
2	2600000.00	0.20	0.17	0.17	0.01	0.00	0.00	0.00	0.00
1	2600000.00	0.28	0.23	0.23	0.01	0.01	0.01	0.00	0.00

COLUMN LINE NO. 17

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.33	0.27	0.27	0.02	0.01	0.01	0.00	0.00
5	2600000.00	0.19	0.01	0.01	4.00	4.00	2.00	0.00	0.00
4	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
3	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
1	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 18

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.17	0.14	0.14	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
4	2600000.00	0.12	0.10	0.10	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 19

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
5	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
4	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
3	2600000.00	0.15	0.13	0.13	0.00	0.00	0.00	0.00	0.00
2	2600000.00	0.18	0.15	0.15	0.00	0.00	0.01	0.00	0.00
1	2600000.00	0.20	0.16	0.16	0.00	0.00	0.01	0.00	0.00

COLUMN LINE NO. 20

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	2600000.00	0.12	0.10	0.10	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 21

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 22

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 23

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 24

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 25

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 26

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 27

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 28

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 29

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 30

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO 31

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 32

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 33

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO 34

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 35

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COLUMN LINE NO. 36

LEVEL	E	A	MAJ SA	MIN SA	TORS I	MAJ I	MIN I	DT	DB
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

frame location c

FRAME POSITION DATA

FRAME	ID	FORCE CODE	X1	Y1	ANG
1	1	1	0.00	0.00	0.00

SUPERSTRUCTURE DAMPING.. ...

MODE SHAPE	DAMPING RATIO (%)
1	5.000
2	5.000
3	5.000
4	5.000
5	5.000
6	5.000

HEIGHT .... ..

FLOOR	HEIGHT
6	20.300
5	17.100
4	13.900
3	10.700
2	6.900
1	3.700
0	0.000

************* ISOLATION SYSTEM DATA ************

BASEMAT MASS AT THE CENTER OF MASS OF THE BASE

	TRANSL. MASS	ROTATINAL MASS
MASS	16.571	1601.000

BASE ISOLATION DATA:
OPTION ONE. EQUIVALENT GLOBAL DEVICE PROPERTIES

GLOBAL ISOLATION DEVICE AT THE CENTER OF MASS OF THE BASE.

	X	Y	R	ECX	ECY
LINEAR STIFFNESS(F/L)	0.0000	0.0000	0.0000	0.0000	0.0000
VISCOUS DAMPING(F/L/T)	0.0000	0.0000	0.0000	0.0000	0.0000

ELEMENT TYPE =

ELASTOMERIC/DAMPER FORCE -DISPLACEMENT LOOP PARAMETERS........

ISOLATOR	ALPFA X	ALPFA Y	YIELD FORCE X	YIELD FORCE Y	YIELD DISPL. X	YIELD DISPL. Y
1	0 14407	0.14407	5.90900	5.90900	0.00435	0.00435
2	0.14407	0.14407	5.90900	5.90900	0.00435	0 00435
3	0.14650	0.14650	3.64000	3.64000	0.00523	0.00523
4	0.15380	0 15380	7.73200	7.73200	0 00706	0.00706
5	0.14407	0.14407	5.90900	5 90900	0 00435	0 00435
6	0.15380	0.15380	7.73200	7 73200	0.00706	0.00706
7	0.15380	0 15380	7.73200	7 73200	0.00706	0.00706
8	0.14407	0 14407	5.90900	5.90900	0.00435	0.00435
9	0.14650	0 14650	3.64000	3 64000	0.00523	0.00523
10	0.14407	0.14407	5.90900	5 90900	0.00435	0.00435
11	0.15380	0.15380	7.73200	7.73200	0.00706	0 00706
12	0.14407	0.14407	5.90900	5 90900	0.00435	0.00435
13	0.14650	0.14650	3.64000	3.64000	0.00523	0.00523
14	0.14407	0 14407	5.90900	5.90900	0.00435	0.00435
15	0.15380	0.15380	7.73200	7.73200	0.00706	0.00706
16	0.15380	0.15380	7.73200	7 73200	0.00706	0.00706
17	0.15380	0.15380	7.73200	7.73200	0.00706	0.00706
18	0 14407	0.14407	5.90900	5.90900	0.00435	0 00435
19	0.15380	0.15380	7 73200	7.73200	0 00706	0.00706
20	0.14407	0 14407	5.90900	5.90900	0.00435	0.00435
21	0 14407	0.14407	5.90900	5 90900	0.00435	0 00435
22	0 14407	0.14407	5 90900	5.90900	0.00435	0 00435

ELEMENT TYPE =

VISCOUS ELEMENT PARAMETERS.......

ISOL	Fo1	Fo2	C1-X	C2-X	V1-X	C1-Y	C2-Y	V1-Y	P1	P2	Fmax	Dy	THETA-1	THETA-2
23	.700E+01	.100E+02	.877E+02	.183E+02	.100E+00	.877E+02	.183E+02	.100E+00	.100E+01	.500E+00	.200E+02	.200E-02	.000E+00	.157E+(
24	.700E+01	.100E+02	.877E+02	.183E+02	.100E+00	.877E+02	.183E+02	.100E+00	.100E+01	.500E+00	.200E+02	.200E-02	.000E+00	.157E+(
25	.700E+01	.100E+02	.877E+02	.183E+02	.100E+00	.877E+02	.183E+02	.100E+00	.100E+01	.500E+00	.200E+02	.200E-02	.000E+00	.157E+(
26	.700E+01	.100E+02	.877E+02	.183E+02	.100E+00	.877E+02	.183E+02	.100E+00	.100E+01	.500E+00	.200E+02	.200E-02	.000E+00	.157E+(

BEARING LOCATION ......

BEARING	X	Y
1	-9.150	-6 900
2	-9.150	-0.050
3	-9 150	6.600
4	-5.700	-6.900
5	-5.700	-0.050
6	-5.700	6.600
7	-2 100	-6 900
8	-2.100	-0.050
9	-2.100	6.600
10	0.300	-0.050
11	1.500	-6.900
12	1.500	-0.050
13	1.500	6.600
14	2.700	-0.050
15	5 100	-6.900
16	5 100	-0.050
17	5 100	6 600
18	6.400	-0 050
19	8 700	-6 900
20	8.700	-0.050
21	8 700	2.100
22	8.700	6 600
23	-5 700	6.600
24	-5.700	-6 900
25	5 100	6.600
26	5.100	-6.900

************ OUTPUT PARAMETERS *************

TIME HISTORY OPTION ... ...= 1
INDEX = 0 FOR TIME HISTORY OUTPUT
INDEX = 1 FOR NO TIME HISTORY OUTPUT

NO. OF TIME STEPS AT WHICH TIME HISTORY
OUTPUT IS DESIRED ... .= 50
FORCE-DISPLACEMENT TIME HISTORY DESIRED
AT BEARINGS NUMBERED... ....= 1 2 3 4

COORDINATES OF COLUMN LINES AT WHICH INTERSTORY DRIFTS ARE DESIRED

COL. LINE	X. CORD	Y. CORD.
1	9 000	6.750
2	-9.000	-6 750
3	0.000	0.000
4	0.000	0.000
5	0.000	0.000
6	0.000	0.000

************************ OUTPUT ******* *****************

MODE SHAPES

LEVEL ID	DIRN	1	2	3	4	5	6
6	X	-0 009528	0.100907	0.004356	0.095580	0.007090	-0.066697
6	Y	0.105770	0.013354	-0.042784	0.005878	-0.077257	0.001406
6	ROTN	0.005537	0 000732	0.013871	0.000123	-0.006776	-0.000595
5	X	-0.009757	0.088173	0.001446	0.022212	0.004214	0 043552
5	Y	0.085108	0.009829	-0.028679	-0.001409	-0.000701	-0 002344
5	ROTN	0.004543	0.000495	0 012522	-0.000543	-0 001227	0.000127
4	X	-0.009425	0 072651	-0.001727	-0.046944	-0 000281	0.084970
4	Y	0 063397	0.006510	-0.016299	-0.005706	0.059408	0 000045
4	ROTN	0.003542	0 000280	0.010895	-0.000925	0.002696	0.000375
3	X	-0.007825	0.054303	-0.003290	-0.085458	-0.005608	0.010653
3	Y	0 040315	0.003435	-0.010052	-0.006066	0.085899	-0.003358
3	ROTN	0 002221	0.000085	0.008281	-0.000845	0.004670	0.000329
2	X	-0.004641	0 029817	-0.002702	-0.074492	-0.006811	-0.087084
2	Y	0.016636	0 000870	-0.007866	-0.003074	0.065660	-0 005079
2	ROTN	0.000748	-0 000051	0 004280	-0.000395	0.003402	0.000233
1	X	-0.001865	0.011884	-0 001170	-0 037343	-0.003486	-0 072194
1	Y	0.006200	0.000345	-0.003564	-0.001550	0.031908	-0.003022
1	ROTN	0.000284	-0.000016	0.001813	-0.000188	0.001493	0.000159

MODE NUMBER	PERIOD
1	0.871650
2	0.832051
3	0.399589
4	0 260888
5	0.234286
6	0 134306

************* MAX RESPONSE ************

MAX REL. DISP AT THE CENTER OF MASS OF FLOORS
(WITH RESPECT TO THE BASE)

FLOOR X DISP Y DISP. ROTN (rad)

6	0.0012	-0.0431	-0.0021
5	0.0010	-0.0345	-0.0017
4	0.0012	-0.0257	-0.0013
3	0.0012	-0.0164	-0.0008
2	0.0008	-0.0070	-0.0003
1	0.0004	-0.0027	-0.0001

MAX INTERSTORY DRIFT

STORY	X DST.	Y DST	TIME	X DRIFT/FL. HT.(%)	TIME	Y DRIFT/FL. HT.(%)
6	9.00	6.75	4.65	0.11	13.57	0.38
5	9.00	6.75	4.66	0.10	4.67	0.39
4	9.00	6.75	4.67	0.12	4.67	0.43
3	9.00	6.75	4.68	0.10	4.68	0.38
2	9.00	6.75	4.76	0.03	4.69	0.18
1	9.00	6.75	4.76	0.02	4.69	0.08
6	-9.00	-6.75	13.61	0.07	13.55	0.17
5	-9.00	-6.75	13.60	0.07	13.55	0.18
4	-9.00	-6.75	4.67	0.10	13.55	0.17
3	-9.00	-6.75	4.68	0.10	13.54	0.14
2	-9.00	-6.75	4.69	0.04	13.53	0.10
1	-9.00	-6.75	4.69	0.02	13.53	0.06
6	0.00	0.00	4.64	0.02	13.57	0.27
5	0.00	0.00	4.64	0.02	13.56	0.28
4	0.00	0.00	14.76	0.01	13.55	0.29
3	0.00	0.00	13.54	0.01	13.53	0.25
2	0.00	0.00	13.51	0.02	13.52	0.14
1	0.00	0.00	13.50	0.01	13.51	0.07
6	0.00	0.00	4.64	0.02	13.57	0.27
5	0.00	0.00	4.64	0.02	13.56	0.28
4	0.00	0.00	14.76	0.01	13.55	0.29
3	0.00	0.00	13.54	0.01	13.53	0.25
2	0.00	0.00	13.51	0.02	13.52	0.14
1	0.00	0.00	13.50	0.01	13.51	0.07
6	0.00	0.00	4.64	0.02	13.57	0.27
5	0.00	0.00	4.64	0.02	13.56	0.28
4	0.00	0.00	14.76	0.01	13.55	0.29
3	0.00	0.00	13.54	0.01	13.53	0.25
2	0.00	0.00	13.51	0.02	13.52	0.14
1	0.00	0.00	13.50	0.01	13.51	0.07
6	0.00	0.00	4.64	0.02	13.57	0.27
5	0.00	0.00	4.64	0.02	13.56	0.28
4	0.00	0.00	14.76	0.01	13.55	0.29
3	0.00	0.00	13.54	0.01	13.53	0.25
2	0.00	0.00	13.51	0.02	13.52	0.14
1	0.00	0.00	13.50	0.01	13.51	0.07

MAX. DISP. AT THE CENTER OF MASS OF BASE

X DISP.	Y DISP.	ROTN.
-0.001	-0.054	-0.001

MAX RESULTANT DISP. AT THE CENTER OF MASS OF BASE

TIME	RES. DISP.	X COMP	Y COMP
13.510	0.054	0.000	-0.054

MAX RESULTANT BEARING DISP.

BEARING	TIME	MAX. DISP	ANG. WITH X AXIS
1	13.510	0.057	-1.525
2	13.510	0.057	-1.564
3	13.510	0.057	1.541
4	13.510	0.056	-1.524

MAX BEARING DISP IN X

BEARING	TIME	MAX. DISP X
1	6.210	-0.006
2	14.330	-0.001
3	6.210	0.006
4	6.210	-0.006

MAX BEARING DISP. IN Y

BEARING	TIME	MAX. DISP Y
1	13.510	-0.057
2	13.510	-0.057
3	13.510	-0.057
4	13.510	-0.056

MAX. TOTAL ACCL. AT CENTER OF MASS OF FLOORS

FLOOR	ACCL. X	ACCL. Y	ACCL. R
6	-0.230893	2.650824	-0.171404
5	-0.161668	2.005563	-0.113937
4	-0.246374	1.659707	-0.098347
3	-0.201235	1.478309	0.100789
2	0.233529	-1.491890	0.108752
1	0.328000	-1.634325	0.111482

MAX STORY SHEAR

STORY	TIME	X SHEAR	TIME	Y SHEAR
6	13.870	-8.235	13.570	94.542
5	14.680	-8.371	13.560	163.685
4	15.800	-10.162	13.540	212.490
3	5.080	-10.363	13.530	255.217
2	16.620	-12.823	13.500	287.550
1	16.640	-13.571	13.460	324.996

MAX. STRUCTURE SHEAR (TOP OF BASE)

FORCE X	FORCE Y	Z MOMENT
-13.571	324.996	-817.186

MAX BASE SHEAR (BEARING LEVEL)

FORCE X	FORCE Y	Z MOMENT
35.019	-365.540	896.268

LOAD CONDITION DEFINITION CARDS

OLOAD	I	II	III	RESPONSE
1	0.00	0.00	0.00	1.00

******** END OF OUTPUT ********

^Z

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