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The new computer program 3D-BASIS-TABS, an extension of 3D-BASIS and ETABS, is a special purpose program developed for nonlinear dynamic analysis of three dimensional base isolated structures. The program can analyze base isolated structures with an elastic superstructure and inelastic/nonlinear isolation system. 3D-BASIS-TABS has three options for modeling the elastic superstructure: 1) three dimensional shear building representation; 2) full three dimensional representation; and 3) three dimensional building representation via a stiffness matrix supplied by user. This report describes the development and verification of the new program, which includes linear beam, column, shear wall and bracing elements to model the elastic three dimensional superstructure and inelastic/nonlinear elements to model the isolation system. The superstructure member forces are computed in 3D-BASIS-TABS by back substitution, after the nonlinear time history analysis is completed and peak member forces are output to facilitate the design of members. The verification of the program 3D-BASIS-TABS is presented in two case studies, three-story and eight-story buildings with various isolators. These case studies serve also as examples of use of this computer program. A comprehensive user's manual with input/output files is presented.

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NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH
State University of New York at Buffalo

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

by

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# NOTICE

PB94-141819

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

by

S. Nagarajaiah[1], C. Li[2], A.M. Reinhorn[3] and M.C. Constantinou[4]

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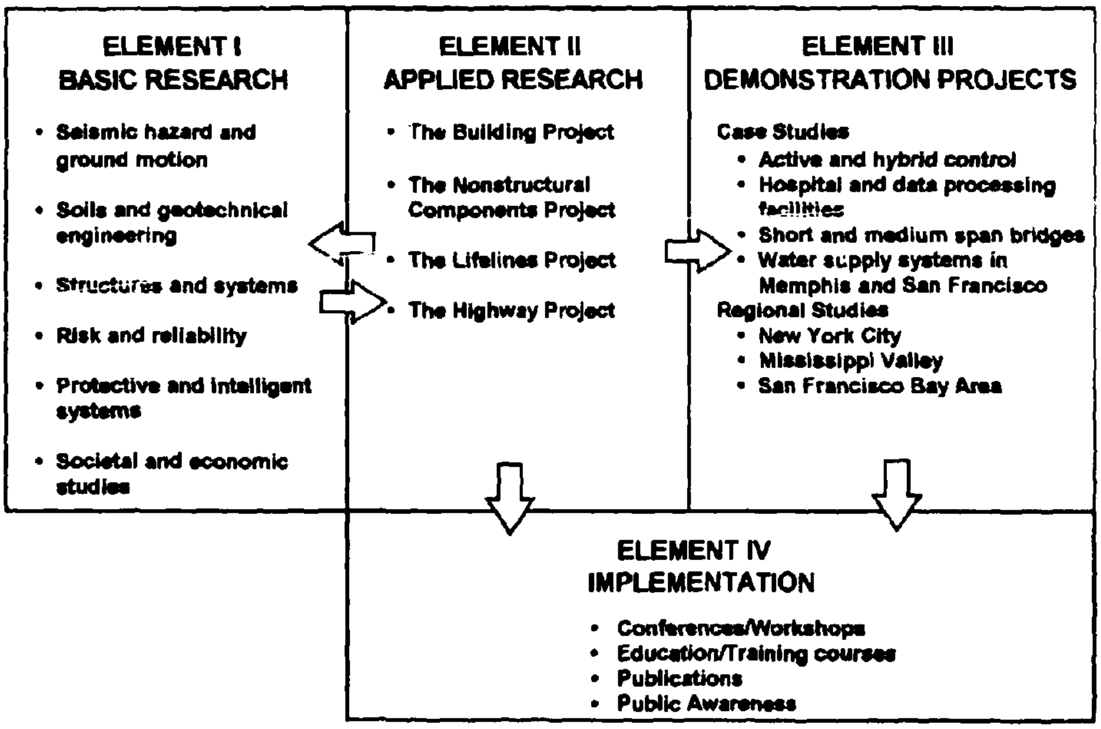
## PREFACE

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, is an enhanced version of 3D-BASIS, a special purpose program developed by NCEER for nonlinear dynamic analysis of base-isolated structures. One disadvantage associated with the original version is that the superstructure forces can not be computed directly. The superstructure member forces are computed in 3D-BASIS-TABS by back substitution, after the nonlinear time history analysis is completed, and peak member forces are output to facilitate the design of members. The verification of this enhanced version is presented in this report using two case studies. A comprehensive user's manual with input output files is also presented.***

## ABSTRACT

The new 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 an elastic superstructure and inelastic/nonlinear isolation system. 3D-BASIS-TABS has three options for modeling the elastic superstructure: (i) option 1 - three dimensional shear building representation, in which case the stiffness matrix of the superstructure is constructed internally by the program followed by the dynamic analysis; and (ii) option 2 - full three dimensional representation, in which case the dynamic characteristics of the superstructure are obtained from a structural analysis routine followed by a dynamic condensation and dynamic step-by-step analysis with a final full recovery of maximum internal forces in structural elements; and (iii) option 3 - three dimensional building representation via stiffness matrix suplied by user, hence the superstructure is modeled at a global level by using either the story stiffnesses or the dynamic characteristics. The isolation system is modeled by representing the force displacement relationship of each individual isolator explicitly. The aforementioned approach yields global response results accurately as well as the history of elements response.

A previous version of this program, 3D-BASIS [Nagarajaiah, Reinhorn, and Constantinou, 1991b] had the disadvantage that superstructure forces could not be computed directly. Hence, the design of beam and column members should have been based on pseudostatic analysis using global response results. This report describes the development and verification of the new computer program 3D-BASIS-TABS, an enhanced version of 3D-BASIS, which includes linear beam, column, shear wall and bracing elements to model the elastic three dimensional superstructure and inelastic/nonlinear elements to model the isolation system. The superstructure member forces are computed in 3D-BASIS-TABS by back substitution, after the nonlinear time history analysis is completed, and peak member forces are output to facilitate the design of members.

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The verification of the program 3D-BASIS-TABS is presented in two case studies, i.e., three-story and eight-story buildings with various isolators. These case studies serve also as examples of use of this computer program. A comprehensive user's manual with input/output files is presented.

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## SECTION 1
## INTRODUCTION

A comprehensive research effort for testing, analysis and design of base isolated structures with different isolation systems has been underway at the State University of New York at Buffalo. The objective of this research effort was: (i) to develop analysis capability and analytical models, calibrated using experimental results, and (ii) to use the analytical tool in-turn in experimental research and practical design applications. The result of this continued research effort was a comprehensive computational tool and computer program 3D-BASIS (Nagarajaiah, Reinhorn, Constantinou 1991a, 1991b; Tsopelas, Nagarajaiah, Constantinou, Reinhorn 1991).

Computer program 3D-BASIS has been specifically developed for analysis of base isolated structures (Fig. 1.1) with elastic superstructure and inelastic/nonlinear sliding and/or elastomeric isolation systems. The novelty of the analytical model and solution algorithm in 3D-BASIS was its capability to capture the highly nonlinear behavior of sliding isolation systems in plane motion. Biaxial and uniaxial models in 3D-BASIS can represent both elastomeric isolation bearings, sliding isolation bearings, various hysteretic devices, and viscous damping devices. The solution algorithm in 3D-BASIS, consisting of the pseudoforce method with iteration, is accurate and efficient.

Computer program 3D-BASIS-M (Tsopelas, Nagarajaiah, Constantinou, Reinhorn 1991), an enhanced version of 3D-BASIS, has been developed for analyzing multiple building base isolated structures (Fig. 1.2). The analysis of multiple buildings on a combined isolation system arises in long buildings which may consist of several buildings separated by narrow thermal expansion joints. The torsional characteristics of the combined isolation system

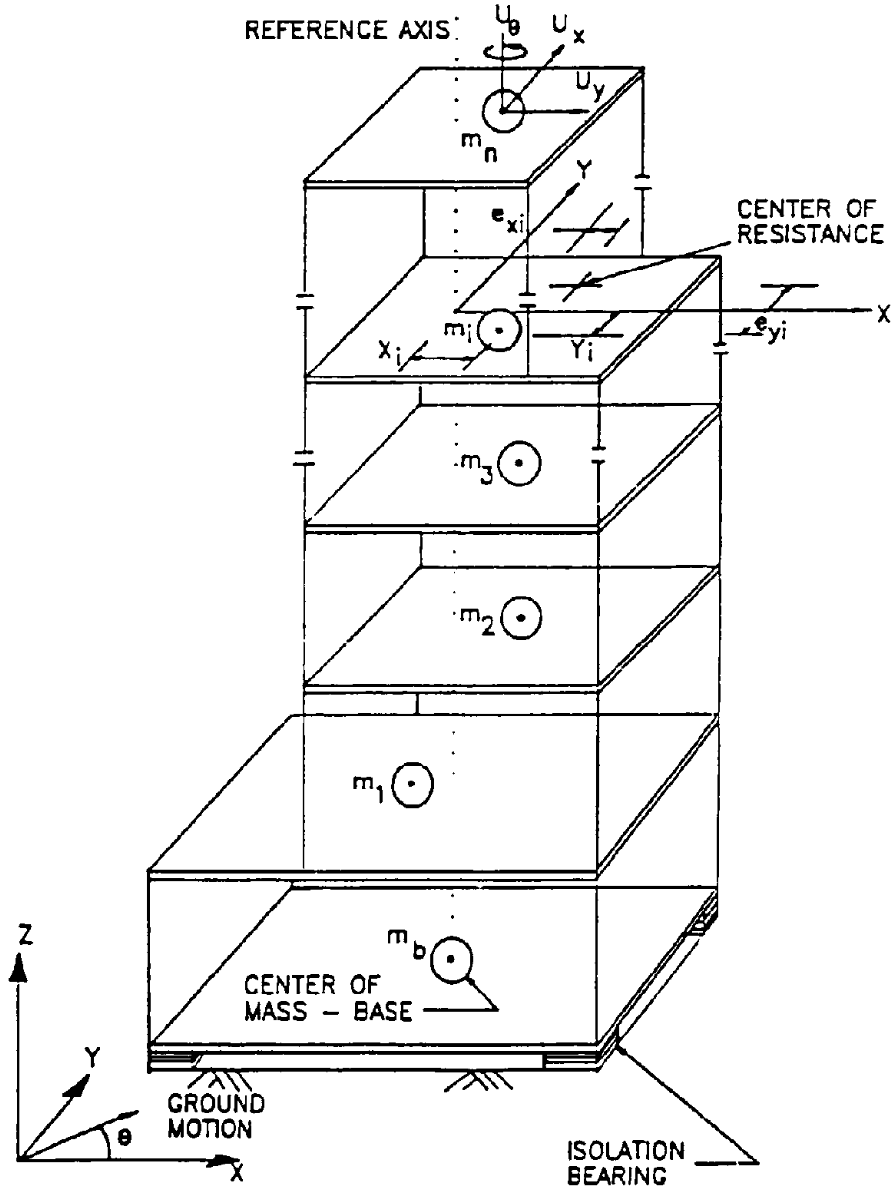



FIG. 1.1. Asymmetric Base Isolated Structure Excited by Bidirectional Ground Motion

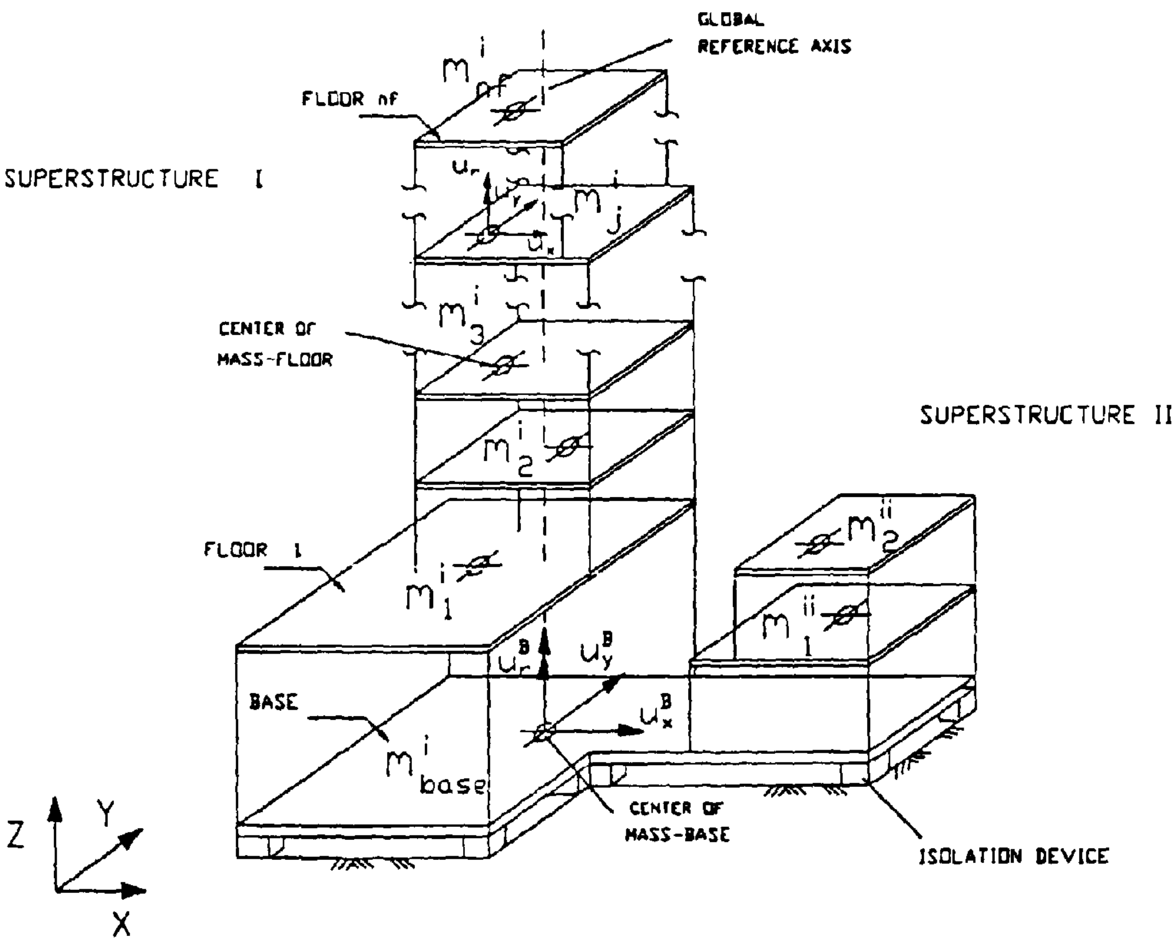



FIG. 1.2. Multiple Building Base Isolated Structure

and single basemat with multiple superstructure configuration can be significantly different than that of individual buildings on separate isolation systems. In such cases, 3D-BASIS-M can be used.

3D-BASIS has two options for modeling the elastic superstructure: (i) option 1 - three dimensional shear building representation, in which case the stiffness matrix of the superstructure is constructed internally by the program and the dynamic analysis is performed; and (ii) option 2 - full three dimensional representation, in which case the dynamic characteristics of the superstructure are obtained from other computer programs, such as ETABS (developed by Wilson et al. 1975 (i.e., the superstructure is modeled separately by ETABS to determine the frequencies and mode shapes) and imported into 3D-BASIS where the dynamic analysis is performed. Hence the superstructure is modeled at a global level by using either the story stiffnesses or the dynamic characteristics (i.e., beams, columns, etc. are not modeled explicitly in 3D-BASIS). However, the isolation system is modeled by representing the force displacement relationship of each individual isolator explicitly. The aforementioned approach yields global response results accurately and this approach is attractive because of its merit of simplicity. However the disadvantage of this approach is that the time history of superstructure member forces cannot be computed. Hence the design of beam and column members should be based on pseudostatic analysis using global response results.

This report describes the development and verification of a new computer program 3D-BASIS-TABS, an enhanced version of 3D-BASIS, which includes linear beam, column, shear wall and bracing elements to model the elastic three dimensional superstructure and inelastic/nonlinear elements to model the isolation system. The superstructure member forces are computed in 3D-BASIS-TABS by back substitution, after the nonlinear time history analysis is completed, and peak member forces are output to facilitate the design of members.

Verification of the program 3D-BASIS-TABS is presented. A case study analyzing an eight story base isolated structure is presented. A comprehensive user's manual with input/output files is presented.

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

# SECTION 2

# OVERVIEW OF 3D-BASIS AND ETABS

In this section, the features of computer programs 3D-BASIS and ETABS are reviewed. The limitations of 3D-BASIS are pointed out and the advantages of enhancing the program 3D-BASIS are elucidated.

3D-BASIS was designed and developed according to the advantages of the modeling approach proposed by Wilson et al. (1975) for the 3D-superstructure in ETABS, i.e., frame substructures interconnected by rigid floor diaphragms, with three degrees-of-freedom per floor at the center of mass. The process of modeling the elastic superstructure in 3D-BASIS was simplified by using eigenvalues and eigenvectors obtained using programs such as ETABS. The tremendous computational advantages that can be gained by this modeling approach, adopted in 3D-BASIS for modeling the linear superstructure, coupled with: (i) modal reduction; and (ii) pseudoforce solution procedure with equilibrium iterations, makes the algorithm in 3D-BASIS highly efficient. The only disadvantage of using eigenvalues and eigenvectors for modeling the superstructure in 3D-BASIS is that superstructure member forces cannot be computed. Hence, the design of beam and column members should be based on pseudo-static analysis performed using the computed global time history response at the center of mass of the floors.

The program 3D-BASIS-TABS described in this report is designed to overcome this limitation. Linear elastic elements available in ETABS are adopted in 3D-BASIS-TABS to model the three dimensional superstructure. The condensation, global assembly and back substitution procedures from ETABS are also adopted. The time history of member forces are computed by back substitution, after the nonlinear time history analysis is completed, and peak member forces are output to facilitate the design of members.

## 2.1 COMPUTER PROGRAM 3D-BASIS

Computer program 3D-BASIS (Nagarajaiah et al. 1990,1991) is a special purpose program for nonlinear dynamic analysis of three dimensional base isolated structures. A typical multistory base isolated building that can be analyzed by 3D-BASIS, along with the relevant degrees of freedom, is shown in Fig. 1.1. The superstructure is modeled with three degrees of freedom attached to the center of mass of each floor. The base and floors are assumed to be rigid diaphragms. The 3D-superstructure is modeled as an elastic frame-shear wall structure and nonlinear behavior is restricted to the base. The isolation system is modeled with spatial distribution and explicit nonlinear force-displacement characteristics of individual isolation devices. Library of isolation elements includes linear spring element, linear viscous damper element, sliding bearing elements, elastomeric bearing element and steel damper element. The hysteretic model used to model the isolators is a differential equation model which can represent the nonlinear biaxial characteristics of the isolators. The time domain solution algorithm developed, consisting of the pseudoforce method with iteration, is suitable for the solution of stiff differential equations that arise in sliding systems due to stick-slip behavior.

## 2.2 SALIENT FEATURES OF 3D-BASIS

Salient features of 3D-BASIS which make it specially suitable for analysis of base isolated structures with different isolation systems are:

(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 aforementioned capabilities, 3D-BASIS has become increasingly popular amongst both researchers and practicing 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. 1993a; 1993b; Asher et al. 1993; Button et al. 1993; Cho et al. 1993; Nagarajaiah et al. 1993; Palfalvi et al. 1993); and (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, Mitsusaka et al. 1993).

## 2.3 SUPERSTRUCTURE MODELING IN 3D-BASIS

The 3D superstructure is modeled as an elastic frame-shear wall structure and nonlinear behavior is restricted to the base. 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 the floors are assumed to be rigid diaphragms.

Two options exist for modeling the superstructure:

(1) Three dimensional shear building representation in which the stiffness matrix of the superstructure is internally constructed by the program. It is assumed that the centers of mass of all the floors lie on a common vertical axis, floors and beams are rigid and walls and columns are inextensible.

(2) Full three dimensional representation in which the dynamic characteristics of the superstructure, such as frequencies and mode shapes supplied by user. [determined by computer programs such as ETABS (Wilson et al. 1975) and imported to program 3D-BASIS]. In this way, the axial deformation of columns; bending and shear deformation of column and beam members; and arbitrary location of the center of mass are implicitly accounted for. However, the model for dynamic analysis still maintains three degrees of freedom per floor because the other joint degrees of freedom are condensed out.

In both options, the data needed for dynamic analysis are the mass and the moment of inertia of each floor, frequencies, mode shapes and associated damping ratios for a given number of modes. A minimum of three modes of vibration of the superstructure need to be considered.

## 2.4 ISOLATION SYSTEM MODELING IN 3D-BASIS

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 elements are available for modeling the behavior of an isolation system:

1. Linear elastic element (spring).
2. Linear viscous element (damper).
3. Hysteretic element for elastomeric bearings and steel dampers.
4. Hysteretic element for sliding bearings.

### 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 having the combined properties of all the elastic devices, and total translational stiffnesses, $K_x$ and $K_y$, and the rotational stiffness, $K_r$, with respect to the center of mass of the base.

### 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 specified are combined, internally in the program, in global viscous elements having the combined properties, and total translational damping coefficients $C_x$ and $C_y$ and rotational damping coefficient $C_r$ with respect to the center of mass of the base.

### 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 resulting 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 resulting hysteretic force.

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

$$\begin{Bmatrix} \dot{Z}_x \\ \dot{Z}_y \end{Bmatrix} = \frac{A}{Y}\begin{Bmatrix} \dot{U}_x \\ \dot{U}_y \end{Bmatrix} - \frac{1}{Y}\begin{pmatrix} Z_x^2(\gamma Sign(\dot{U}_x Z_x)+\beta) & Z_x Z_y(\gamma Sign(\dot{U}_y Z_y)+\beta) \\ Z_x Z_y(\gamma Sign(\dot{U}_x Z_x)+\beta) & Z_y^2(\gamma Sign(\dot{U}_y Z_y)+\beta) \end{pmatrix}\begin{Bmatrix} \dot{U}_x \\ \dot{U}_y \end{Bmatrix} \tag{2.2}$$

in which, $Z_x$ and $Z_y$ are hysteretic dimensionless quantities, $Y$ is the yield displacement, $A$, $\gamma$ and $\beta$ 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 $A/(\beta + \gamma) = 1$ (Constantinou et al. 1990):

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

$Z_x$ and $Z_y$ are bounded by values $\pm 1$ 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 Element 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 $\mu_s$ is the coefficient of sliding friction which depends on the value of bearing pressure, angle $\theta$ 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 $Z_y$ which are bounded by the values $\pm 1$, 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):

$$\mu_s = f_{max} - \Delta f \cdot \exp(-a|\dot{U}|) \tag{2.6}$$

in which, $f_{max}$ is the maximum value of the coefficient of friction and $\Delta f$ is the difference between the maximum and minimum (at $\dot{U} \sim 0$) values of the coefficient of friction. $f_{max}$, $\Delta f$ and $a$ are functions of bearing pressure and angle $\theta$ (Constantinou et al. 1990). To account for the effects of axial load, the parameters are adjusted based on experimental results (Mokha et al. 1993). The dependency on the angle $\theta$ is negligible and hence neglected.

### 2.4.3.2 Biaxial Model for Elastomeric Bearings and Steel Dampers

For an 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, $\alpha$ is the postyielding to preyielding stiffness ratio, $F^y$ is the yield force and $Y$ is the yield displacement. $Z_x$ and $Z_y$ 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. When the ratio $A/(\beta + \gamma) = 1$ the model reduces (Constantinou et al. 1990) to a model of viscoplasticity.

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. Validity of the Biaxial Elements

The validity of the biaxial elements was verified by comparison with the experimental results of: (i) tests on Teflon-steel sliding bearings under simultaneous compression and high velocity bidirectional motion (Mokha et al. 1993) shown in Fig. 2.1; and (ii) tests on steel rod dampers under bidirectional motion (Yasaka et al. 1988) shown in Fig. 2.2. The simulated and experimental results from Nagarajaiah et al. (1993a;1991b) shown in Fig. 2.1 and 2.2 indicate good agreement.

From the comparison with experimental biaxial force-displacement loops, the accuracy of the hysteretic model in 3D-BASIS is evident. Further verification of the hysteretic model in 3D-BASIS by comparison with test results can be found in Nagarajaiah et al. (1991;1990).

### 2.4.6 Global System Assembly and Pseudoforce Solution Algorithm in 3D-BASIS

The global system assembly, of the 3D-superstructure and the isolation system, has been described in Nagarajaiah et al. (1991). The incremental nonlinear force vector in the equations of motion is brought on to the right hand side and treated as a pseudoforce vector. The two step solution algorithm that was developed by Nagarajaiah et al. (1991) is as follows:

1. The solution of equations of motion using unconditionally stable Newmark's constant-average-acceleration method;
2. The solution of differential equations governing the behavior of the nonlinear isolation elements using unconditionally stable semi-implicit Runge-Kutta method suitable for solution of stiff differential equations.

### 2.4.7 Validity of the Analytical Model and Solution Algorithm in 3D-BASIS

The validity of the analytical model and solution algorithm used in 3D-BASIS was demonstrated further, by Nagarajaiah et al. (1993a), by comparison with experimental results from bidirectional shake table tests on a sliding isolated model by Hisano et al. (1988).

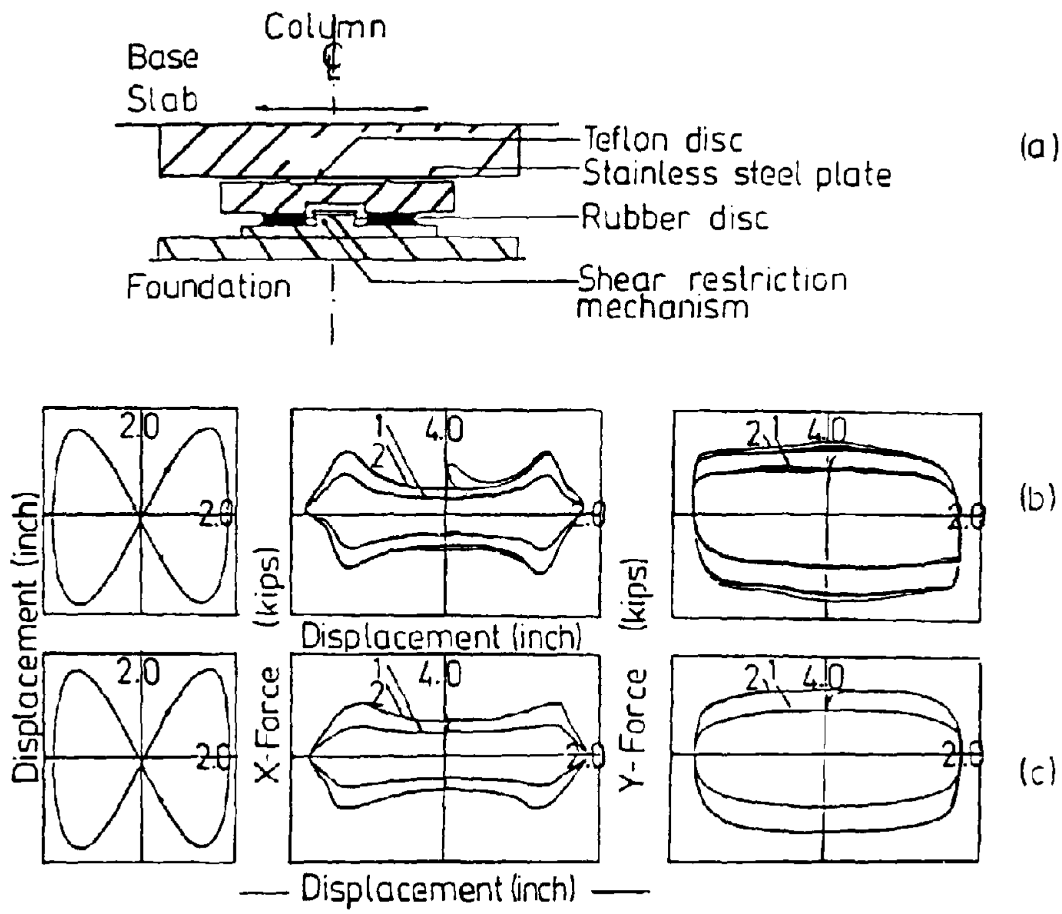



FIG. 2.1. Validity of the Biaxial Sliding Element in 3D-BASIS: (a) Section of Teflon Disc Sliding Bearing; (b) Measured Biaxial Force - Displacement Response of Sliding Bearing; (c) Simulated Biaxial Force - Displacement Response of Sliding Bearing

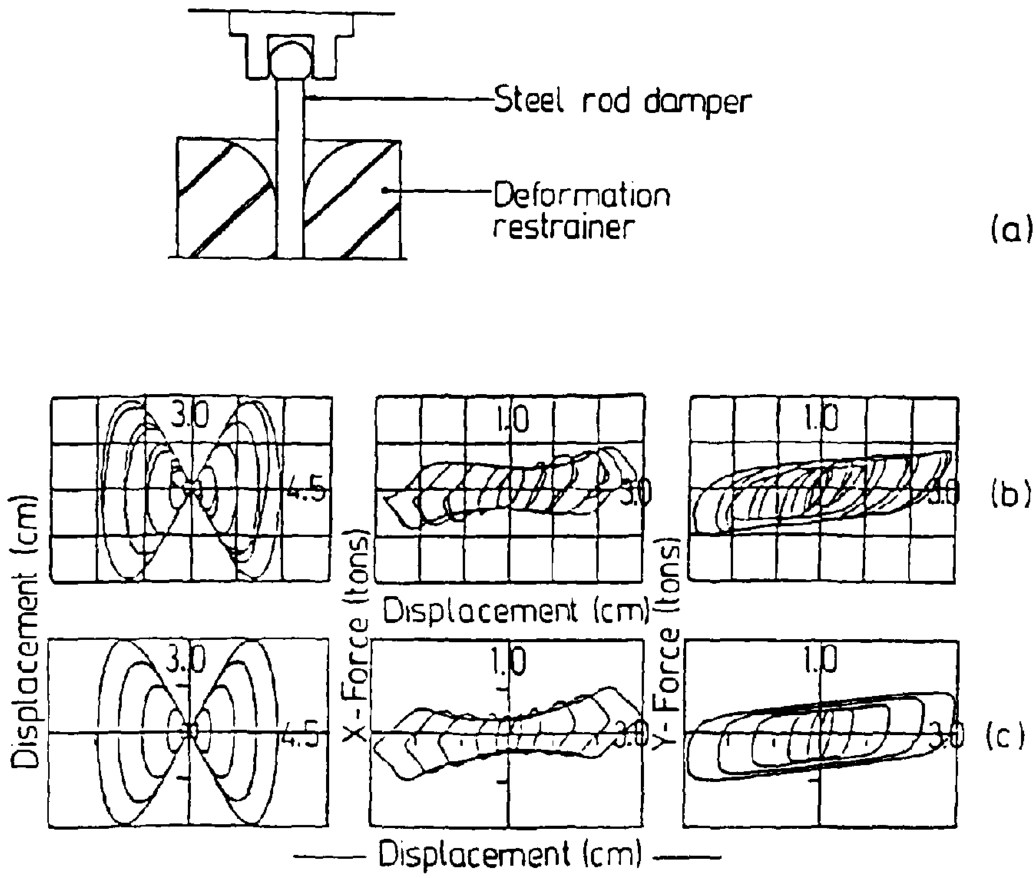



FIG. 2.2. Validity of the Biaxial Element for Steel Dampers in 3D-BASIS: (a) Section of Steel Damper; (b) Measured Biaxial Force - Displacement Response of Steel Damper; (c) Simulated Biaxial Force - Displacement Response of Steel Damper

The tested model was a 1/8 scale steel structure, 120 in (3048 mm) long and 90 in (2286 mm) wide, on a sliding isolation system consisting of 9 sliding bearings with 4 rubber springs. The model weighed 10.1 tons (101 kN), with 8.05 tons (80.5 kN) of superstructure weight and 2.05 tons (20.5 kN) of base weight. The radius of gyration was r = 0.29 L. The model had symmetric stiffness and mass properties. For the scaled superstructure, the uncoupled lateral period was 0.11 sec (corresponding to 0.3 sec in prototype) and the uncoupled torsional period was 0.07 sec (0.2 sec in prototype). The damping ratio measured in the superstructure was 1%. For the isolation system, the uncoupled lateral period was 0.35 sec (1.0 sec in prototype) and the uncoupled torsional period was 0.208 sec (0.588 sec in prototype). The diameter of the sliding bearings were between 2.75 in (69.85 mm) and 1.4 in (35.56 mm). The maximum bearing pressure during tests was 900 psi (6.21 MPa). The coefficient of friction was measured to vary between 0.10 and 0.15. The model structure was excited by time scaled accelerations of 1940 El Centro NS and EW components. The peak table acceleration in both the directions was scaled up by a factor of 1.5. Fig. 2.3 shows the measured and simulated frame acceleration and the base displacement in the NS direction, and the displacement orbit of the center of mass of the base. The historical accelerogram of 1940 El Centro motion scaled appropriately was used as the excitation for the analytical simulation, as the achieved shake table acceleration time history was not available. Despite this, a comparison between the measured and simulated results show good agreement, including major features of the displacement orbit.

From the above comparison with shake table test results, the accuracy of the analytical model and solution algorithm in 3D-BASIS is evident. Further verification of 3D-BASIS by comparison with unidirectional shake table test results and results from general purpose finite element computer programs such as ANSR (Mondkar et al. 1975) and DRAIN-2D (Kannan et al. 1975) has been presented by the authors (Nagarajaiah et al. 1991b).

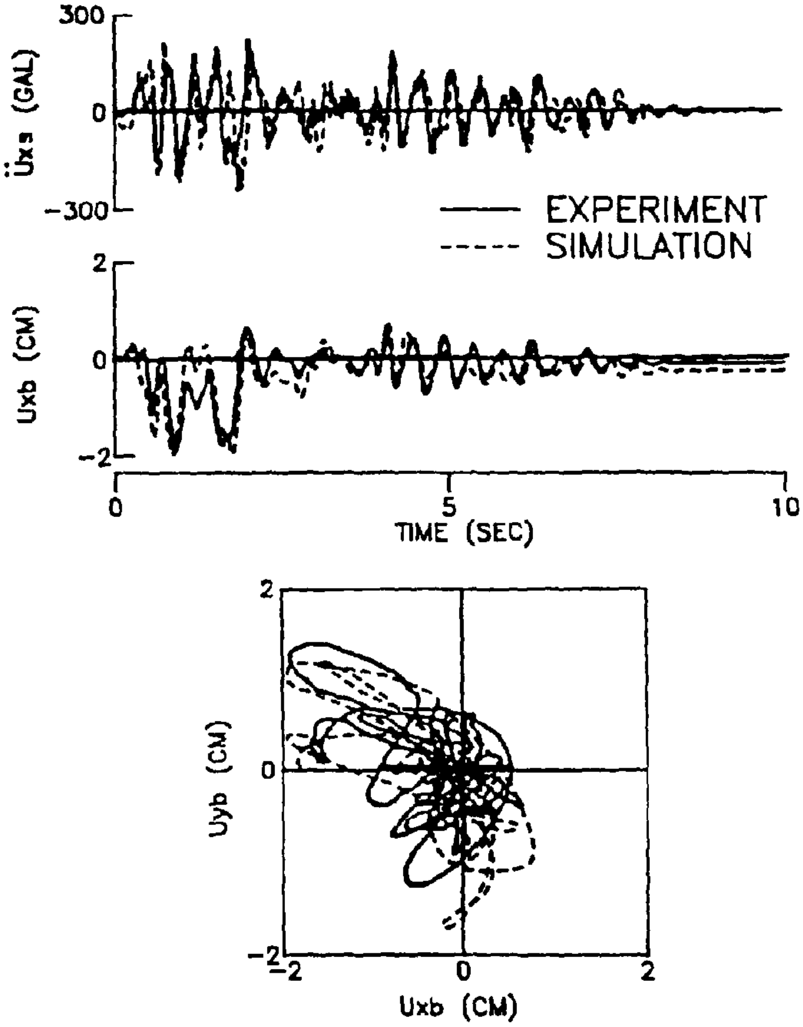



FIG. 2.3. Comparison of Simulated (3D-BASIS) and Measured Results of Bidirectional Shake Table Tests of a Sliding Isolated Structure with El Centro Excitation. $\ddot{U}_{xs}$ - Superstructure Acceleration Response in X Dir.; $U_{xb}$ - Base Displacement Response in X Dir.; $U_{yb}$ - Base Displacement Response in Y Dir.

## 2.5 3D-BASIS APPLICATIONS

3D-BASIS is a useful tool for experimental studies, for response prediction and for postprocessing data. Among these applications was an analytical study of a shake table test performed on a six-story-steel-structure at SUNY-Buffalo with a sliding isolation system (Nagarajaiah et al. 1992). Applications at UC Berkeley include preliminary studies for a shake table test of a 1/2.5 scale reinforced concrete three-story-structure with three types of isolation systems (Aiken et al. 1993). 3D-BASIS has been also used to evaluate the important effects of nonlinear biaxial interaction, between orthgonal lateral forces in isolation bearings, on the response of base isolated structures, by Nagarajaiah et al. (1990), and by Mokha et al. (1993).

In a more recent application, 3D-BASIS has been used in the study of lateral-torsional response of base isolated structures. The important system parameters which influence the lateral-torsional of response of: (i) sliding isolated structures (Nagarajaiah et al. 1993a) and (ii) elastomeric isolated structures (Nagarajaiah et al. 1993b) were studied. It was shown that although small in magnitude significant torsional effects could occur in the total response depending on the system parameters.

3D-BASIS has been recently used in evaluation of SEAOC code provisions for base isolated structures (Constantinou et al. 1993; Theodossiou et al. 1991;Winters et al. 1993). These studies, conducted at SUNY-Buffalo, involved structures ranging from one to eight stories with different isolation systems and involved statistical evaluation. The structures were excited by historical strong ground motions and spectrum compatible simulated motions.

Another application is a post-earthquake evaluation study and performance evaluation of Foothill Communities Law and Justice Center, San Bernardino, California, and some other Japanese buildings under actual earthquakes (Clark et al 1993; Mitsusaka et al 1993).

Some recent use of 3D-BASIS was in retrofit projects such as: (i) the Court of Appeals Building in San Francisco, by consulting firm Skidmore, Owings and Merrill and Associates (Amin et al. 1993a; 1993b); (ii) State of California Justice Building, San Francisco, and Hayward City Hall, Hayward, by Charles Kircher and Associates and (iii) Los Angeles County emergency operations center, by the consulting firm Daniel, Mann, Johnson & Mendenhall and Associates (Cho et al. 1993). In a recent application 3D-BASIS was used in the design verification of a new base isolated structure, the Martin Luther King Hospital in Los Angeles, by Office of Statewide Health Planning and Development, California.

Microcomputer PC-DOS/WINDOWS versions of 3D-BASIS and 3D-BASIS-M have also been developed and made available through the National Center for Earthquake Engineering and the National Information Service in Earthquake Engineering. This has greatly facilitated the usage of 3D-BASIS in design offices which have in-house microcomputers. The versatility of 3D-BASIS stems from the fact that it can analyze base isolated structures like sliding structures with great accuracy and yet complete the analysis in reasonable CPU time on a microcomputer. Furthermore, simplicity of input requirements and fast execution on microcomputers make the program attractive to the designers of base isolated structures.

## 2.6 COMPUTER PROGRAM ETABS

Computer program ETABS (Wilson et al. 1975) is a special purpose program for linear structural analysis of frame and shear wall structures subjected to both static and earthquake loadings. This program and its new PC based versions are widely used for several decades.

## 2.7 SALIENT FEATURES OF ETABS

Salient modeling and analysis features of ETABS are as follows (Wilson et al. 1975):

(1) Nonsymmetric, nonrectangular multistory buildings which have frames and shear walls located arbitrarily in plan can be modeled;

(2) The structure is idealized as a system of frame and shear wall substructures interconnected by floor diaphragms which are rigid in their own plane;

(3) Only three degrees of freedom, i.e., two translational and one rotational degree of freedom attached to the center of mass, are retained in the analysis after condensation of other frame-shear wall degrees of freedom;

(4) Beam, column, shear wall and diagonal bracing elements can be included;

(5) Axial deformation in columns and bending and shearing deformations in columns and beams can be included;

(6) Finite column and beam widths or "rigid zone" can be specified;

(7) Nonprismatic beams can be modeled;

(8) Vertical static loads can be combined with seismic loads;

(9) Time history or response spectrum analysis can be performed and peak member forces can be output.

Because of the aforementioned capabilities, ETABS is one of the most widely used programs by practicing engineers for analysis and seismic design of structures.

## 2.8 SUPERSTRUCTURE MODELING IN ETABS

The 3D superstructure is modeled as an elastic frame-shear wall structure. 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 complete structure composed of several frame and shear wall substructures is modeled with the assumption that these substructures are interconnected by floor diaphragms which are rigid in their own plane. Each joint in the structure is modeled with six degrees of freedom. Within each frame, three degrees of freedom (the two translations and one rotation in the floor plane) are transformed, using the assumption of rigid floor diaphragm, to the frame degrees of freedom at that floor level. The remaining three joint degrees of freedom are eliminated by static condensation before each frame substructure stiffness is added to the total structural stiffness. The total structural stiffness matrix corresponds to three degrees of freedom per floor at the center of mass.

The inherent assumptions in this approach, such as: (1) compatibility being not enforced with regard to displacements at joints which are common to more than one frame substructure; (2) approximate inclusion of the out-of-plane bending stiffness of the rigid floors while specifying beam properties; and (3) axial deformation of beams is not permitted because of rigid floor assumption, which has been described in detail by Wilson et al. (1975).

## 2.9 ELEMENTS FOR MODELING INDIVIDUAL MEMBERS

Beam, column, shear wall-panel and diagonal bracing elements in ETABS are linear elastic elements. Column elements are available for modelling prismatic column members only; however, beam elements are available and can either model prismatic or nonprismatic beam members; beam members must be symmetric about their vertical midplane. Axial deformation in columns and bending and shearing deformations in columns and beams can

Finite column and beam widths or "rigid zone" are explicitly accounted for. The panel element available for modelling infill panels and discontinuous shear walls has two modelling options: (i) a "flexural" model which carries both bending and shear; and (ii) a "pure shear" model which is restricted to carrying only shear. The diagonal bracing element available is a truss element and can be placed in any arbitrary story of the frame. A complete description of the element stiffness matrices and modeling options can be found in Wilson et al. (1975).

## 2.10 FRAME SUBSTRUCTURE

The stiffness matrix of the frame substructure, planar or rectangular with arbitrary plan, is assembled first, following which, the global stiffness matrix of the whole structure is constructed by direct stiffness approach using individual frame substructure stiffness matrices. The frame reference axis and the reference lines, formed by column lines and floor levels, are used for describing connectivity. A complete description of the lateral frame stiffness matrix assembly and static condensation can be found in Wilson et al. (1975). Vertical loading is applied to the individual frames by means of sets of fixed end forces associated with each beam.

## 2.11 GLOBAL STIFFNESS MATRIX AND SOLUTION ALGORITHM

The global displacement coordinate system consists of two translations and one rotation in the floor plane attached to the center of mass; hence, the mass matrix is diagonal. The position of the center of mass at each story level may vary from story to story. The center of mass of each floor is defined with reference to global structure axes. The global stiffness matrix is assembled by transforming the frame substructure stiffness matrices to the global coordinate system. Gaussian elimination is used for solution in static load cases and step-by-step modal solution procedure is used for earthquake response. A complete description of the global stiffness matrix assembly and solution procedure can be found in Wilson et al. (1975).

## 2.12 CONCLUDING REMARKS

It is evident from the overview of 3D-BASIS and ETABS that the two programs have special features which can be integrated to develop a more comprehensive program for analysis of base isolated structures. The intent of 3D-BASIS-TABS is to integrate structural capabilities of ETABS with the nonlinear analysis of base isolations from 3D-BASIS. The subsequent sections describe these new developments.

# SECTION 3

# 3D-BASIS-TABS

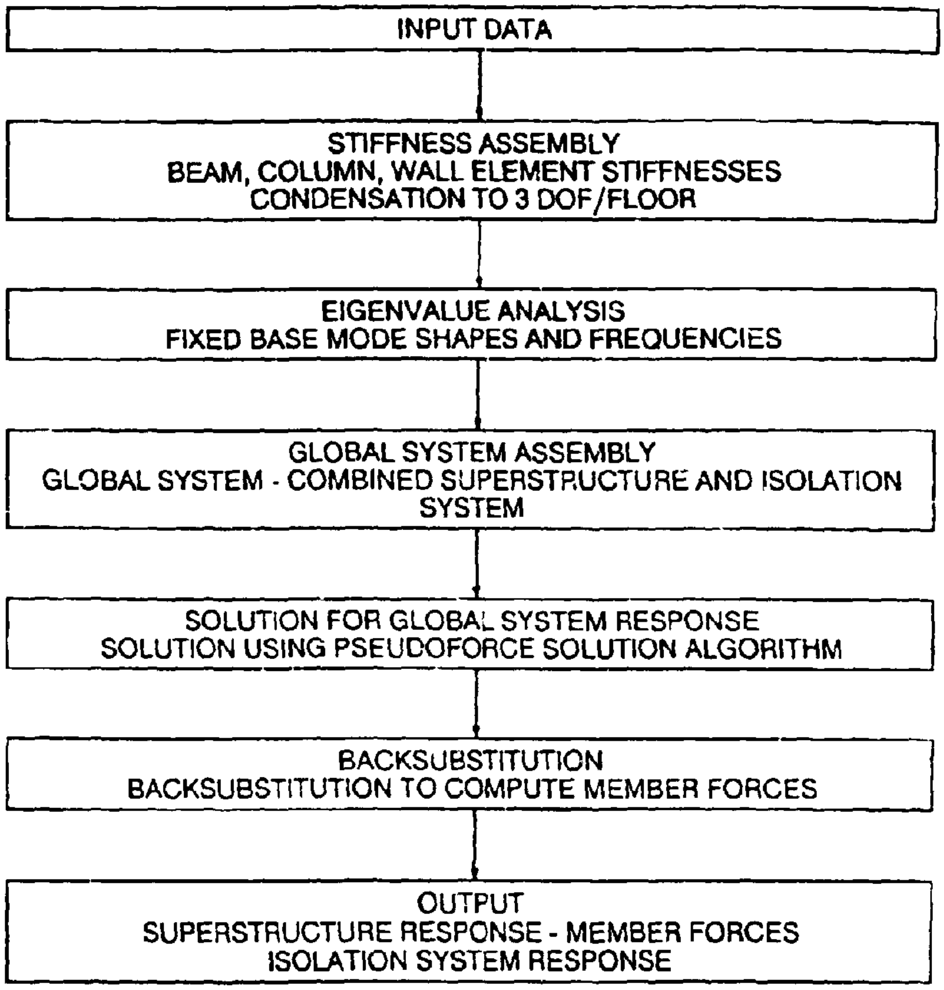
The structural model and the solution algorithm in 3D-BASIS-TABS are described in this section. The major steps in the solution algorithm are presented in the Flowchart 3.1. The detailed description of each step is described in the following sections.

## 3.1 INPUT DATA

The input format has been retained in the same format as in ETABS to facilitate usage (since many engineers and researchers 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.

## 3.2 SUPERSTRUCTURE STIFFNESS ASSEMBLY

3D-BASIS-TABS is designed to include three options for modeling the superstructure. Option 1 for 3D-shear building in which story shear stiffnesses are to be input. Option 2 for full 3D-building in which 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 eigenvalues/eigenvectors (computed using ETABS) are to be input. Option 1 and Option 3 are cases which have been described in detail by the authors (Nagarajaiah et al., 1991) in 3D-BASIS. If Option 1 or 3 is used, member forces are not output, as no data for representing members is available.




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

In Option 2, assembly of the stiffness matrix of the frame substructure described in Section 2.8 from ETABS is adopted. Each joint in the structure is modeled with six degrees of freedom. Within each frame joint three degrees of freedom (the two translations and one rotation in the floor plane) are transformed, using the rigid floor diaphragm, to the frame degrees of freedom at that floor level. The remaining three frame joint degrees of freedom are eliminated by static condensation before each frame substructure stiffness is added to the total structural stiffness. The global degrees of freedom retained after condensation are three degrees of freedom per floor. The global stiffness matrix of the superstructure in the fixed base condition is used for eigenvalue analysis.

### 3.3 EIGENVALUE ANALYSIS

An eigenvalue analysis is undertaken 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. The frequencies and mode shapes obtained correspond to the condensed three degrees of freedom per floor model.

### 3.4 ISOLATION SYSTEM MODELING

The isolation system is modeled with spatial distribution and explicit nonlinear force-displacement characteristics of individual isolation devices. The isolation elements in 3D-BASIS described in Section 2.4, such as: (i) linear elastic element; (ii) linear viscous element; (iii) hysteretic element for elastomeric bearings and steel dampers; and (iv) hysteretic element for sliding bearings, can be specified.

## 3.5 GLOBAL SYSTEM ASSEMBLY

The formulation for global system assembly of the combined superstructure and the isolation system has been presented in detail by Nagarajaiah et al. (1991): 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. 3.1 ($U_i$, $U_b$, $U_g$ may be in X or Y direction). The superstructure is modeled as an elastic frame shear wall structure with three degrees of freedom per floor. 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, and other isolation series.

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

$$\mathbf{M}_{n\times n}\ddot{\mathbf{u}}_{n\times 1} + \mathbf{C}_{n\times n}\dot{\mathbf{u}}_{n\times 1} + \mathbf{K}_{n\times n}\mathbf{u}_{n\times 1} = -\mathbf{M}_{n\times n}\mathbf{R}_{n\times 3}\{\ddot{\mathbf{u}}_g + \ddot{\mathbf{u}}_b\}_{3\times 1} \qquad (3.1)$$

in which, n is three times the number of floors, $\mathbf{M}$ is the diagonal superstructure mass matrix, $\mathbf{C}$ is the superstructure damping matrix, $\mathbf{K}$ is the superstructure stiffness matrix and $\mathbf{R}$ 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, $\ddot{\mathbf{u}}$, $\dot{\mathbf{u}}$ and $\mathbf{u}$ represent the floor acceleration, velocity and displacement vectors relative to the base, $\ddot{\mathbf{u}}_b$ is the vector of base acceleration relative to the ground and $\ddot{\mathbf{u}}_g$ is the vector of ground acceleration.

The equations of motion for the base are as follows:

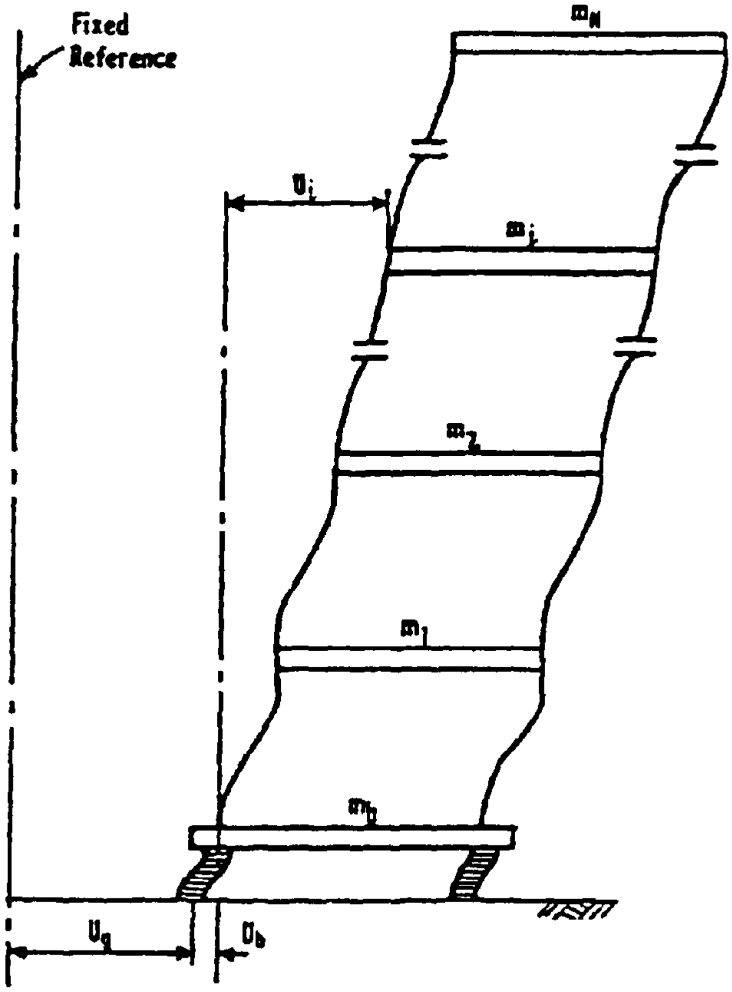



FIG. 3.1. Displacement Coordinates of the base isolated structure

$$\mathbf{R}^T_{3xn}\mathbf{M}_{nxn}\{\{\ddot{\mathbf{u}}\} + \mathbf{R}\{\ddot{\mathbf{u}}_b + \ddot{\mathbf{u}}_g\}\}_{nx1} + \mathbf{M}_{b\,3x3}\{\ddot{\mathbf{u}}_b + \ddot{\mathbf{u}}_g\}_{3x1} + \mathbf{C}_{b\,3x3}\{\dot{\mathbf{u}}_b\}_{3x1} + \mathbf{K}_{b\,3x3}\{\mathbf{u}_b\}_{3x1} + \{\mathbf{f}\}_{3x1} = 0 \tag{3.2}$$

in which, $\mathbf{M}_b$ is the diagonal mass matrix of the rigid base, $\mathbf{C}_b$ is the resultant damping matrix of viscous isolation elements, $\mathbf{K}_b$ 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. Employing modal reduction:

$$\mathbf{u}_n = \Phi_{nxm}\mathbf{u}^*_{mx1} \tag{3.3}$$

in which, $\Phi$ is the modal matrix normalized with respect to the mass matrix and $\mathbf{u}^*$ is the modal displacement vector relative to the base and m is the number of eigenvectors retained in the analysis, and combining Eqs. 3.1 to 3.3 the following equation is derived:

$$\begin{pmatrix} [I] & [\Phi^T\mathbf{M}\mathbf{R}] \\ [\mathbf{R}^T\mathbf{M}\Phi] & [\mathbf{R}^T\mathbf{M}\mathbf{R} + \mathbf{M}_b] \end{pmatrix}_{(m+3)x(m+3)} \begin{Bmatrix} \ddot{\mathbf{u}}^* \\ \ddot{\mathbf{u}}_b \end{Bmatrix}_{(m+3)x1} + \begin{pmatrix} [2\xi_i\omega_i] & 0 \\ 0 & [\mathbf{C}_b] \end{pmatrix}_{(m+3)x(m+3)} \begin{Bmatrix} \dot{\mathbf{u}}^* \\ \dot{\mathbf{u}}_b \end{Bmatrix}_{(m+3)x1}$$
$$+ \begin{pmatrix} [\omega_i^2] & 0 \\ 0 & [\mathbf{K}_b] \end{pmatrix}_{(m+3)x(m+3)} \begin{Bmatrix} \mathbf{u}^* \\ \mathbf{u}_b \end{Bmatrix}_{(m+3)x1} + \begin{Bmatrix} 0 \\ \mathbf{f} \end{Bmatrix}_{(m+3)x1} = -\begin{bmatrix} \Phi^T\mathbf{M}\mathbf{R} \\ \mathbf{R}^T\mathbf{M}\mathbf{R} + \mathbf{M}_b \end{bmatrix}_{(m+3)x3} \ddot{\mathbf{u}}_{g\,3x1} \tag{3.4}$$

in which, $\xi_i$ = the modal damping ratio and $\omega_i$ = the natural frequency, of the fixed base structure in the mode i. In Eq. 3.4 matrices $[2\xi_i\omega_i]$ and $[\omega_i^2]$ are diagonal.

Eq. 3.4 can be written as follows:

$$\tilde{\mathbf{M}}\ddot{\tilde{\mathbf{u}}}_t + \tilde{\mathbf{C}}\dot{\tilde{\mathbf{u}}}_t + \tilde{\mathbf{K}}\tilde{\mathbf{u}}_t + \mathbf{f}_t = \tilde{\mathbf{P}}_t \tag{3.5}$$

At time $t + \Delta t$

$$\tilde{\mathbf{M}}\ddot{\tilde{\mathbf{u}}}_{t+\Delta t} + \tilde{\mathbf{C}}\dot{\tilde{\mathbf{u}}}_{t+\Delta t} + \tilde{\mathbf{K}}\tilde{\mathbf{u}}_{t+\Delta t} + \mathbf{f}_{t+\Delta t} = \tilde{\mathbf{P}}_{t+\Delta t} \tag{3.6}$$

Written in incremental form

$$\bar{M}\Delta\ddot{\bar{u}}_{t+\Delta t} + \bar{C}\Delta\dot{\bar{u}}_{t+\Delta t} + \bar{K}\Delta\bar{u}_{t+\Delta t} + \Delta f_{t+\Delta t} = \bar{P}_{t+\Delta t} - \bar{M}\ddot{\bar{u}}_t - \bar{C}\dot{\bar{u}}_t - \bar{K}\bar{u}_t - f_t \tag{3.7}$$

In which, $\bar{M}$, $\bar{C}$, $\bar{K}$ and $\bar{P}$ represent the reduced mass, damping, stiffness and load matrices (see Eq. 3.4). Furthermore, the state of motion of modal superstructure and base is represented by vectors $\ddot{\bar{u}}_t$, $\dot{\bar{u}}_t$ and $\bar{u}_t$ (see Eq. 3.4).

## 3.6 LOADING CONDITIONS

Vertical static loading conditions for representing dead loads, and earthquake loading conditions for 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.

## 3.7 SOLUTION FOR GLOBAL SYSTEM RESPONSE

The incremental nonlinear force vector $\Delta f_{t+\Delta t}$ in Eq. 3.7 is unknown. This vector is brought on to the right hand side of Eq. 3.7 and treated as a pseudo-force vector. The two step solution algorithm developed is as follows:

(i) The solution of equations of motion using unconditionally stable Newmark's constant-average-acceleration method (Newmark 1959); (ii) The solution of the 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, an 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).

### 3.8 BACKSUBSTITUTION

The time history of member forces are computed by backsubstitution, after the non-linear time history analysis is completed, and the peak member forces are output to facilitate the design of members. The backsubstitution procedure described in section 2.11 (from ETABS) is adopted.

### 3.9 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 frequencies and mode shapes. The peak response results of member response and isolator response is output. The time history of isolator response, and other response quantities of interest are also 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.

# SECTION 4

# VERIFICATION OF 3D-BASIS-TABS

A sliding isolated structure and a structure supported on a combined sliding-elastomeric isolation system are considered as case study since the novelty of 3D-BASIS-TABS (as well as 3D-BASIS) is that it can capture the highly nonlinear behavior of sliding isolation systems in plane motion accurately. The verification of 3D-BASIS-TABS was performed in two stages by dynamic analysis of a three story reinforced concrete building with a sliding isolation system.

The first stage verification was accomplished by comparing global results (results at the center of mass) of the program 3D-BASIS-TABS, modeling the superstructure explicitly element-by-element, with the results of the program 3D-BASIS (Nagarajaiah et al. 1991b) using the dynamic characteristics of the superstructure i.e., frequencies and mode shapes. The first stage verified the global results.

The second stage was accomplished by comparing the dynamic analysis results of the program 3D-BASIS-TABS, in the form of peak member forces at a chosen instant of time during the time history, with the results of a pseudo-static analysis using commercially available finite element program STAAD, which can analyze 3D - linear structures. The pseudo-static analysis using STAAD consisted of the application of lateral forces or inertial forces at the center of mass of the three floors at the same instant of time as chosen in 3D-BASIS-TABS time history analysis. The lateral forces or inertial forces were extracted from the dynamic analysis using 3D-BASIS-TABS. The second stage verified the member force computations in the program 3D-BASIS-TABS.

## 4.1 THREE STORY REINFORCED CONCRETE BASE ISOLATED BUILDING

A three story reinforced concrete building designed based on code provisions is considered. The building is square in plan and consists of three bays in each direction as shown in Fig. 4.1. The dimensions of the various members shown in Fig. 4.1 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; and (v) shear wall or panel of 100 mm thickness. The floor slab is 150 mm thick. The floor masses are: (i) translational mass of 108317 kg (119.4 ton) and (ii) mass moment of inertia 2985.6kN-m. The modulus of elasticity of the concrete is assumed to be $E_c$ = 29862560kN/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. 4.2. 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. 4.3. 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 $f_{max} = 0.10$ 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. 4.2 in greater detail (see the enlarged detail in Fig. 4.2).

3D-BASIS-TABS is used to analyze the base isolated building excited by El Centro NS earthquake. The input file and the output file for the three story base isolated building is given in Appendix B and C. The details about bay numbers and I.D. numbers of column lines are shown in Fig. 4.4 and should be read in conjunction with the input file in Appendix B.

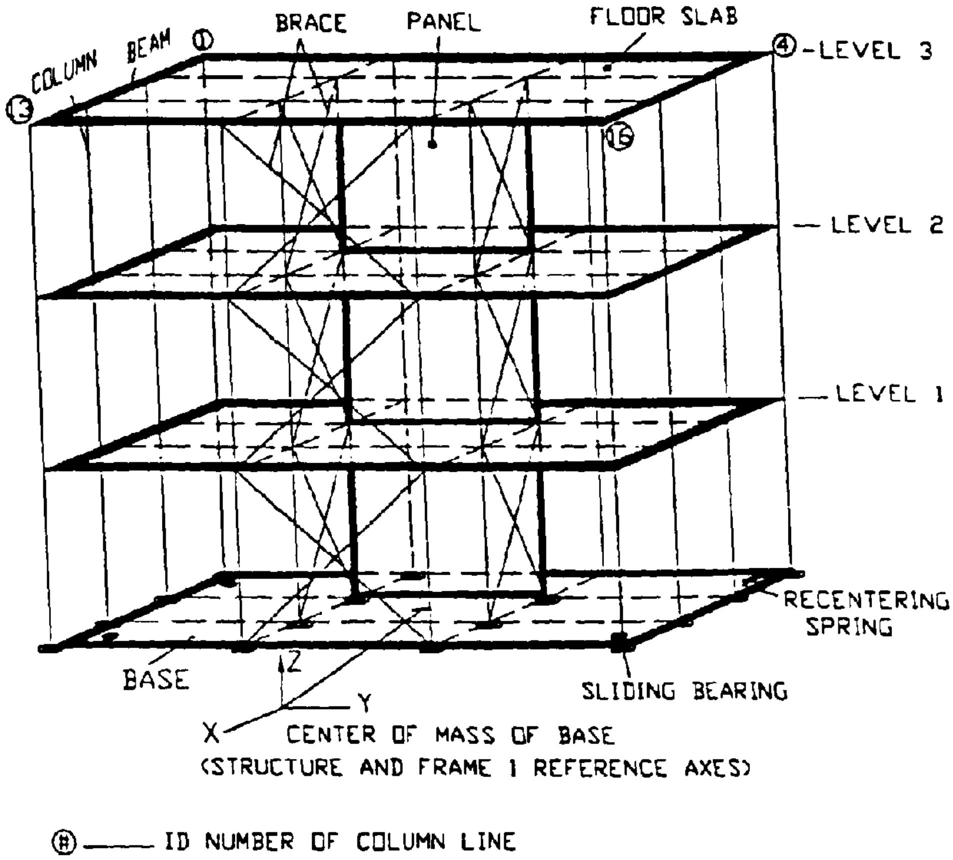



FIG. 4.1. Superstructure Member Configuration and Isolation System Configuration of the Three Story Reinforced Concrete Sliding Isolated Building. Note the Location of the Structure Axis at the Center of Mass of the Base and the Location of the Column Lines 1, 4, 13 and 16 (Refer to the Input File given in Appendix B)

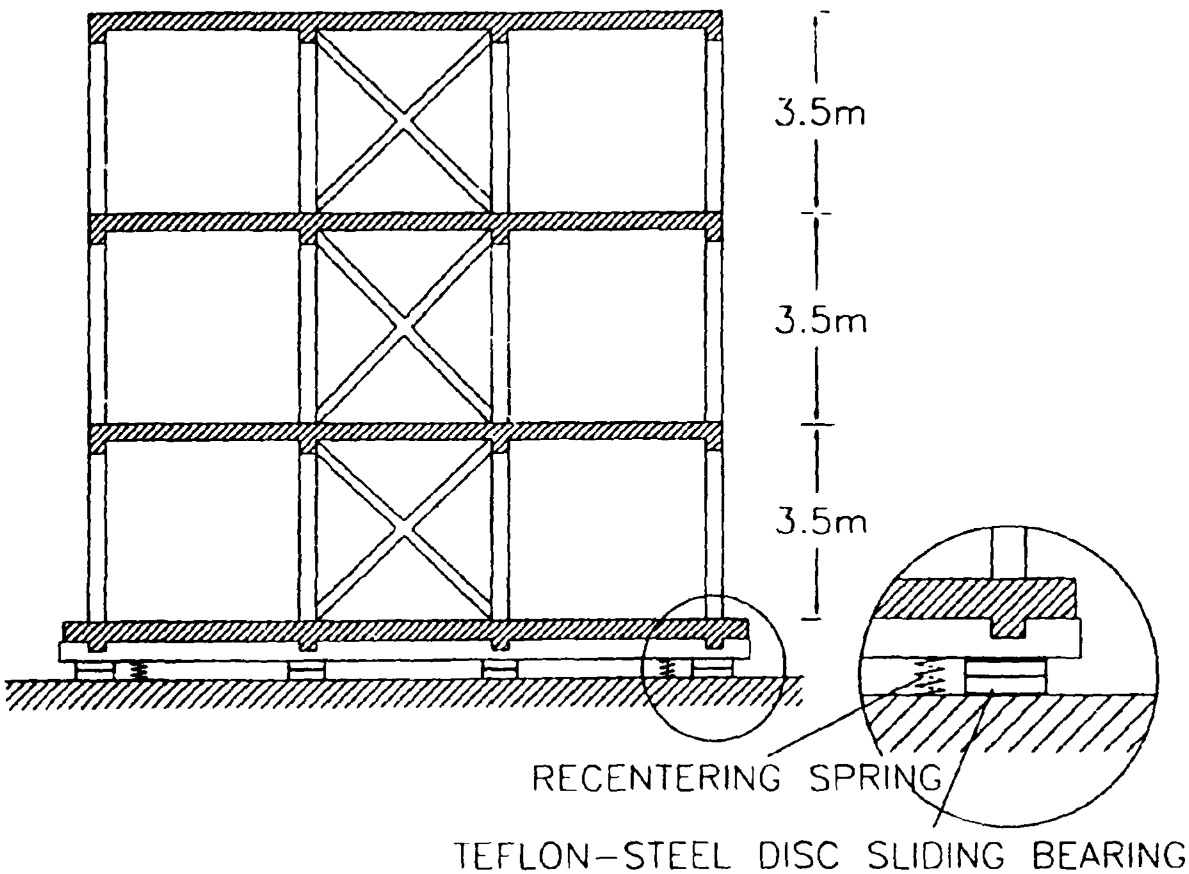



FIG. 4.2. Cross Section of the Three Story Reinforced Concrete Sliding Isolated Building (Left Extreme Column Line is 16 and Right Extreme Column Line is 13). Note the Details of the Sliding Bearing and Recentering Spring Shown in the Inset and Plan Location Shown in FIG. 4.3.

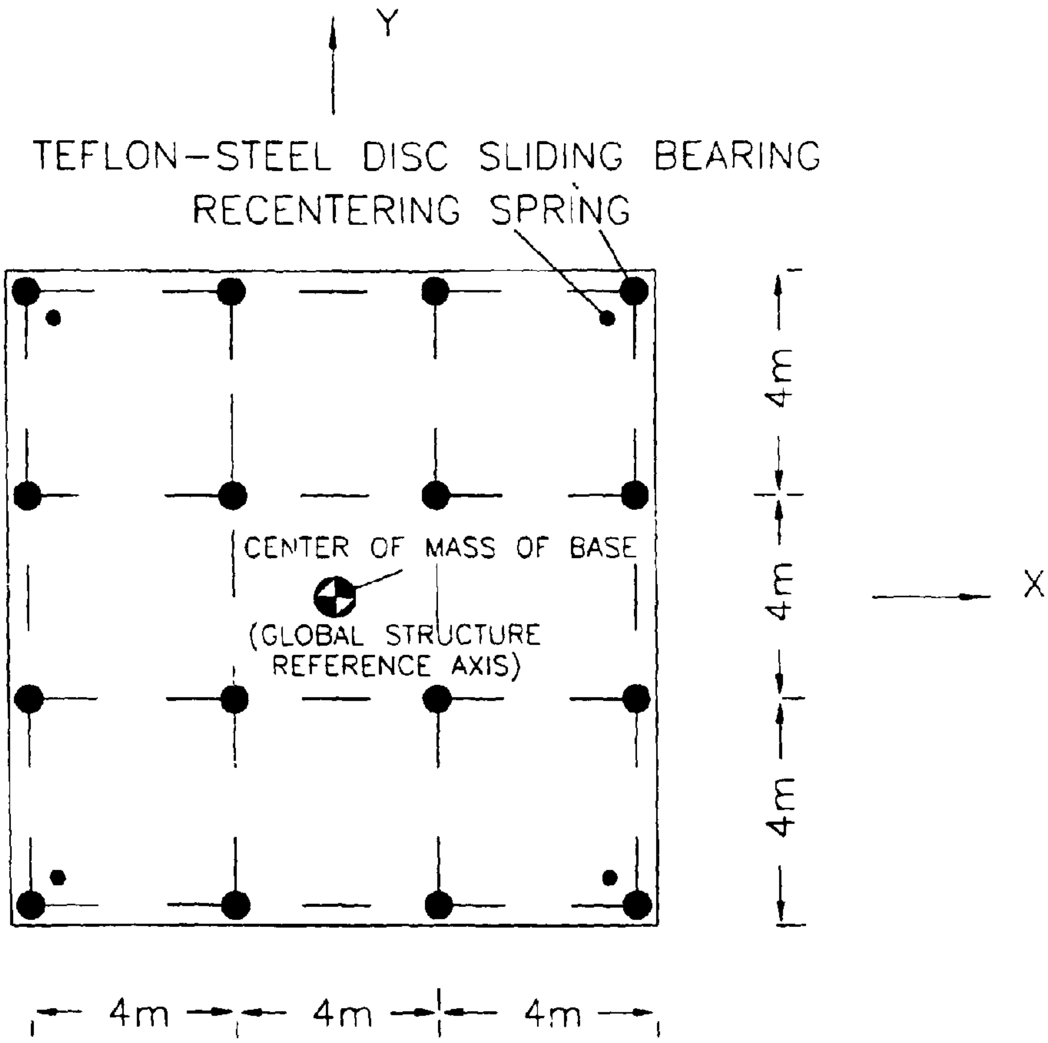



**FIG. 4.3.** **Plan of the Sliding Isolation System with Teflon - Steel Disc Sliding Bearings and Recentering Springs**

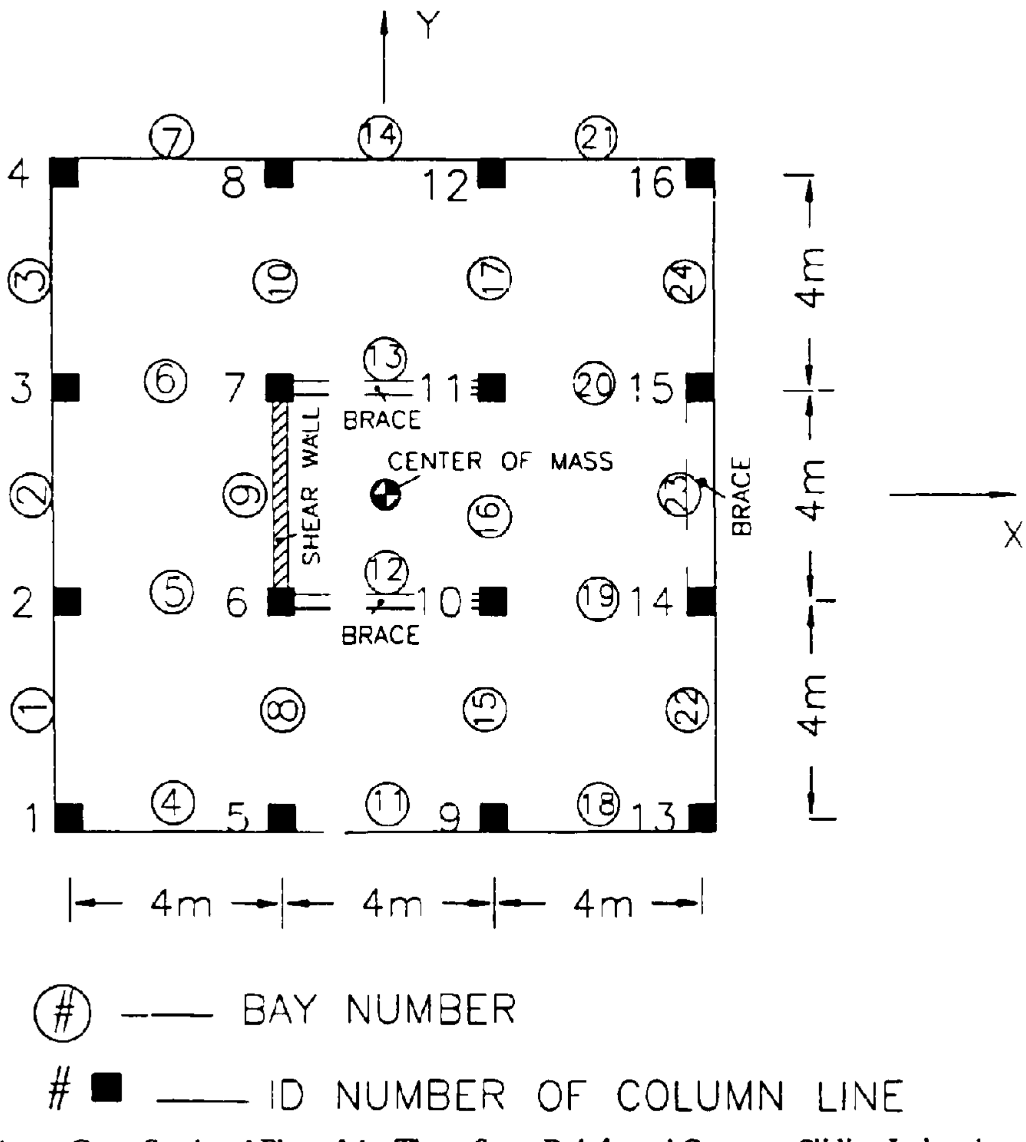



**FIG. 4.4.** Cross Sectional Plan of the Three Story Reinforced Concrete Sliding Isolated Building between Levels 2 and 3. Note the Location of the Column Lines and Bay Numbers (Refer to the Input File given in Appendix B)

### 4.1.1 Verification of Global Results

In order to verify the global response computed by 3D-BASIS-TABS i.e., at the center of mass of the floors, the same building was analyzed using 3D-BASIS (Nagarajaiah et al. 1991) with eigenvalues and eigenvectors of the three story building as the input for super-structure dynamic characteristics. A comparison of the results showed identical results in both cases, indicating the global response computed by 3D-BASIS-TABS to be accurate.

### 4.1.2 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 of 20 secs under El Centro ground motion, were verified by comparing the results of 3D-BASIS-TABS with the results of a pseudo-static analysis using commercially available finite element program STAAD. The pseudo-static analysis using STAAD consisted of application of lateral forces or inertial forces at the center of mass of the three floors at the same instant of time as chosen in 3D-BASIS-TABS time history analysis. The lateral forces or inertial forces were 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 4-1 and 4-2. Table 4-1 shows the column moments and forces. Table 4-2 shows the beam moments. It is evident from this comparison of results, obtained using 3D-BASIS-TABS and STAAD, that the member force computations in 3D-BASIS-TABS are accurate.

### 4.1.3 Time History Response

The time history of base displacement, roof displacement, and force displacement response of bearing no. 1, are shown in Fig. 4.5. Identical time history response was obtained by using 3D-BASIS-TABS and 3D-BASIS.

**Table 4-1 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 | 7.73 | 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 4-2 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 |

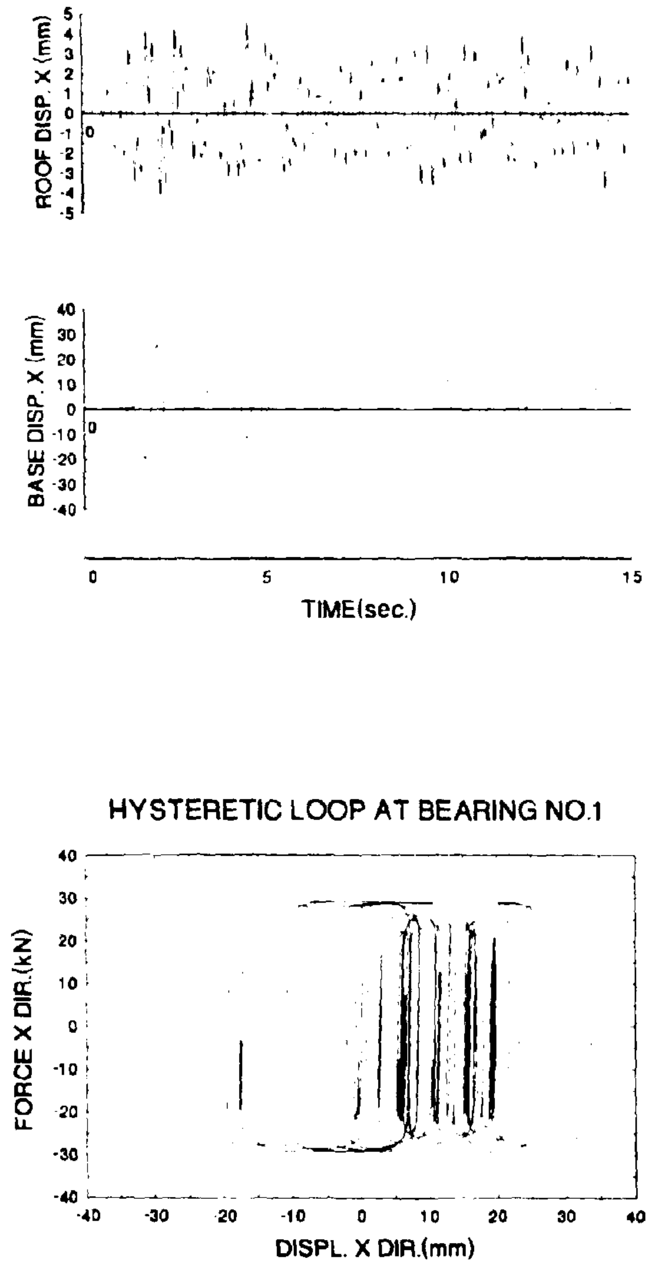



FIG. 4.5. Response of Three Story Reinforced Concrete Structure to El Centro NS Earthquake: (a) X Dir. Roof Displacement; (b) X Dir. Base Displacement; and (c) X Dir. Force - Displacement Loop at Sliding Bearing No. 1 Located on Column Line 1

## 4.2 CASE STUDY - EIGHT-STORY REINFORCED CONCRETE BASE ISOLATED BUILDING

An eight-story reinforced concrete base isolated structure shown in Fig 4.6 is considered. The structure consists of three bays in the transverse direction and eight bays in the longitudinal direction, as shown in Figure 4.7. The typical floor height is 147 inches.

A complete description of member properties, such as beam and column properties; is given in Table 4-3 and Table 4-4. The slab thickness is 102 mm in all floors and roof. The modulus of elasticity of the concrete is assumed to be 22183098 $kN/m^2$ ($3150k/in^2$). The damping ratio in the superstructure is assumed to be 5% critical.

The isolation system consists of 28 sliding bearings and eight recentering springs, as shown in Fig. 4.8. The sliding bearings are made of unfilled Teflon and polished stainless steel plates. The sliding bearings have a coefficient of friction $f_{max} = 0.08$. and $f_{min} = 0.04$. The recentering helical springs are designed to provide an isolation period $T_b = 3 sec$.

3D-BASIS-TABS is used to analyze the base isolated structure. The structure is excited by bidirectional El Centro earthquake, since bidirectional/biaxial interaction is of importance (Nagarajaiah et.al. 1990; Mokha et al., 1993).

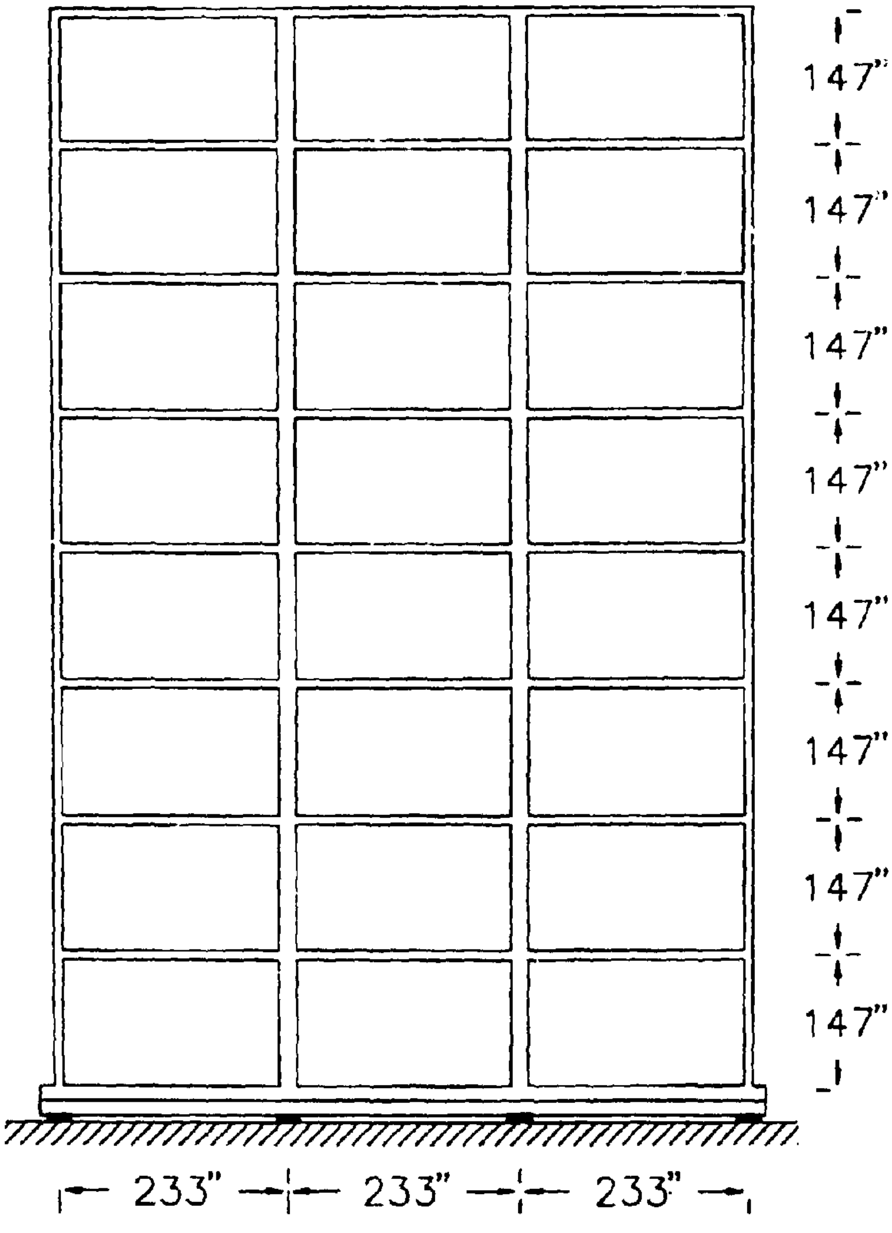



FIG. 4.6. Eight Story Reinforced Concrete Base Isolated Building on Combined Sliding and Elastomeric Isolation System

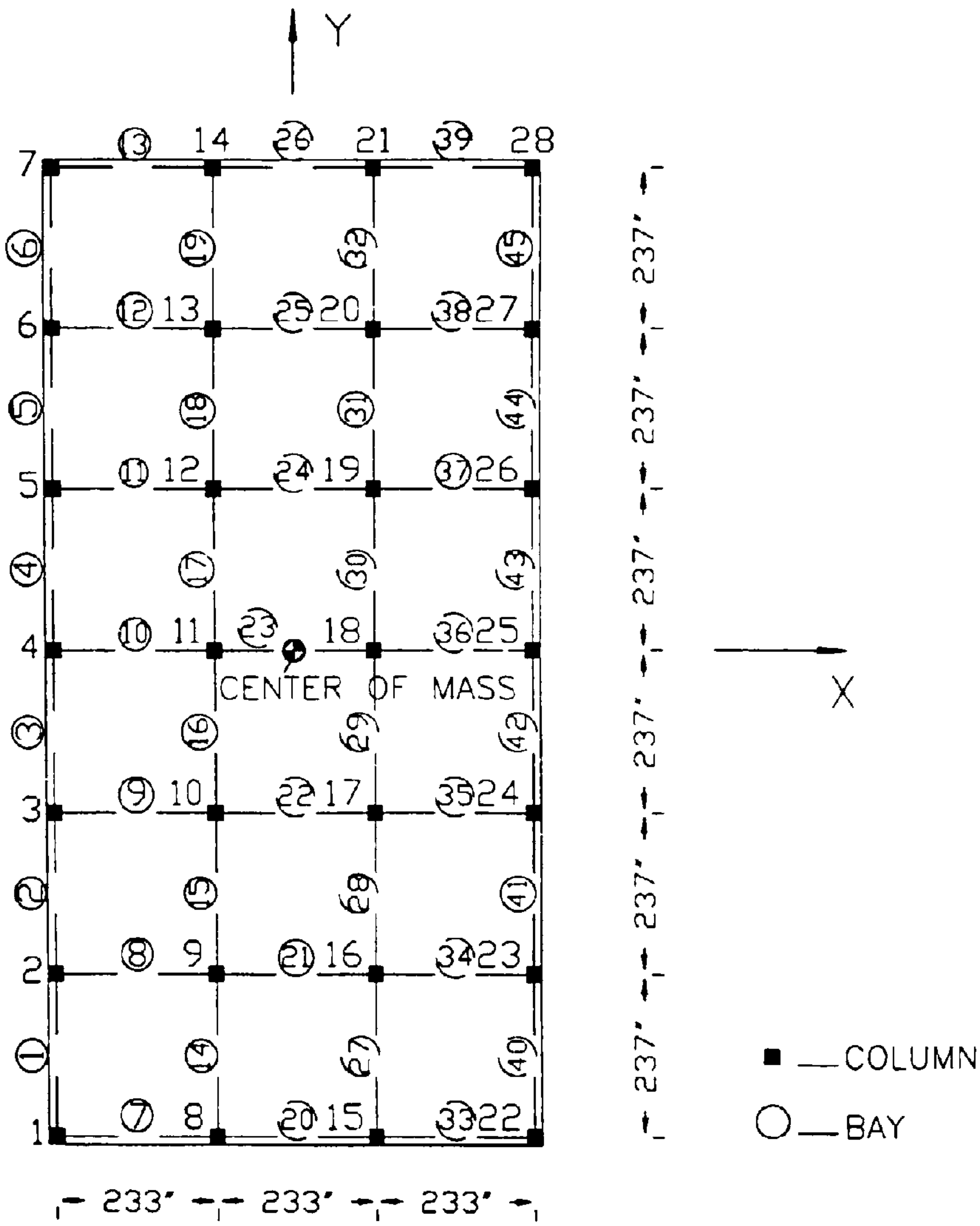



FIG. 4.7. Cross Sectional Plan of the Eight Story Reinforced Concrete Base Isolated Building between Levels 7 and 8. Note the Location of the Column Lines and Bay Numbers (Refer to the Input File given in Appendix D)

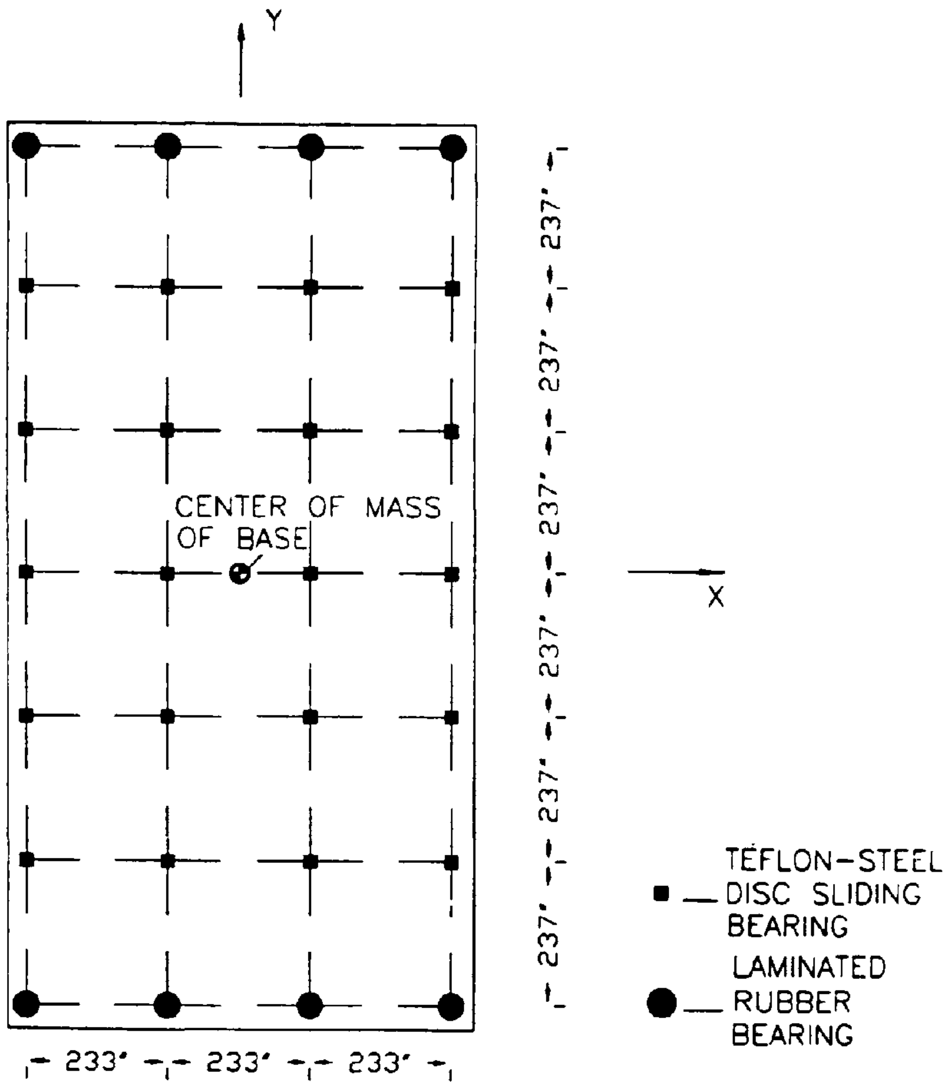



FIG. 4.8. Plan of the Isolation System with Laminated Rubber Bearings and Teflon - Steel Disc Sliding Bearings

Table 4-3 - Column Schedule

| COL. ID | 1st fl. | 2nd fl. | 3rd fl. | 4th fl. | 5th fl. | 6th fl. | 7th fl. | 8th fl. |
|---|---|---|---|---|---|---|---|---|
| 1 | 3* | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 2 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 3 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 4 | 2 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 5 | 5 | 3 | 3 | 2 | 2 | 2 | 1 | 1 |
| 6 | 5 | 3 | 3 | 2 | 2 | 2 | 1 | 1 |
| 7 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 9 | 5 | 5 | 3 | 3 | 2 | 2 | 1 | 1 |
| 10 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 |
| 11 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 |
| 12 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 |
| 13 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 |
| 14 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 15 | 7 | 7 | 7 | 7 | 7 | 2 | 7 | 7 |
| 16 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 |
| 17 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 |
| 18 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 |
| 19 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 |
| 20 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 |
| 21 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 22 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 23 | 2 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 24 | 2 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 25 | 2 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 26 | 2 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 27 | 2 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 28 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

*Column types:

| TYPE | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| bxh (inxin) | 18x18 | 24x24 | 26x26 | 24x28 | 28x28 | 24x32 | 18x24 |

Table 4-4 - Beam Schedule

| Bay # | 1st fl. | 2nd fl. | 3rd fl. | 4th fl. | 5th fl. | 6th fl. | 7th fl. | 8th fl. |
|---|---|---|---|---|---|---|---|---|
| 1 | 13* | 13 | 9 | 9 | 6 | 6 | 3 | 11 |
| 2 | 13 | 13 | 9 | 9 | 6 | 6 | 3 | 11 |
| 3 | 13 | 13 | 9 | 9 | 6 | 6 | 3 | 11 |
| 4 | 12 | 12 | 12 | 12 | 6 | 6 | 6 | 2 |
| 5 | 12 | 12 | 12 | 12 | 6 | 6 | 6 | 2 |
| 6 | 12 | 12 | 12 | 12 | 6 | 6 | 6 | 2 |
| 7 | 11 | 11 | 11 | 11 | 5 | 5 | 3 | 2 |
| 8 | 12 | 12 | 12 | 12 | 6 | 6 | 6 | 2 |
| 9 | 11 | 11 | 11 | 11 | 5 | 5 | 3 | 2 |
| 10 | 12 | 12 | 12 | 12 | 6 | 6 | 6 | 2 |
| 11 | 12 | 12 | 12 | 12 | 6 | 6 | 6 | 11 |
| 12 | 12 | 12 | 9 | 9 | 6 | 6 | 6 | 11 |
| 13 | 12 | 12 | 9 | 9 | 6 | 6 | 6 | 11 |
| 14 | 12 | 12 | 9 | 9 | 6 | 6 | 6 | 11 |
| 15 | 10 | 10 | 2 | 2 | 4 | 4 | 2 | 11 |
| 16 | 10 | 10 | 2 | 2 | 4 | 4 | 2 | 1 |
| 17 | 10 | 10 | 2 | 2 | 4 | 4 | 2 | 1 |
| 18 | 9 | 9 | 6 | 6 | 3 | 3 | 2 | 1 |
| 19 | 9 | 9 | 6 | 6 | 3 | 3 | 2 | |
| 20 | 9 | 9 | 6 | 6 | 3 | 3 | 2 | |
| 21 | 8 | 8 | 5 | 5 | 3 | 3 | 2 | |
| 22 | 9 | 9 | 6 | 6 | 3 | 3 | 2 | |
| 23 | 9 | 9 | 6 | 6 | 3 | 3 | 2 | |
| 24 | 12 | 12 | 9 | 6 | 6 | 6 | 6 | |
| 25 | 12 | 12 | 9 | 6 | 6 | 6 | 6 | |
| 26 | 12 | 12 | 9 | 6 | 6 | 6 | 6 | |
| 27 | 12 | 12 | 9 | 6 | 6 | 6 | 6 | |
| 28 | 12 | 12 | 9 | 6 | 6 | 6 | 6 | |

*Beam types:

| TYPE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bxh (inxin) | 12x 22 | 16x 24 | 18x 24 | 14x 22 | 20x 22 | 20x 24 | 16x 22 | 22x 22 | 22x 24 | 18x 22 | 24x 22 | 24x 24 | 26x 26 |

### 4.2.1 Response to Bidirectional El Centro Earthquake

Figure 4.9 shows the envelope of axial forces, shear forces, and moments in Column 1. The results presented in Fig. 4.9, such as member forces, illustrate the capability of 3D-BASIS-TABS to provide useful information for the design of members.

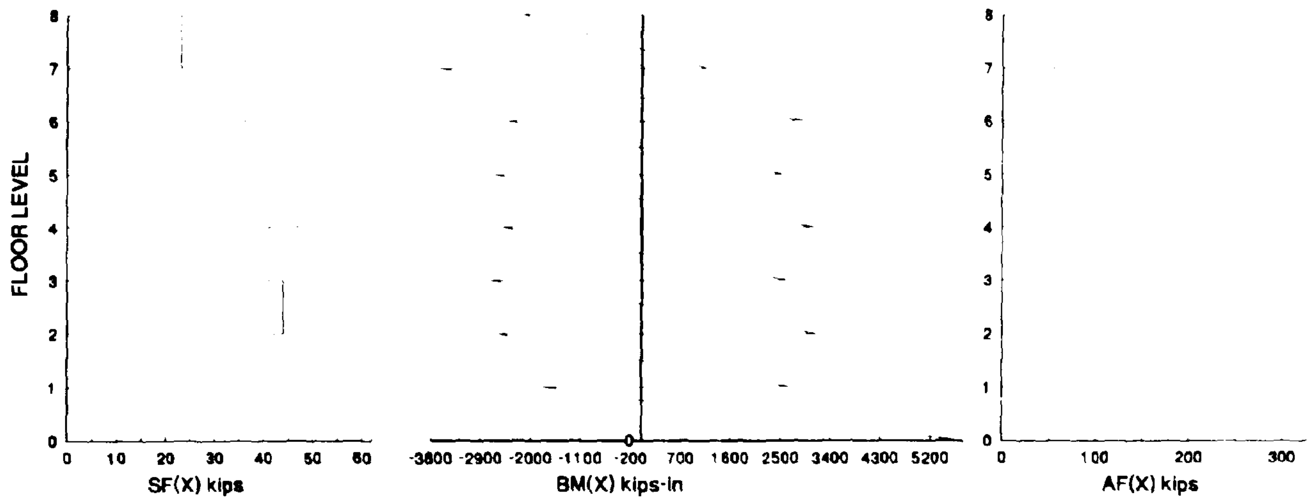



FIG. 4.9. Envelope of Shear Force, Bending Moment and Axial Force in the Column on Column Line 1

# SECTION 5

# CONCLUDING REMARKS

3D-BASIS was designed to emphasize the advantages of the modeling approach proposed by Wilson et al. (1975) for the 3D-superstructure in ETABS. The developments described in this report have led to the incorporation of the modeling approach for the 3D-superstructure of ETABS into 3D-BASIS, resulting in the enhanced version 3D-BASIS-TABS. New features, such as multidirectional excitation capabilities, have been incorporated into 3D-BASIS-TABS. The program 3D-BASIS-TABS has been verified by comparison with other program and previous versions.

Microcomputer PC - DOS/WINDOWS version of 3D-BASIS-TABS has also been developed. The PC version of 3D-BASIS-TABS can be used with desktop microcomputers running MS-DOS or WINDOWS environments. The versatility of 3D-BASIS-TABS (as well as 3D-BASIS) stems from the fact that it can analyze base isolated structures like sliding isolated structures with great accuracy and yet complete the analysis in reasonable CPU time on a microcomputer. 3D-BASIS-TABS has been designed keeping in view the concerns and feedback from practicing engineers and it is envisaged that further improvements can be made.

Finally, 3D-BASIS-TABS will be enhanced in the near future to incorporate nonlinear dampers, failsafe devices, displacement restraints and hybrid control which has been developed by several researchers (Reinhorn, et al. 1987; 1993; Feng, et al. 1993; Nagarajaiah, et al. 1993c, 1993d; Riley, et al. 1993; Soong, et al 1993; Subramaniam, et al. 1993; Yang, et al. 1992). Hybrid control involves augmentation of the passive isolation system with a active hydraulic devices.

# SECTION 6
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# APPENDIX A

# 3D-BASIS-TABS PROGRAM USER'S GUIDE

# APPENDIX A
# 3D-BASIS-TABS PROGRAM USER'S GUIDE

## A.1 INPUT FORMAT

The input will be specified in a main file BASTABS.DAT accompanied by wave motion data files WAVEX.DAT, WAVEY.DAT.

Dynamic arrays are used. Double precision is used in the program 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 specified in the input file unless mentioned otherwise. No blank cards are to be specified in the input file.

Note: Provision is made for a line of text between each set of data items. Refer to the sample data files accompanying this manual. No blank lines are to be specified in the input file.

## 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

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

LOR = Length of earthquake record (number of data points) [Records in different directions must have same length as specified here.]

*Notes: 1. For explanation of the option 1, option 2 and option 3 refer to section 3.2. If option 2 or 3 is used then member forces are not output.

2. Number of eigenvectors/eigenvalues to be 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, lead-rubber bearings, steel dampers, sliding bearings.

**A.4.2 Superstructure Control Information (for ISEV=2 only; skip this to A4.3 if ISEV=1 or 3)**

USER_TXT Reference information; upto 80 characters of text.

NDF,NTF,NLD,NAT

(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

(3) NAT = Analysis type code:

EQ.1; Static load analysis + mode shapes and frequencies
+ Lateral earthquake response and peak response
printout only

EQ.2; Static load analysis + mode shapes and frequencies
+ Lateral earthquake response and time history printout

*Notes: 1. Input data for frames with identical properties and vertical loading are given only once - see also section A.5.1.2.10 on Frame Location.

2. Load conditions are defined as combinations of the four load cases - see section A.9 on Load Case Definition.

3. Allowable story degrees of freedom are restricted to three degrees of freedom per floor.

### 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 (error) 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 (may require some iterations).

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. |
| (1) | (Default value = 0.5) |
| | BET = Parameter which controls the variation of acceleration within a time step. |
| (1) | (Default value = 0.25) |

1. Default values are assigned only when both GAM and BET are zero.

**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.

(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 (for INDGACC = 1).

(3) ULF = Load factor.

*Notes: 1. Three 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 WAVEX.DAT). Refer to A.7.1 for wave input information.

b) INDGACC = 2 refers to two independent earthquake records input in the X and Y directions, eg. 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 WAVEX.DAT and WAVEY.DAT). Refer to A.7.1 and A.7.2 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 = 2 and 3.

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 option 2 of A.4.1 - Full three dimensional representation of the superstructure.

Go to A.5.2 for option 1 - three dimensional shear building representation of the superstructure.

Go to A.5.3 for option 3 of A.4.1 - Eigenvalues/Eigenvectors for three dimensional representation of the superstructure.

### A.5.1 THREE DIMENSIONAL BUILDING (for ISEV = 2)

USR_TXT Reference information; upto 80 characters of text

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

#### A.5.1.1 Story Data

Repeat the following block of data according to the number of stories (NST).*

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.

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

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 according to number of different frames (NDF).

USR_TXT    Frame data information; up to 80 characters

##### 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 specified in the input file.

3. An isolated shear wall is a single column line frame. For this case all data pertaining to beams is meaningless an 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 specified in the input file 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 Properties**

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.

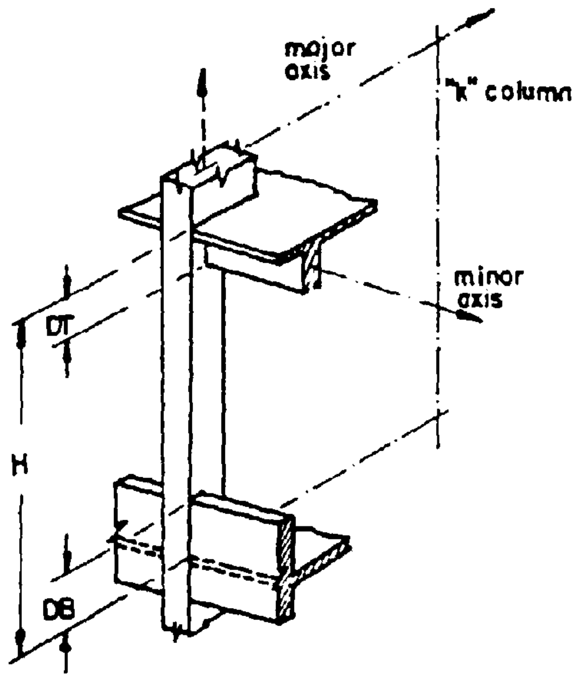


Fig. A-1 - Typical Column Model.

### A.5.1.2.4 Beam Properties

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 SA.

BP(3,I) = Torsional inertia.

BP(4,I) = Flexural inertia, I.

BP(5,I) = $K_{II}$ - stiffness factor (eg. 4)

BP(6,I) = $K_{JJ}$ - stiffness factor (eg. 4)

BP(7,I) = $K_{IJ}$ - stiffness factor (eg. 2)

(3) BP(8,I) = Rigid zone depth at the I side of beam.

BP(9,I) = Rigid zone depth at the J side of 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.

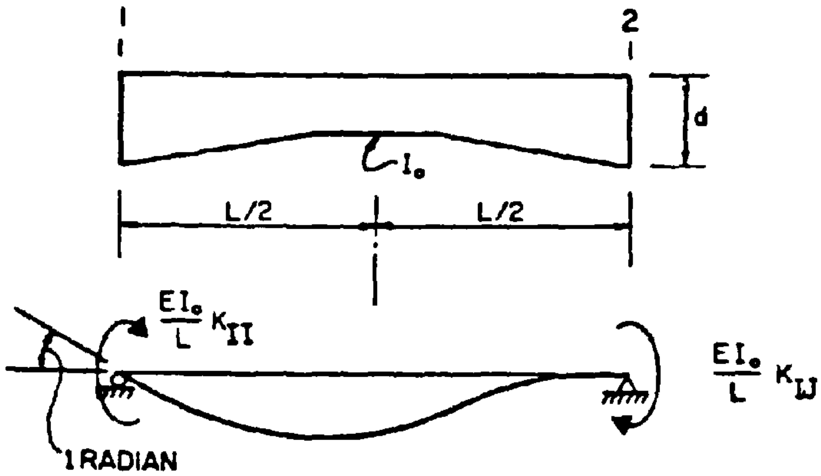


Fig. A-2 - Typical Notation of Beam Stiffness Coefficients

**A.5.1.2.5 Fixed-End Beam Loads**

(See A.5.1.2.1 If NFEF = 0, skip this.)

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 sketch.

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

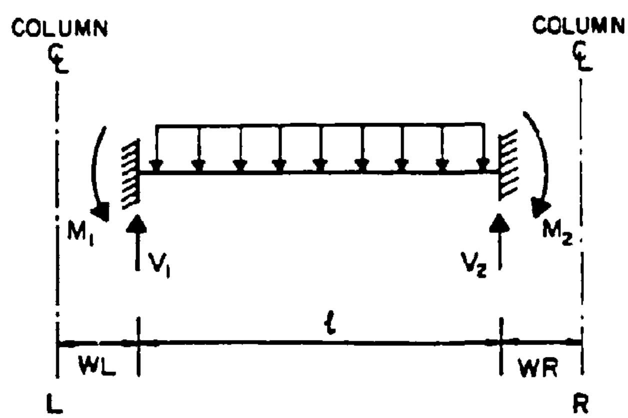


Fig. A-3 - Typical Beam Loading

**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.9.

#### 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, above.

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 for the frame.

3. Distance from structure (global) axis to origin of 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 eg. 15° 30' input as 15.5.

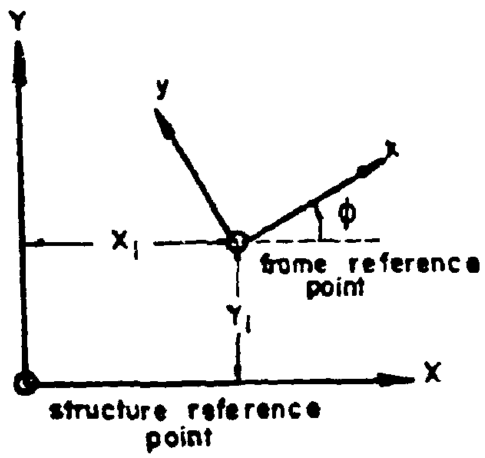


Fig. A-4 - Typical Coordinate Systems.

**A.5.2 Shear Stiffness Data for Three Dimensional Shear Building (for ISEV = 1)**

| | |
|---|---|
| USR_TXT | Reference information; upto 80 characters of text |

**A.5.2.1 Shear Stiffness - X, Y and Torsional Stiffness in Θ 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 Θ direction about the center of mass of the floor. |

Note: Input shear stiffness in the X and Y direction and torsional stiffness in the Θ 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.5.2.3 Superstructure Translational Mass and Rotational Mass (Mass moment of Inertia)

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

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

### A.5.3 Eigenvalues and Eigenvectors for Three Dimensional Building (for ISEV = 3)

| | |
|---|---|
| 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 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.5.5 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.5.6 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 of floors ordered from the top floor to the base.

## A.6 ISOLATION SYSTEM DATA

USR_TXT Isolation data text: up to 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 $\theta$ 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 $\theta$ 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**

(i). Data for NP isolation elements to be given using the library of various elements types given in the subsequent subsections.

(ii). The following indices are used in the following subsections to identify the element types in the isolation system. INELEM(NP,2) described below:

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

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

INELEM(K,2) = 1 for a linear elastic element
INELEM(K,2) = 2 for a viscous element
INELEM(K,2) = 3 for a hysteretic element for elastomeric bearing or steel damper
INELEM(K,2) = 4 for a hysteretic element for sliding bearing

**A.6.4.1 Linear Elastic Element**

USR_TXT Reference information; upto 80 characters of text.

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 Viscous Element**

USR_TXT Reference information; upto 80 characters of text.

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).

PC(K,1),PC(K,2)

PC(K,1) = Damping coefficient 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).

PC(K,2) = Damping coefficient 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 damping in both X and Y directions (no interaction between forces in the X and Y direction).

**A.6.4.3 Hysteretic Element for Elastomeric Bearings/Steel Dampers**

USR_TXT Reference information, upto 80 characters of text.

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 Hysteretic Element for Sliding Bearings

USR_TXT — Reference information; upto 80 characters of text.

INELEM(K,1:2) — INELEM(K,1) can be either 1,2 or 3
INELEM(K,2) = 4
(Refer to A.6.4 for further details).

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

FMAX(K,1) = Maximum coefficient
of sliding friction;
DF(K,1) = Difference between
the maximum and minimum
coefficient of sliding friction;
PA(K,1) = Constant which controls the
transition of coefficient of sliding
friction from maximum to minimum value;
YD(K,1) = Yield displacement of Friction Interface;
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).

FMAX(K,2) = Maximum coefficient
of sliding friction;
DF(K,2) = Difference between
the maximum and minimum
coefficient of sliding friction;
PA(K,2) = Constant which controls the
transition of coefficient of sliding
friction from maximum to minimum value;
YD(K,2) = Yield displacement of Friction Interface;
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.6.5 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 EARTHQUAKE DATA**

This information is to be specified in additional files outside the main input data file.

**A.7.1 Unidirectional Earthquake Record**

USR_TXT Frame data information; up to 80 characters

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, then X(LOR) is considered to be the X component of the bidirectional earthquake.

### A.7.2 Earthquake Record in the Y Direction for the Bidirectional Earthquake

File:WAVEY.DAT (Input only if INDGACC = 2)

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

## A.8 OUTPUT INFORMATION DATA

### A.8.1 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.8.2 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.9 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.

## APPENDIX B

## INPUT FILE FOR THREE STORY R/C SLIDING ISOLATED STRUCTURE

(Refer to Section 4.1)

[redacted]

INPUT FOR CASE STUDY #1

```
THREE STORIES BLDG IN ITALIA
UNIT KN-METER-SEC
GENERAL CONTROL INFORMATION
  2 3 9 16 750
SUPERSTRUCTURE CONTROL INFORMATION
  1 1 1 4 0
INTEGRATION CONTROL PARAMETER
  0.01 0.005 1000 20 1
NEWMARK METHOD CONTROL PARAMETER (DEFAULT VALUES: 0.5 AND 0.25)
  0 0
EARTHQUAKE CONTROL PARAMETER
  1 0.02 0 0.98
SUPERSTRUCTURE INFORMATION
THIRD STORY-GENERAL DATA
  3.5 119.4 2985.6 0 0 0 0
  0 0 0 0 0 0 0 0
SECOND
  3.5 119.4 2985.6 0 0 0 0
  0 0 0 0 0 0 0 0
FIRST
  3.5 119.4 2985.6 0 0 0 0
  0 0 0 0 0 0 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 G
  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
PANAL 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
```

INPUT FOR CASE STUDY #1

```
 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
  0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15
ECCENTRICITYIES 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 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
   3 4
   0.1 0.03 23.6 0.000254 0.1 0.03 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 PARAMETER
   0 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
```

## APPENDIX C

## OUTPUT FILE FOR THREE STORY R/C SLIDING ISOLATED STRUCTURE
**(Refer to Section 4.1)**

[redacted]

OUTPUT FOR CASE STUDY #1

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

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

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

                 VAX VERSION AND PC VERSION, DEC. 1992

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH
STATE UNIVERSITY OF NEW YORK, 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 ********
   THREE STORIES BUILDING IN ITALY
   UNIT KN-METER-SEC
   GENERAL CONTROL INFORMATION
     2 3 9 16 750
   SUPERSTRUCTURE CONTROL INFORMATION
     1 1 1 2 0
   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 0 0
   SECOND
     3.5 119.4 2985.6 0 0 0 0
   FIRST
     3.5 119.4 2985.6 0 0 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 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
  0.1 0.03 23.6 0.000254 0.1 0.03 23.6 0.000254 292.85
  3 4
```

```
  0.1 0.03 23.6 0.000254 0.1 0.03 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 ********

******** START OF PROCESSED DATA *******

THREE STORIES BUILDING IN ITALY

POINTER WITHIN MASTER ARRAY... MAX STORAGE =      3978

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
  TYPE OF ANALYSIS--------    2
  EQ.1-STATIC LOAD ANALYSIS+MODE SHAPES AND FREQUENCIES
  +LATERAL EARTHQUAKE RESPONSE AND PEAK RESPONSE PRINTOUT
  EQ.2-STATIC LOAD ANALYSIS+MODE SHAPES AND FREQUENCIES
  +LATERAL EARTHQUAKE RESPONSE AND TIME HISTORY PRINTOUT
  NUMBER OF FREQUENCIES----   9
  STORY TRANSLATION CODE---   0


  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

  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.........=       0.0050
  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 ....................=        0.020
  LENGTH OF RECORD........................=          750
  LOAD FACTOR.............................=         9.80
  ANGLE OF EARTHQUAKE INCIDENCE...........=         0.00


    ************** 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 | 0.00 | 0.00 | 0.00 | 0.00 |
| SECOND | 2 | | 3.50 | 119.40 | 2985.60 | 0.00 | 0.00 | 0.00 | 0.00 |
| FIRST | 1 | | 3.50 | 119.40 | 2985.60 | 0.00 | 0.00 | 0.00 | 0.00 |

[redacted]

OUTPUT FOR CASE STUDY #1

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 | 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 |

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 |

OCOLUMN 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 |

| COLUMN ID | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | RIGID TOP | RIGID BOT |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

| BEAM ID | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | RIGID I | RIGID J |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 |

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 |

## OUTPUT FOR CASE STUDY #1

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 | 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 |

COLUMN LOCATIONS

| 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

| STORY | 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 | 0.37 | 0.42 | 0.31 | 11945024.00 |
| 2 | 6 | 7 | 29862560.00 | 0.37 | 0.42 | 0.31 | 11945024.00 |
| 1 | 6 | 7 | 29862560.00 | 0.37 | 0.42 | 0.31 | 11945024.00 |

BRACING ELEMENT CARDS

| LEV | UC | LC | E | A |
|---|---|---|---|---|
| 3 | 7 | 11 | 43280000.00000 | 0.01600 |
| 3 | 11 | 7 | 43280000.00000 | 0.01600 |
| 2 | 7 | 11 | 43280000.00000 | 0.01600 |
| 2 | 11 | 7 | 43280000.00000 | 0.01600 |
| 1 | 7 | 11 | 43280000.00000 | 0.01600 |
| 1 | 11 | 7 | 43280000.00000 | 0.01600 |
| 3 | 6 | 10 | 43280000.00000 | 0.01600 |
| 3 | 10 | 6 | 43280000.00000 | 0.01600 |
| 2 | 6 | 10 | 43280000.00000 | 0.01600 |
| 2 | 10 | 6 | 43280000.00000 | 0.01600 |
| 1 | 6 | 10 | 43280000.00000 | 0.01600 |
| 1 | 10 | 6 | 43280000.00000 | 0.01600 |
| 3 | 14 | 15 | 43280000.00000 | 0.01000 |
| 3 | 15 | 14 | 43280000.00000 | 0.01000 |
| 2 | 14 | 15 | 43280000.00000 | 0.01000 |
| 2 | 15 | 14 | 43280000.00000 | 0.01000 |
| 1 | 14 | 15 | 43280000.00000 | 0.01000 |
| 1 | 15 | 14 | 43280000.00000 | 0.01000 |

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 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 2

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 3

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 4

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 5

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 6

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 7

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 8

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 9

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 10

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 11

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 12

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 13

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 14

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 15

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 16

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 17

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 18

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 19

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 20

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 21

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 22

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 23

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |

BAY NUMBERS 24

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 2 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 0 | 0 | 0 |
| 1 | 29862560.00 | 0.10 | 0.00 | 0.00 | 4.00 | 4.00 | 2.00 | 0.15 | 0.15 | 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 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 2

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 3

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 4

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 5

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 6

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 7

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 8

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 9

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 10

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 11

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.12 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 12

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 13

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 14

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 15

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

COLUMN LINE NO. 16

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 2 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |
| 1 | 29862560.00 | 0.09 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 |

FIRST FRAME LOCA

FRAME POSITION DATA

| FRAME | ID | FORCE CODE | X1 | Y1 | ANG |
|---|---|---|---|---|---|
| 1 | 1 | 0 | 0.00 | 0.00 | 0.00 |

SUPERSTRUCTURE DAMPING.......

| MODE SHAPE | DAMPING RATIO (%) |
|---|---|
| 1 | 5.0 |
| 2 | 5.0 |
| 3 | 5.0 |
| 4 | 5.0 |
| 5 | 5.0 |
| 6 | 5.0 |
| 7 | 5.0 |
| 8 | 5.0 |
| 9 | 5.0 |

HEIGHT.........

| FLOOR | HEIGHT |
|---|---|
| 3 | 10.5 |
| 2 | 7.0 |
| 1 | 3.5 |
| 0 | 0.0 |

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

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

| | TRANSL. MASS | ROTATINAL MASS |
|---|---|---|
| MASS | 119.400 | 2985.600 |

BASE ISOLATION DATA: OPTION ONE: EQUIVALENT GLOBAL DEVICE PROPERTIES

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

| | X | Y | R | ECX | ECY |
|---|---|---|---|---|---|
| LINEAR STIFFNESS[F/L] | 2092.6400 | 2092.6400 | 602680.3200 | 0.0000 | 0.0000 |
| VISCOUS DAMPING[F/L/T] | 0.1000 | 0.1000 | 0.1000 | 0.0000 | 0.0000 |

BASE ISOLATION DATA: OPTION TWO: INDIVIDUAL ISOLATION ELEMENTS

SLIDING BEARING PARAMETERS.......

| BEARING | FMAX X | FMAX Y | DF X | DF Y | PA X | PA Y | Y.DIS.X | Y.DIS.Y | NORM. FORCE |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 2 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 3 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 4 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 5 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 6 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 7 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 8 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 9 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 10 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 11 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 12 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 13 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 14 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 15 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |
| 16 | 0.100 | 0.100 | 0.030 | 0.030 | 23.600 | 23.600 | 0.00025 | 0.00025 | 292.85000 |

BEARING LOCATION .........

| BEARING | 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 |

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 | 0.00 | 0.00 |
| 2 | 0.00 | 0.00 |
| 3 | 0.00 | 0.00 |
| 4 | 0.00 | 0.00 |
| 5 | 0.00 | 0.00 |
| 6 | 0.00 | 0.00 |

1
*********************** OUTPUT ***********************

MODE SHAPES

| LEVEL ID | DIRN | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 3 | X | 0.000000 | -0.070705 | 0.000000 | 0.000000 | 0.051357 | 0.000000 | 0.000000 | 0.027174 |
| 3 | Y | 0.028814 | 0.000000 | 0.068441 | 0.017460 | 0.000000 | 0.044028 | 0.008[illegible]3 | 0.000000 |
| 3 | ROTN | 0.012811 | 0.000000 | -0.005789 | 0.009780 | 0.000000 | -0.003318 | 0.0[illegible]265 | 0.000000 |
| 2 | X | 0.000000 | -0.052181 | 0.000000 | 0.000000 | -0.037300 | 0.000000 | 0.[illegible]00000 | -0.065277 |
| 2 | Y | 0.020758 | 0.000000 | 0.044503 | -0.013985 | 0.000000 | -0.041217 | -0.[illegible]21198 | 0.000000 |
| 2 | ROTN | 0.009659 | 0.000000 | -0.004117 | -0.006752 | 0.000000 | 0.002711 | -0.012361 | 0.000000 |
| 1 | X | 0.000000 | -0.025556 | 0.000000 | 0.000000 | -0.065927 | 0.000000 | 0.000000 | 0.058101 |
| 1 | Y | 0.009895 | 0.000000 | 0.018832 | -0.023792 | 0.000000 | -0.060575 | 0.021215 | 0.000000 |
| 1 | ROTN | 0.004814 | 0.000000 | -0.001939 | -0.012291 | 0.000000 | 0.004938 | 0.010762 | 0.000000 |

MODE SHAPES

| LEVEL ID | DIRN | 9 |
|---|---|---|
| 3 | X | 0.000000 |
| 3 | Y | -0.023486 |
| 3 | ROTN | 0.001717 |
| 2 | X | 0.000000 |
| 2 | Y | 0.060167 |
| 2 | ROTN | -0.004355 |
| 1 | X | 0.000000 |
| 1 | Y | -0.056896 |
| 1 | ROTN | 0.004091 |

| MODE NUMBER | PERIOD |
|---|---|
| 1 | 0.269144 |
| 2 | 0.267683 |
| 3 | 0.205015 |
| 4 | 0.090896 |
| 5 | 0.090021 |
| 6 | 0.062462 |
| 7 | 0.058352 |
| 8 | 0.057300 |
| 9 | 0.037163 |

************* 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 | 0.0046 | 0.0000 | 0.0000 |
| 2 | 0.0030 | 0.0000 | 0.0000 |
| 1 | 0.0014 | 0.0000 | 0.0000 |

MAX INTERSTORY DRIFT

| STORY | X DST. | Y DST. | TIME | X DRIFT/FL. HT.(%) | TIME | Y DRIFT/FL. HT.(%) |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | 0.00 | 0.00 | 4.57 | 0.04 | 10.79 | 0.00 |
| 2 | 0.00 | 0.00 | 4.56 | 0.05 | 7.48 | 0.00 |
| 1 | 0.00 | 0.00 | 2.58 | 0.04 | 6.61 | 0.00 |
| 3 | 0.00 | 0.00 | 4.57 | 0.04 | 10.79 | 0.00 |
| 2 | 0.00 | 0.00 | 4.56 | 0.05 | 7.48 | 0.00 |
| 1 | 0.00 | 0.00 | 2.58 | 0.04 | 6.61 | 0.00 |
| 3 | 0.00 | 0.00 | 4.57 | 0.04 | 10.79 | 0.00 |
| 2 | 0.00 | 0.00 | 4.56 | 0.05 | 7.48 | 0.00 |
| 1 | 0.00 | 0.00 | 2.58 | 0.04 | 6.61 | 0.00 |
| 3 | 0.00 | 0.00 | 4.57 | 0.04 | 10.79 | 0.00 |
| 2 | 0.00 | 0.00 | 4.56 | 0.05 | 7.48 | 0.00 |
| 1 | 0.00 | 0.00 | 2.58 | 0.04 | 6.61 | 0.00 |
| 3 | 0.00 | 0.00 | 4.57 | 0.04 | 10.79 | 0.00 |
| 2 | 0.00 | 0.00 | 4.56 | 0.05 | 7.48 | 0.00 |
| 1 | 0.00 | 0.00 | 2.58 | 0.04 | 6.61 | 0.00 |
| 3 | 0.00 | 0.00 | 4.57 | 0.04 | 10.79 | 0.00 |
| 2 | 0.00 | 0.00 | 4.56 | 0.05 | 7.48 | 0.00 |
| 1 | 0.00 | 0.00 | 2.58 | 0.04 | 6.61 | 0.00 |

MAX. DISP. AT THE CENTER OF MASS OF BASE

| X DISP. | Y DISP. | ROTN... |
|---|---|---|
| 0.034 | 0.000 | 0.000 |

MAX RESULTANT DISP. AT THE CENTER OF MASS OF BASE

| TIME | RES. DISP. | X COMP. | Y COMP. |
|---|---|---|---|
| 5.440 | 0.034 | 0.034 | 0.000 |

MAX RESULTANT BEARING DISP.

| BEARING | TIME | MAX. DISP | ANG. WITH X AXIS |
|---|---|---|---|
| 1 | 5.440 | 0.034 | 0.000 |
| 2 | 5.440 | 0.034 | 0.000 |
| 3 | 5.440 | 0.034 | 0.000 |
| 4 | 5.440 | 0.034 | 0.000 |

MAX BEARING DISP. IN X

| BEARING | TIME | MAX. DISP X |
|---|---|---|
| 1 | 5.440 | 0.034 |
| 2 | 5.440 | 0.034 |
| 3 | 5.440 | 0.034 |
| 4 | 5.440 | 0.034 |

MAX BEARING DISP. IN Y

| BEARING | TIME | MAX. DISP Y |
|---|---|---|
| 1 | 10.260 | 0.000 |
| 2 | 10.260 | 0.000 |
| 3 | 10.260 | 0.000 |
| 4 | 10.260 | 0.000 |

MAX. TOTAL ACCL. AT CENTER OF MASS OF FLOORS

| FLOOR | ACCL. X | ACCL. Y | ACCL. R |
|---|---|---|---|
| 3 | -3.632259 | 0.000000 | 0.000000 |
| 2 | -2.292641 | 0.000000 | 0.000000 |
| 1 | 2.342419 | 0.000000 | 0.000000 |

MAX STORY SHEAR

| STORY | TIME | X SHEAR | TIME | Y SHEAR |
|---|---|---|---|---|
| 3 | 2.550 | -433.692 | 10.790 | 0.000 |
| 2 | 4.550 | -540.764 | 7.480 | 0.000 |
| 1 | 2.570 | -525.501 | 10.700 | 0.000 |

MAX. STRUCTURE SHEAR (TOP OF BASE)

| FORCE X | FORCE Y | Z MOMENT |
|---|---|---|
| -525.50 | 0.00 | 0.00 |

MAX. BASE SHEAR (BEARING LEVEL)

| FORCE X | FORCE Y | Z MOMENT |
|---|---|---|
| 511.87 | 0.00 | 0.00 |

LOAD CONDITION DEFINITION CARDS

| LOAD | I | II | III | RESPONSE |
|---|---|---|---|---|

OUTPUT FOR CASE STUDY #1

1 0.00 0.00 0.00 1.00

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

LEVEL NO 1 ... LEVEL ID

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 | 0.0000 | 9.7447 | 13.2903 | 23.4319 | 0.0562 | 0.0300 | 7.4306 | 0.0278 |
| | 1 | MIN | 0.0000 | -9.7447 | -13.2903 | -23.4319 | -0.0562 | -0.0300 | -7.4306 | -0.0278 |
| 2 | 1 | MAX | 0.0000 | 10.9553 | 13.9376 | 33.5534 | 0.0401 | 0.0215 | 8.0300 | 0.0199 |
| | 1 | MIN | 0.0000 | -10.9553 | -13.9376 | -33.5534 | -0.0401 | -0.0215 | -8.0300 | -0.0199 |
| 3 | 1 | MAX | 0.0000 | 10.9553 | 13.9376 | 33.5534 | 0.0401 | 0.0215 | 8.0300 | 0.0199 |
| | 1 | MIN | 0.0000 | -10.9553 | -13.9376 | -33.5534 | -0.0401 | -0.0215 | -8.0300 | -0.0199 |
| 4 | 1 | MAX | 0.0000 | 9.7447 | 13.2903 | 23.4319 | 0.0562 | 0.0300 | 7.4306 | 0.0278 |
| | 1 | MIN | 0.0000 | -9.7447 | -13.2903 | -23.4319 | -0.0562 | -0.0300 | -7.4306 | -0.0278 |
| 5 | 1 | MAX | 0.0000 | 13.1817 | 15.1279 | 2.0934 | 0.4076 | 0.2179 | 9.1321 | 0.2018 |
| | 1 | MIN | 0.0000 | -13.1817 | -15.1279 | -2.0934 | -0.4076 | -0.2179 | -9.1321 | -0.2018 |
| 6 | 1 | MAX | 0.0000 | 21.7100 | 30.5115 | 144.4236 | 0.3892 | 0.2081 | 16.8456 | 0.1927 |
| | 1 | MIN | 0.0000 | -21.7100 | -30.5115 | -144.4236 | -0.3892 | -0.2081 | -16.8456 | -0.1927 |
| 7 | 1 | MAX | 0.0000 | 21.7100 | 30.5115 | 144.4236 | 0.3892 | 0.2081 | 16.8457 | 0.1927 |
| | 1 | MIN | 0.0000 | -21.7100 | -30.5115 | -144.4236 | -0.3892 | -0.2081 | -16.8457 | -0.1927 |
| 8 | 1 | MAX | 0.0000 | 13.1817 | 15.1279 | 2.0934 | 0.4076 | 0.2179 | 9.1321 | 0.2018 |
| | 1 | MIN | 0.0000 | -13.1817 | -15.1279 | -2.0934 | -0.4076 | -0.2179 | -9.1321 | -0.2018 |
| 9 | 1 | MAX | 0.0000 | 13.1944 | 15.1347 | 1.5861 | 0.9571 | 0.5117 | 9.1384 | 0.4738 |
| | 1 | MIN | 0.0000 | -13.1944 | -15.1347 | -1.5861 | -0.9571 | -0.5117 | -9.1384 | -0.4738 |
| 10 | 1 | MAX | 0.0000 | 22.2053 | 30.7727 | 325.1292 | 0.8851 | 0.4732 | 17.0897 | 0.4382 |
| | 1 | MIN | 0.0000 | -22.2053 | -30.7727 | -325.1292 | -0.8851 | -0.4732 | -17.0897 | -0.4382 |
| 11 | 1 | MAX | 0.0000 | 22.2053 | 30.7727 | 325.1291 | 0.8851 | 0.4732 | 17.0897 | 0.4382 |
| | 1 | MIN | 0.0000 | -22.2053 | -30.7727 | -325.1291 | -0.8851 | -0.4732 | -17.0897 | -0.4382 |
| 12 | 1 | MAX | 0.0000 | 13.1944 | 15.1347 | 1.5861 | 0.9571 | 0.5117 | 9.1384 | 0.4738 |
| | 1 | MIN | 0.0000 | -13.1944 | -15.1347 | -1.5861 | -0.9571 | -0.5117 | -9.1384 | -0.4738 |
| 13 | 1 | MAX | 0.0000 | 9.7744 | 13.3062 | 23.3867 | 0.0880 | 0.0471 | 7.4454 | 0.0436 |
| | 1 | MIN | 0.0000 | -9.7744 | -13.3062 | -23.3867 | -0.0880 | -0.0471 | -7.4454 | -0.0436 |
| 14 | 1 | MAX | 0.0000 | 11.4165 | 14.1842 | 36.1179 | 0.0573 | 0.0307 | 8.2583 | 0.0284 |
| | 1 | MIN | 0.0000 | -11.4165 | -14.1842 | -36.1179 | -0.0573 | -0.0307 | -8.2583 | -0.0284 |
| 15 | 1 | MAX | 0.0000 | 11.4165 | 14.1842 | 36.1179 | 0.0573 | 0.0307 | 8.2583 | 0.0284 |
| | 1 | MIN | 0.0000 | -11.4165 | -14.1842 | -36.1179 | -0.0573 | -0.0307 | -8.2583 | -0.0284 |
| 16 | 1 | MAX | 0.0000 | 9.7744 | 13.3062 | 23.3866 | 0.0880 | 0.0471 | 7.4454 | 0.0436 |
| | 1 | MIN | 0.0000 | -9.7744 | -13.3062 | -23.3866 | -0.0880 | -0.0471 | -7.4454 | -0.0436 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 0.2765 | 0.0895 | 0.1043 |
| | 1 | MIN | -0.2765 | -0.0895 | -0.1043 |
| 2 | 1 | MAX | 0.0000 | 0.0371 | 0.0371 |
| | 1 | MIN | 0.0000 | -0.0371 | -0.0371 |
| 3 | 1 | MAX | 0.2765 | 0.1043 | 0.0895 |
| | 1 | MIN | -0.2765 | -0.1043 | -0.0895 |
| 4 | 1 | MAX | 0.0756 | 18.9457 | 15.6913 |
| | 1 | MIN | -0.0756 | -18.9457 | -15.6913 |
| 5 | 1 | MAX | 0.0542 | 22.5194 | 24.1013 |
| | 1 | MIN | -0.0542 | -22.5194 | -24.1013 |
| 6 | 1 | MAX | 0.0542 | 22.5194 | 24.1013 |
| | 1 | MIN | -0.0542 | -22.5194 | -24.1013 |
| 7 | 1 | MAX | 0.0756 | 18.9457 | 15.6913 |
| | 1 | MIN | -0.0756 | -18.9457 | -15.6913 |
| 8 | 1 | MAX | 0.8504 | 1.5123 | 1.6192 |
| | 1 | MIN | -0.8504 | -1.5123 | -1.6192 |
| 9 | 1 | MAX | 0.0000 | 0.2697 | 0.2697 |
| | 1 | MIN | 0.0000 | -0.2697 | -0.2697 |
| 10 | 1 | MAX | 0.8504 | 1.6192 | 1.5123 |
| | 1 | MIN | -0.8504 | -1.6192 | -1.5123 |
| 11 | 1 | MAX | 0.2937 | 12.7435 | 12.7298 |
| | 1 | MIN | -0.2937 | -12.7435 | -12.7298 |
| 12 | 1 | MAX | 0.2057 | 16.5341 | 16.3104 |

| | | | | | |
|---|---|---|---|---|---|
| | 1 | MIN | -0.2057 | -16.5341 | -16.3104 |
| 13 | 1 | MAX | 0.2057 | 16.5341 | 16.3104 |
| | 1 | MIN | -0.2057 | -16.5341 | -16.3104 |
| 14 | 1 | MAX | 0.2937 | 12.7435 | 12.7298 |
| | 1 | MIN | -0.2937 | -12.7435 | -12.7298 |
| 15 | 1 | MAX | 0.8015 | 3.1751 | 3.4460 |
| | 1 | MIN | -0.8015 | -3.1751 | -3.4460 |
| 16 | 1 | MAX | 0.0000 | 0.6135 | 0.6135 |
| | 1 | MIN | 0.0000 | -0.6135 | -0.6135 |
| 17 | 1 | MAX | 0.8015 | 3.4460 | 3.1751 |
| | 1 | MIN | -0.8015 | -3.4460 | -3.1751 |
| 18 | 1 | MAX | 0.1870 | 15.7039 | 18.9403 |
| | 1 | MIN | -0.1870 | -15.7039 | -18.9403 |
| 19 | 1 | MAX | 0.1305 | 25.9289 | 24.0846 |
| | 1 | MIN | -0.1305 | -25.9289 | -24.0846 |
| 20 | 1 | MAX | 0.1305 | 25.9289 | 24.0846 |
| | 1 | MIN | -0.1305 | -25.9289 | -24.0846 |
| 21 | 1 | MAX | 0.1870 | 15.7039 | 18.9403 |
| | 1 | MIN | -0.1870 | -15.7039 | -18.9403 |
| 22 | 1 | MAX | 0.3923 | 0.0725 | 0.1009 |
| | 1 | MIN | -0.3923 | -0.0725 | -0.1009 |
| 23 | 1 | MAX | 0.0000 | 0.0530 | 0.0530 |
| | 1 | MIN | 0.0000 | -0.0530 | -0.0530 |
| 24 | 1 | MAX | 0.3923 | 0.1009 | 0.0725 |
| | 1 | MIN | -0.3923 | -0.1009 | -0.0725 |

PANEL FORCES

FLEXURAL PANELS

| I COL | LOAD | | TOP-MOMENT | BOT-MOMENT | AXIAL-FORCE | SHEAR-FORCE |
|---|---|---|---|---|---|---|
| 6 | 1 | MAX | 0.0001 | 0.0001 | 394.4139 | 0.0000 |
| | 1 | MIN | -0.0001 | -0.0001 | -394.4139 | 0.0000 |

BRACING ELEMENTS - LISTED IN SAME SEQUENCE AS INPUT

| T-COL | LOAD | | AXIAL-FORCE |
|---|---|---|---|
| 7 | 1 | MAX | 130.5494 |
| | 1 | MIN | -130.5494 |
| 11 | 1 | MAX | 120.0116 |
| | 1 | MIN | -120.0116 |
| 6 | 1 | MAX | 130.5494 |
| | 1 | MIN | -130.5494 |
| 10 | 1 | MAX | 120.0116 |
| | 1 | MIN | -120.0116 |
| 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

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 | 0.0000 | 9.6309 | 9.6128 | 14.3279 | 0.1082 | 0.0979 | 6.1944 | 0.0665 |
| | 1 | MIN | 0.0000 | -9.6309 | -9.6128 | -14.3279 | -0.1082 | -0.0979 | -6.1944 | -0.0665 |
| 2 | 1 | MAX | 0.0000 | 11.5751 | 11.5917 | 21.2851 | 0.0863 | 0.0748 | 7.4731 | 0.0520 |
| | 1 | MIN | 0.0000 | -11.5751 | -11.5917 | -21.2851 | -0.0863 | -0.0748 | -7.4731 | -0.0520 |
| 3 | 1 | MAX | 0.0000 | 11.5751 | 11.5917 | 21.2851 | 0.0863 | 0.0748 | 7.4731 | 0.0520 |
| | 1 | MIN | 0.0000 | -11.5751 | -11.5917 | -21.2851 | -0.0863 | -0.0748 | -7.4731 | -0.0520 |
| 4 | 1 | MAX | 0.0000 | 9.6309 | 9.6128 | 14.3279 | 0.1082 | 0.0979 | 6.1944 | 0.0665 |
| | 1 | MIN | 0.0000 | -9.6309 | -9.6128 | -14.3279 | -0.1082 | -0.0979 | -6.1944 | -0.0665 |
| 5 | 1 | MAX | 0.0000 | 14.5563 | 14.6782 | 0.7632 | 0.8084 | 0.7233 | 9.4305 | 0.4941 |
| | 1 | MIN | 0.0000 | -14.5563 | -14.6782 | -0.7632 | -0.8084 | -0.7233 | -9.4305 | -0.4941 |
| 6 | 1 | MAX | 0.0000 | 20.3872 | 20.3207 | 80.8200 | 0.7781 | 0.6939 | 13.0215 | 0.4748 |
| | 1 | MIN | 0.0000 | -20.3872 | -20.3207 | -80.8200 | -0.7781 | -0.6939 | -13.0215 | -0.4748 |
| 7 | 1 | MAX | 0.0000 | 20.3872 | 20.3207 | 80.8201 | 0.7781 | 0.6939 | 13.0215 | 0.4748 |
| | 1 | MIN | 0.0000 | -20.3872 | -20.3207 | -80.8201 | -0.7781 | -0.6939 | -13.0215 | -0.4748 |
| 8 | 1 | MAX | 0.0000 | 14.5563 | 14.6782 | 0.7632 | 0.8084 | 0.7233 | 9.4305 | 0.4941 |
| | 1 | MIN | 0.0000 | -14.5563 | -14.6782 | -0.7632 | -0.8084 | -0.7233 | -9.4305 | -0.4941 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 1 | MAX | 0.0000 | 14.5937 | 14.7102 | 2.1275 | 1.8674 | 1.6819 | 9.4528 | 1.1449 |
| | 1 | MIN | 0.0000 | -14.5937 | -14.7102 | -2.1275 | -1.8674 | -1.6819 | -9.4528 | -1.1449 |
| 10 | 1 | MAX | 0.0000 | 21.4273 | 21.3795 | 180.5946 | 1.7662 | 1.5764 | 13.7375 | 1.0782 |
| | 1 | MIN | 0.0000 | -21.4273 | -21.3795 | -180.5946 | -1.7662 | -1.5764 | -13.7375 | -1.0782 |
| 11 | 1 | MAX | 0.0000 | 21.4273 | 21.3795 | 180.5945 | 1.7662 | 1.5764 | 13.7375 | 1.0782 |
| | 1 | MIN | 0.0000 | -21.4273 | -21.3795 | -180.5945 | -1.7662 | -1.5764 | -13.7375 | -1.0782 |
| 12 | 1 | MAX | 0.0000 | 14.5937 | 14.7102 | 2.1275 | 1.8674 | 1.6819 | 9.4528 | 1.1449 |
| | 1 | MIN | 0.0000 | -14.5937 | -14.7102 | -2.1275 | -1.8674 | -1.6819 | -9.4528 | -1.1449 |
| 13 | 1 | MAX | 0.0000 | 9.6903 | 9.6756 | 14.2844 | 0.1624 | 0.1497 | 6.2361 | 0.1007 |
| | 1 | MIN | 0.0000 | -9.6903 | -9.6756 | -14.2844 | -0.1624 | -0.1497 | -6.2361 | -0.1007 |
| 14 | 1 | MAX | 0.0000 | 12.6877 | 12.5982 | 23.3447 | 0.1246 | 0.1075 | 8.1567 | 0.0749 |
| | 1 | MIN | 0.0000 | -12.6877 | -12.5982 | -23.3447 | -0.1246 | -0.1075 | -8.1567 | -0.0749 |
| 15 | 1 | MAX | 0.0000 | 12.6877 | 12.5982 | 23.3447 | 0.1246 | 0.1075 | 8.1567 | 0.0749 |
| | 1 | MIN | 0.0000 | -12.6877 | -12.5982 | -23.3447 | -0.1246 | -0.1075 | -8.1567 | -0.0749 |
| 16 | 1 | MAX | 0.0000 | 9.6903 | 9.6756 | 14.2844 | 0.1624 | 0.1497 | 6.2361 | 0.1007 |
| | 1 | MIN | 0.0000 | -9.6903 | -9.6756 | -14.2844 | -0.1624 | -0.1497 | -6.2361 | -0.1007 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 0.2794 | 0.1856 | 0.1979 |
| | 1 | MIN | -0.2794 | -0.1856 | -0.1979 |
| 2 | 1 | MAX | 0.0000 | 0.0599 | 0.0599 |
| | 1 | MIN | 0.0000 | -0.0599 | -0.0599 |
| 3 | 1 | MAX | 0.2794 | 0.1979 | 0.1856 |
| | 1 | MIN | -0.2794 | -0.1979 | -0.1856 |
| 4 | 1 | MAX | 0.1103 | 18.4991 | 15.5767 |
| | 1 | MIN | -0.1103 | -18.4991 | -15.5767 |
| 5 | 1 | MAX | 0.0781 | 23.4172 | 25.2585 |
| | 1 | MIN | -0.0781 | -23.4172 | -25.2585 |
| 6 | 1 | MAX | 0.0781 | 23.4172 | 25.2585 |
| | 1 | MIN | -0.0781 | -23.4172 | -25.2585 |
| 7 | 1 | MAX | 0.1103 | 18.4991 | 15.5767 |
| | 1 | MIN | -0.1103 | -18.4991 | -15.5767 |
| 8 | 1 | MAX | 0.8299 | 2.4599 | 2.6105 |
| | 1 | MIN | -0.8299 | -2.4599 | -2.6105 |
| 9 | 1 | MAX | 0.0000 | 0.3951 | 0.3951 |
| | 1 | MIN | 0.0000 | -0.3951 | -0.3951 |
| 10 | 1 | MAX | 0.8299 | 2.6105 | 2.4599 |
| | 1 | MIN | -0.8299 | -2.6105 | -2.4599 |
| 11 | 1 | MAX | 0.4188 | 13.3385 | 13.3123 |
| | 1 | MIN | -0.4188 | -13.3385 | -13.3123 |
| 12 | 1 | MAX | 0.3007 | 11.4809 | 11.1505 |
| | 1 | MIN | -0.3007 | -11.4809 | -11.1505 |
| 13 | 1 | MAX | 0.3007 | 11.4809 | 11.1505 |
| | 1 | MIN | -0.3007 | -11.4809 | -11.1505 |
| 14 | 1 | MAX | 0.4188 | 13.3385 | 13.3123 |
| | 1 | MIN | -0.4188 | -13.3385 | -13.3123 |
| 15 | 1 | MAX | 0.7591 | 5.2267 | 5.5832 |
| | 1 | MIN | -0.7591 | -5.2267 | -5.5832 |
| 16 | 1 | MAX | 0.0000 | 0.8962 | 0.8962 |
| | 1 | MIN | 0.0000 | -0.8962 | -0.8962 |
| 17 | 1 | MAX | 0.7591 | 5.5832 | 5.2267 |
| | 1 | MIN | -0.7591 | -5.5832 | -5.2267 |
| 18 | 1 | MAX | 0.2669 | 15.6282 | 18.5343 |
| | 1 | MIN | -0.2669 | -15.6282 | -18.5343 |
| 19 | 1 | MAX | 0.1885 | 28.5609 | 26.3066 |
| | 1 | MIN | -0.1885 | -28.5609 | -26.3066 |
| 20 | 1 | MAX | 0.1885 | 28.5609 | 26.3066 |
| | 1 | MIN | -0.1885 | -28.5609 | -26.3066 |
| 21 | 1 | MAX | 0.2669 | 15.6282 | 18.5343 |
| | 1 | MIN | -0.2669 | -15.6282 | -18.5343 |
| 22 | 1 | MAX | 0.4427 | 0.1960 | 0.2157 |
| | 1 | MIN | -0.4427 | -0.1960 | -0.2157 |
| 23 | 1 | MAX | 0.0000 | 0.0868 | 0.0868 |
| | 1 | MIN | 0.0000 | -0.0868 | -0.0868 |
| 24 | 1 | MAX | 0.4427 | 0.2158 | 0.1960 |
| | 1 | MIN | -0.4427 | -0.2158 | -0.1960 |

PANEL FORCES

FLEXURAL PANELS

| I COL | LOAD | | TOP-MOMENT | BOT-MOMENT | AXIAL-FORCE | SHEAR-FORCE |
|---|---|---|---|---|---|---|
| 6 | 1 | MAX | 0.0002 | 0.0001 | 220.7157 | 0.0000 |
| | 1 | MIN | -0.0002 | -0.0001 | -220.7157 | 0.0000 |

BRACING ELEMENTS - LISTED IN SAME SEQUENCE AS INPUT

| T-COL | LOAD | | AXIAL-FORCE |
|---|---|---|---|
| 7 | 1 | MAX | 131.3472 |
| | 1 | MIN | -131.3472 |
| 11 | 1 | MAX | 124.0436 |
| | 1 | MIN | -124.0436 |
| 6 | 1 | MAX | 131.3472 |
| | 1 | MIN | -131.3472 |
| 10 | 1 | MAX | 124.0436 |
| | 1 | MIN | -124.0436 |
| 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

| O 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 | 0.0000 | 10.2558 | 8.8238 | 5.0615 | 0.2061 | 0.1660 | 6.1547 | 0.1200 |
| | 1 | MIN | 0.0000 | -10.2558 | -8.8238 | -5.0615 | -0.2061 | -0.1660 | -6.1547 | -0.1200 |
| 2 | 1 | MAX | 0.0000 | 13.0322 | 11.2294 | 8.2814 | 0.1350 | 0.1185 | 7.8263 | 0.0818 |
| | 1 | MIN | 0.0000 | -13.0322 | -11.2294 | -8.2814 | -0.1350 | -0.1185 | -7.8263 | -0.0818 |
| 3 | 1 | MAX | 0.0000 | 13.0322 | 11.2294 | 8.2814 | 0.1350 | 0.1185 | 7.8263 | 0.0818 |
| | 1 | MIN | 0.0000 | -13.0322 | -11.2294 | -8.2814 | -0.1350 | -0.1185 | -7.8263 | -0.0818 |
| 4 | 1 | MAX | 0.0000 | 10.2558 | 8.8238 | 5.0615 | 0.2061 | 0.1660 | 6.1547 | 0.1200 |
| | 1 | MIN | 0.0000 | -10.2558 | -8.8238 | -5.0615 | -0.2061 | -0.1660 | -6.1547 | -0.1200 |
| 5 | 1 | MAX | 0.0000 | 14.1216 | 13.1272 | 0.4156 | 1.2315 | 1.0801 | 8.7899 | 0.7457 |
| | 1 | MIN | 0.0000 | -14.1216 | -13.1272 | -0.4156 | -1.2315 | -1.0801 | -8.7899 | -0.7457 |
| 6 | 1 | MAX | 0.0000 | 19.7117 | 17.0956 | 23.4223 | 1.1612 | 1.0279 | 11.8733 | 0.7062 |
| | 1 | MIN | 0.0000 | -19.7117 | -17.0956 | -23.4223 | -1.1612 | -1.0279 | -11.8733 | -0.7062 |
| 7 | 1 | MAX | 0.0000 | 19.7117 | 17.0956 | 23.4223 | 1.1612 | 1.0279 | 11.8733 | 0.7062 |
| | 1 | MIN | 0.0000 | -19.7117 | -17.0956 | -23.4223 | -1.1612 | -1.0279 | -11.8733 | -0.7062 |
| 8 | 1 | MAX | 0.0000 | 14.1216 | 13.1272 | 0.4156 | 1.2315 | 1.0801 | 8.7899 | 0.7457 |
| | 1 | MIN | 0.0000 | -14.1216 | -13.1272 | -0.4156 | -1.2315 | -1.0801 | -8.7899 | -0.7457 |
| 9 | 1 | MAX | 0.0000 | 14.1795 | 13.1785 | 1.2844 | 2.9232 | 2.5310 | 8.8252 | 1.7594 |
| | 1 | MIN | 0.0000 | -14.1795 | -13.1785 | -1.2844 | -2.9232 | -2.5310 | -8.8252 | -1.7594 |
| 10 | 1 | MAX | 0.0000 | 21.6602 | 18.7282 | 51.6728 | 2.6375 | 2.3335 | 13.0285 | 1.6036 |
| | 1 | MIN | 0.0000 | -21.6602 | -18.7282 | -51.6728 | -2.6375 | -2.3335 | -13.0285 | -1.6036 |
| 11 | 1 | MAX | 0.0000 | 21.6602 | 18.7282 | 51.6727 | 2.6375 | 2.3335 | 13.0285 | 1.6036 |
| | 1 | MIN | 0.0000 | -21.6602 | -18.7282 | -51.6727 | -2.6375 | -2.3335 | -13.0285 | -1.6036 |
| 12 | 1 | MAX | 0.0000 | 14.1795 | 13.1785 | 1.2844 | 2.9232 | 2.5310 | 8.8252 | 1.7594 |
| | 1 | MIN | 0.0000 | -14.1795 | -13.1785 | -1.2844 | -2.9232 | -2.5310 | -8.8252 | -1.7594 |
| 13 | 1 | [illegible] | 0.0000 | 10.4033 | 8.9356 | 4.9866 | 0.3304 | 0.2590 | 6.2383 | 0.1901 |
| | 1 | MIN | 0.0000 | 10.4033 | -8.9356 | -4.9866 | -0.3304 | -0.2590 | -6.2383 | -0.1901 |
| 14 | 1 | MAX | 0.0000 | 14.8121 | 12.7581 | 9.2394 | 0.1945 | 0.1710 | 8.8936 | 0.1179 |
| | 1 | MIN | 0.0000 | -14.8121 | -12.7581 | -9.2394 | -0.1945 | -0.1710 | -8.8936 | -0.1179 |
| 15 | 1 | MAX | 0.0000 | 14.8121 | 12.7581 | 9.2394 | 0.1945 | 0.1710 | 8.8936 | 0.1179 |
| | 1 | MIN | 0.0000 | -14.8121 | -12.7581 | -9.2394 | -0.1945 | -0.1710 | -8.8936 | -0.1179 |
| 16 | 1 | MAK | 0.0000 | 10.4033 | 8.9356 | 4.9866 | 0.3304 | 0.2590 | 6.2383 | 0.1901 |
| | 1 | MIN | 0.0000 | -10.4033 | -8.9356 | -4.9866 | -0.3304 | -0.2590 | -6.2383 | -0.1901 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 0.4491 | 0.0610 | 0.1202 |
| | 1 | MIN | -0.4491 | -0.0610 | -0.1202 |
| 2 | 1 | MAX | 0.0000 | 0.0927 | 0.0927 |
| | 1 | MIN | 0.0000 | -0.0927 | -0.0927 |
| 3 | 1 | MAX | 0.4491 | 0.1202 | 0.0610 |
| | 1 | MIN | -0.4491 | -0.1202 | -0.0610 |

| | | | | | |
|---|---|---|---|---|---|
| 4 | 1 | MAX | 0.1617 | 10.2858 | 8.2604 |
| | 1 | MIN | -0.1617 | -10.2858 | -8.2604 |
| 5 | 1 | MAX | 0.1166 | 13.7971 | 17.0252 |
| | 1 | MIN | -0.1166 | -13.7971 | -17.0252 |
| 6 | 1 | MAX | 0.1166 | 13.7971 | 17.0252 |
| | 1 | MIN | -0.1166 | -13.7971 | -17.0252 |
| 7 | 1 | MAX | 0.1617 | 10.2858 | 8.2604 |
| | 1 | MIN | -0.1617 | -10.2858 | -8.2604 |
| 8 | 1 | MAX | 0.7743 | 2.0371 | 2.2897 |
| | 1 | MIN | -0.7743 | -2.0371 | -2.2897 |
| 9 | 1 | MAX | 0.0000 | 0.5936 | 0.5936 |
| | 1 | MIN | 0.0000 | -0.5936 | -0.5936 |
| 10 | 1 | MAX | 0.7743 | 2.2897 | 2.0371 |
| | 1 | MIN | -0.7743 | -2.2897 | -2.0371 |
| 11 | 1 | MAX | 0.6701 | 7.0700 | 7.0305 |
| | 1 | MIN | -0.6701 | -7.0700 | -7.0305 |
| 12 | 1 | MAX | 0.4524 | 3.1352 | 2.9438 |
| | 1 | MIN | -0.4524 | -3.1352 | -2.9438 |
| 13 | 1 | MAX | 0.4524 | 3.1352 | 2.9438 |
| | 1 | MIN | -0.4524 | -3.1352 | -2.9438 |
| 14 | 1 | MAX | 0.6701 | 7.0700 | 7.0305 |
| | 1 | MIN | -0.6701 | -7.0700 | -7.0305 |
| 15 | 1 | MAX | 0.6445 | 4.0078 | 4.6902 |
| | 1 | MIN | -0.6445 | -4.0078 | -4.6902 |
| 16 | 1 | MAX | 0.0000 | 1.3490 | 1.3490 |
| | 1 | MIN | 0.0000 | -1.3490 | -1.3490 |
| 17 | 1 | MAX | 0.6445 | 4.6902 | 4.0078 |
| | 1 | MIN | -0.6445 | -4.6902 | -4.0078 |
| 18 | 1 | MAX | 0.4152 | 8.2397 | 10.1910 |
| | 1 | MIN | -0.4152 | -8.2397 | -10.1910 |
| 19 | 1 | MAX | 0.2831 | 19.7375 | 15.8604 |
| | 1 | MIN | -0.2831 | -19.7375 | -15.8604 |
| 20 | 1 | MAX | 0.2831 | 19.7375 | 15.8604 |
| | 1 | MIN | -0.2831 | -19.7375 | -15.8604 |
| 21 | 1 | MAX | 0.4152 | 8.2397 | 10.1910 |
| | 1 | MIN | -0.4152 | -8.2397 | -10.1910 |
| 22 | 1 | MAX | 0.7128 | 0.0476 | 0.0674 |
| | 1 | MIN | -0.7128 | -0.0476 | -0.0674 |
| 23 | 1 | MAX | 0.0000 | 0.1333 | 0.1333 |
| | 1 | MIN | 0.0000 | -0.1333 | -0.1333 |
| 24 | 1 | MAX | 0.7128 | 0.0674 | 0.0476 |
| | 1 | MIN | -0.7128 | -0.0674 | -0.0476 |

PANEL FORCES

FLEXURAL PANELS

| I COL | LOAD | | TOP-MOMENT | BOT-MOMENT | AXIAL-FORCE | SHEAR-FORCE |
|---|---|---|---|---|---|---|
| 6 | 1 | MAX | 0.0002 | 0.0002 | 63.9652 | 0.0001 |
| | 1 | MIN | -0.0002 | -0.0002 | -63.9652 | -0.0001 |

BRACING ELEMENTS - LISTED IN SAME SEQUENCE AS INPUT

| I-COL | LOAD | | AXIAL-FORCE |
|---|---|---|---|
| 7 | 1 | MAX | 96.4841 |
| | 1 | MIN | -96.4841 |
| 11 | 1 | MAX | 94.3960 |
| | 1 | MIN | -94.3960 |
| 6 | 1 | MAX | 96.4841 |
| | 1 | MIN | -96.4841 |
| 10 | 1 | MAX | 94.3959 |
| | 1 | MIN | -94.3959 |
| 14 | 1 | MAX | 0.5714 |
| | 1 | MIN | -0.5714 |
| 15 | 1 | MAX | 0.5714 |
| | 1 | MIN | -0.5714 |

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

[redacted]

# APPENDIX D

## INPUT FILE FOR EIGHT STORY R/C BASE ISOLATED STRUCTURE
(Refer to Section 4.2)

INPUT FOR CASE STUDY #2

```
EIGHT STORIES R/C BUILDING IN CALIFORNIA
UNIT KIPS-IN-SEC
GENERAL CONTROL INFORMATION
2  8  12  28  3000
SUPERSTRUCTURE CONTROL INFORMATION
1  1  1  2  0
INTEGRETION CONTROL PARAMETERS
0.005 0.001 5000 200 1
NEWMARK METHOD CONTROL PARAMETERS
0.5 0.25
EARTHQUAKE CONTROL PARAMETERS
2 0.01 0 386.22
**** SUPERSTRUCTURE INFORMATION ****
EIGHTH STORY-GENERAL INFORMATION
147    2.819    589802    421.5    639    0    0
SEVENTH
147    3.529    738351    421.5    639    0    0
SIXTH
147    3.529    738351    421.5    639    0.00  0.00
FIFTH
147    3.529    738351    421.5    639    0.00  0.00
FORTH
147    3.529    738351    421.5    639    0.00  0.00
THIRD
147    3.555    743790    421.5    639    0.00  0.00
SECOND
147    3.555    743790    421.5    639    0.00  0.00
FIRST
147    3.555    743790    421.5    639    0.00  0.00
FRAME DATA
EXTERNAL FRAME
1   8   28   45   7   13   0   0   0
COLUMN LINE COORDINATES
  1   0     0
  2   0.0   237
  3   0.0   474
  4   0     711
  5   0     948
  6   0     1185
  7   0     1422
  8   233   0
  9   233   237
  10  233   474
  11  233   711
  12  233   948
  13  233   1185
  14  233   1422
  15  466   0
  16  466   237
  17  466   474
  18  466   711
  19  466   948
  20  466   1185
  21  466   1422
  22  699   0
  23  699   237
  24  699   474
  25  699   711
  26  699   948
  27  699   1185
  28  699   1422
COLUMN PROPERTIES
1  3150  324  269  269  14762  8748   8748   12.0  12.0
2  3150  576  478  478  46656  27648  27648  12.0  12.0
3  3150  676  561  561  64262  38081  38081  12.0  12.0
4  3150  672  558  558  75866  43904  32256  12    12
5  3150  784  651  651  86436  51221  51221  12.0  12.0
6  3150  768  637  637  80179  65536  36864  12.0  12.0
7  3150  432  359  359  25369  20736  11664  12.0  12.0
BEAM PROPERTIES
1   3150  219  8696   10648  4    4    2    12.0  12.0
2   3150  319  19268  18432  4.0  4.0  2.0  12.0  12.0
3   3150  359  25369  20736  4.0  4.0  2.0  12.0  12.0
4   3150  256  12073  12423  4.0  4.0  2.0  12.0  12.0
5   3150  365  26400  17747  4.0  4.0  2.0  12.0  12.0
6   3150  398  31872  23040  4.0  4.0  2.0  12.0  12.0
7   3150  292  16896  14197  4    4    2    12    12
8   3150  402  32942  19521  4    4    2    14    14
9   3150  438  38333  25344  4    4    2    14    14
10  3150  329  21331  15972  4    4    2    13    13
11  3150  438  21331  21296  4    4    2    14    14
12  3150  478  46656  27648  4    4    2    14    14
13  3150  518  53914  29952  4    4    2    14    14
BEAMS LOCATION
 1  1  2   7  0  0  0  0
 1  1  2   6  2  0  0  0
 1  1  2   9  1  0  0  0
 1  1  2  12  1  0  0  0
 2  2  3  11  0  0  0  0
 2  2  3   6  2  0  0  0
 2  2  3   9  1  0  0  0
 2  2  3  12  1  0  0  0
 3  3  4  11  0  0  0  0
 3  3  4   6  2  0  0  0
 3  3  4   9  1  0  0  0
 3  3  4  12  1  0  0  0
 4  4  5  11  0  0  0  0
 4  4  5   2  0  0  0  0
 4  4  5   4  1  0  0  0
```

[redacted]

INPUT FOR CASE STUDY #2

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

[redacted]

INPUT FOR CASE STUDY #2

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 27 | 15 | 16 | 9 | 1 | 0 | 0 | 0 |
| 28 | 16 | 17 | 1 | 0 | 0 | 0 | 0 |
| 28 | 16 | 17 | 2 | 0 | 0 | 0 | 0 |
| 28 | 16 | 17 | 3 | 1 | 0 | 0 | 0 |
| 28 | 16 | 17 | 6 | 1 | 0 | 0 | 0 |
| 28 | 16 | 17 | 9 | 1 | 0 | 0 | 0 |
| 29 | 17 | 18 | 1 | 0 | 0 | 0 | 0 |
| 29 | 17 | 18 | 2 | 0 | 0 | 0 | 0 |
| 29 | 17 | 18 | 3 | 1 | 0 | 0 | 0 |
| 29 | 17 | 18 | 6 | 1 | 0 | 0 | 0 |
| 29 | 17 | 18 | 9 | 1 | 0 | 0 | 0 |
| 30 | 18 | 19 | 1 | 0 | 0 | 0 | 0 |
| 30 | 18 | 19 | 2 | 0 | 0 | 0 | 0 |
| 30 | 18 | 19 | 3 | 1 | 0 | 0 | 0 |
| 30 | 18 | 19 | 6 | 1 | 0 | 0 | 0 |
| 30 | 18 | 19 | 9 | 1 | 0 | 0 | 0 |
| 31 | 19 | 20 | 1 | 0 | 0 | 0 | 0 |
| 31 | 19 | 20 | 2 | 0 | 0 | 0 | 0 |
| 31 | 19 | 20 | 3 | 1 | 0 | 0 | 0 |
| 31 | 19 | 20 | 6 | 1 | 0 | 0 | 0 |
| 31 | 19 | 20 | 9 | 1 | 0 | 0 | 0 |
| 32 | 20 | 21 | 1 | 0 | 0 | 0 | 0 |
| 32 | 20 | 21 | 2 | 0 | 0 | 0 | 0 |
| 32 | 20 | 21 | 3 | 1 | 0 | 0 | 0 |
| 32 | 20 | 21 | 6 | 1 | 0 | 0 | 0 |
| 32 | 20 | 21 | 9 | 1 | 0 | 0 | 0 |
| 33 | 15 | 22 | 11 | 0 | 0 | 0 | 0 |
| 33 | 15 | 22 | 3 | 0 | 0 | 0 | 0 |
| 33 | 15 | 22 | 6 | 1 | 0 | 0 | 0 |
| 33 | 15 | 22 | 9 | 1 | 0 | 0 | 0 |
| 33 | 15 | 22 | 13 | 1 | 0 | 0 | 0 |
| 34 | 16 | 23 | 7 | 0 | 0 | 0 | 0 |
| 34 | 16 | 23 | 6 | 2 | 0 | 0 | 0 |
| 34 | 16 | 23 | 12 | 3 | 0 | 0 | 0 |
| 35 | 17 | 24 | 7 | 0 | 0 | 0 | 0 |
| 35 | 17 | 24 | 6 | 2 | 0 | 0 | 0 |
| 35 | 17 | 24 | 12 | 3 | 0 | 0 | 0 |
| 36 | 18 | 25 | 7 | 0 | 0 | 0 | 0 |
| 36 | 18 | 25 | 6 | 2 | 0 | 0 | 0 |
| 36 | 18 | 25 | 12 | 3 | 0 | 0 | 0 |
| 37 | 19 | 26 | 7 | 0 | 0 | 0 | 0 |
| 37 | 19 | 26 | 6 | 2 | 0 | 0 | 0 |
| 37 | 19 | 26 | 12 | 3 | 0 | 0 | 0 |
| 38 | 20 | 27 | 7 | 0 | 0 | 0 | 0 |
| 38 | 20 | 27 | 6 | 2 | 0 | 0 | 0 |
| 38 | 20 | 27 | 12 | 3 | 0 | 0 | 0 |
| 39 | 21 | 28 | 11 | 0 | 0 | 0 | 0 |
| 39 | 21 | 28 | 3 | 0 | 0 | 0 | 0 |
| 39 | 21 | 28 | 6 | 1 | 0 | 0 | 0 |
| 39 | 21 | 28 | 9 | 1 | 0 | 0 | 0 |
| 39 | 21 | 28 | 13 | 1 | 0 | 0 | 0 |
| 40 | 22 | 23 | 7 | 0 | 0 | 0 | 0 |
| 40 | 22 | 23 | 6 | 2 | 0 | 0 | 0 |
| 40 | 22 | 23 | 9 | 1 | 0 | 0 | 0 |
| 40 | 22 | 23 | 12 | 1 | 0 | 0 | 0 |
| 41 | 23 | 24 | 11 | 0 | 0 | 0 | 0 |
| 41 | 23 | 24 | 6 | 2 | 0 | 0 | 0 |
| 41 | 23 | 24 | 9 | 1 | 0 | 0 | 0 |
| 41 | 23 | 24 | 12 | 1 | 0 | 0 | 0 |
| 42 | 24 | 25 | 11 | 0 | 0 | 0 | 0 |
| 42 | 24 | 25 | 6 | 2 | 0 | 0 | 0 |
| 42 | 24 | 25 | 9 | 1 | 0 | 0 | 0 |
| 42 | 24 | 25 | 12 | 1 | 0 | 0 | 0 |
| 43 | 25 | 26 | 11 | 0 | 0 | 0 | 0 |
| 43 | 25 | 26 | 6 | 2 | 0 | 0 | 0 |
| 43 | 25 | 26 | 9 | 1 | 0 | 0 | 0 |
| 43 | 25 | 26 | 12 | 1 | 0 | 0 | 0 |
| 44 | 26 | 27 | 11 | 0 | 0 | 0 | 0 |
| 44 | 26 | 27 | 6 | 2 | 0 | 0 | 0 |
| 44 | 26 | 27 | 9 | 1 | 0 | 0 | 0 |
| 44 | 26 | 27 | 12 | 1 | 0 | 0 | 0 |
| 45 | 27 | 28 | 11 | 0 | 0 | 0 | 0 |
| 45 | 27 | 28 | 6 | 2 | 0 | 0 | 0 |
| 45 | 27 | 28 | 12 | 3 | 0 | 0 | 0 |

COLUMNS LOCATION

| | | | |
|---|---|---|---|
| 1 | 3 | 2 | 7 |
| 2 | 7 | 3 | 7 |
| 3 | 7 | 4 | 7 |
| 4 | 7 | 5 | 6 |
| 4 | 2 | 5 | 0 |
| 5 | 1 | 6 | 1 |
| 5 | 2 | 6 | 2 |
| 5 | 3 | 6 | 1 |
| 5 | 5 | 6 | 0 |
| 6 | 1 | 7 | 1 |
| 6 | 2 | 7 | 2 |
| 6 | 3 | 7 | 1 |
| 6 | 5 | 7 | 0 |
| 7 | 3 | 6 | 7 |
| 8 | 7 | 9 | 7 |
| 9 | 1 | 10 | 1 |
| 9 | 2 | 10 | 1 |
| 9 | 3 | 10 | 1 |
| 9 | 5 | 10 | 1 |
| 10 | 2 | 11 | 3 |
| 10 | 4 | 11 | 1 |
| 10 | 6 | 11 | 1 |
| 11 | 1 | 12 | 1 |
| 11 | 2 | 12 | 1 |

[redacted]

INPUT FOR CASE STUDY #2

```
11   3  12   1
11   5  12   1
12   1  13   1
12   2  13   1
12   3  13   1
12   5  13   1
13   1  14   1
13   2  14   1
13   3  14   1
13   5  14   1
14   7  13   7
15   7  16   7
16   1  17   1
16   2  17   1
16   3  17   1
16   5  17   1
17   1  18   1
17   2  18   1
17   3  18   1
17   5  18   1
18   1  19   1
18   2  19   1
18   3  19   1
18   5  19   1
19   1  20   1
19   2  20   1
19   3  20   1
19   5  20   1
20   1  21   1
20   2  21   1
20   3  21   1
20   5  21   1
21   7  20   7
22   3  23   7
23   7  24   7
24   7  25   7
25   7  26   7
26   7  27   7
27   7  28   7
28   3  27   7
FRAME 1 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 0.05 0.05 0.05
ECCENTRICITIES OF MASS
0 0
0 0
0 0
0 0
0 0
0 0
0 0
0 0
HEIGHT OF FLOOR
1176 1029 882 735 588 441 294 147 0
****  BASE ISOLATION SYSTEM DATA ****
STIFFNESS DATA FOR LINEAR ELASTIC BEARING
136.73 136.73 87155787 0 0
MASS OF BASE
3.581 749231
GLOBAL DAMPING
0 0 0 0 0
BEARING DATA
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
```

[redacted]

## INPUT FOR CASE STUDY #2

```
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
COORDINATES OF BEARING
-349.5 711
-349.5 474
-349.5 237
-349.5 0
-349.5 -237
-349.5 -474
-349.5 -711
-116.5 711
-116.5 474
-116.5 237
-116.5 0
-116.5 -237
-116.5 -474
-116.5 -711
116.5 711
116.5 474
116.5 237
116.5 0
116.5 -237
116.5 -474
116.5 -711
349.5 711
349.5 474
349.5 237
349.5 0
349.5 -237
349.5 -474
349.5 -711
OUTPUT CONTROL PARAMETERS
1 10 1 2 3 4
COORDINATES OF DESIRED INTERSTORY DRIFT
349.5 711
-349.5 -711
0 0
0 0
0 0
0 0
LOAD CASE DATA
0 0 0 1
```

# APPENDIX E

## OUTPUT FILE FOR EIGHT STORY R/C BASE ISOLATED STRUCTURE

(Refer to Section 4.2)

OUTPUT FOR CASE STUDY #2

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

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

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

                 VAX VERSION AND PC VERSION, DEC. 1992

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH
STATE UNIVERSITY OF NEW YORK, 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 ********
     EIGHT STORIES R/C BUILDING IN CALIFORNIA
     UNIT KIPS-IN-SEC
     GENERAL CONTROL INFORMATION
     2   8  12  28  3000
     SUPERSTRUCTURE CONTROL INFORMATION
     1   1   1   2   0
     INTEGRETION CONTROL PARAMETERS
     0.005 0.001 5000 200 1
     NEWMARK METHOD CONTROL PARAMETERS
     0.5 0.25
     EARTHQUAKE CONTROL PARAMETERS
     2 0.01 0 386.22
     **** SUPERSTRUCTURE INFORMATION ****
     EIGHTH STORY-GENERAL INFORMATION
     147     2.819   589802    421.5    639   0     0
     SEVENTH
     147     3.529   738351    421.5    639   0     0
     SIXTH
     147     3.529   738351    421.5    639    0.00  0.00
     FIFTH
     147     3.529   738351     421.5    639   0.00  0.00
     FORTH
     147     3.529   738351    421.5    639   0.00  0.00
     THIRD
     147     3.555   743790    421.5    639    0.00  0.00
     SECOND
     147     3.555   743790    421.5    639   0.00  0.00
     FIRST
     147     3.555   743790    421.5    639   0.00  0.00
     FRAME DATA
     EXTERNAL FRAME
     1    8   28   45    7    13    0    0    0
     COLUMN LINE COORDINATES
       1    0     0
       2    0.0    237
       3    0.0    474
       4    0     711
       5    0     948
       6    0     1185
       7    0     1422
       8    233    0
       9    233    237
      10    233    474
      11    233    711
      12    233    948
      13    233    1185
      14    233    1422
      15    466    0
      16    466    237
      17    466    474
      18    466    711
      19    466    948
      20    466    1185
      21    466    1422
      22    699    0
      23    699    237
      24    699    474
      25    699    711
      26    699    948
      27    699    1185
```

[redacted]

OUTPUT FOR CASE STUDY #2

```
  28   699    1422
COLUMN PROPERTIES
1  3150  324   269   269   14763   8748   8748  12.0  12.0
2  3150  576   478   478   46656   27648  27648  12.0  12.0
3  3150  676   561   561   64262   38081  38081  12.0  12.0
4  3150  672   558   558   75866   43904  32256  12    12
5  3150  784   651   651   86436   51221  51221  12.0  12.0
6  3150  768   637   637   80179   65536  36864  12.0  12.0
7  3150  432   359   359   25369   20736  11664  12.0  12.0
BEAM PROPERTIES
1  3150  219   8696   10648   4    4    2    12.0  12.0
2  3150  319   19268  18432   4.0  4.0  2.0  12.0  12.0
3  3150  359   25369  20736   4.0  4.0  2.0  12.0  12.0
4  3150  256   12073  12423   4.0  4.0  2.0  12.0  12.0
5  3150  365   26400  17747   4.0  4.0  2.0  12.0  12.0
6  3150  398   31872  23040   4.0  4.0  2.0  12.0  12.0
7  3150  292   16896  14197   4    4    2    12    12
8  3150  402   32942  19521   4    4    2    14    14
9  3150  438   38333  25344   4    4    2    14    14
10  3150  329   21331  15972   4    4    2    13    13
11  3150  438   21331  21296   4    4    2    14    14
12  3150  478   46656  27648   4    4    2    14    14
13  3150  518   53914  29952   4    4    2    14    14
BEAMS LOCATION
  1   1   2   7  0  0  0  0
  1   1   2   6  2  0  0  0
  1   1   2   9  1  0  0  0
  1   1   2  12  1  0  0  0
  2   2   3  11  0  0  0  0
  2   2   3   6  2  0  0  0
  2   2   3   9  1  0  0  0
  2   2   3  12  1  0  0  0
  3   3   4  11  0  0  0  0
  3   3   4   6  2  0  0  0
  3   3   4   9  1  0  0  0
  3   3   4  12  1  0  0  0
  4   4   5  11  0  0  0  0
  4   4   5   2  0  0  0  0
  4   4   5   4  1  0  0  0
  4   4   5   9  1  0  0  0
  4   4   5  12  1  0  0  0
  5   5   6  11  0  0  0  0
  5   5   6   2  0  0  0  0
  5   5   6   4  1  0  0  0
  5   5   6   2  1  0  0  0
  5   5   6   3  1  0  0  0
  6   6   7  11  0  0  0  0
  6   6   7   2  0  0  0  0
  6   6   7   4  1  0  0  0
  6   6   7   9  1  0  0  0
  6   6   7  12  1  0  0  0
  7   1   8  11  0  0  0  0
  7   1   8   3  0  0  0  0
  7   1   8   6  1  0  0  0
  7   1   8   9  1  0  0  0
  7   1   8  13  1  0  0  0
  8   2   9   7  0  0  0  0
  8   2   9   6  2  0  0  0
  8   2   9  12  3  0  0  0
  9   3  10   7  0  0  0  0
  9   3  10   6  2  0  0  0
  9   3  10  12  3  0  0  0
 10   4  11   7  0  0  0  0
 10   4  11   6  2  0  0  0
 10   4  11  12  3  0  0  0
 11   5  12   7  0  0  0  0
 11   5  12   6  2  0  0  0
 11   5  12  12  3  0  0  0
 12   6  13   7  0  0  0  0
 12   6  13   6  2  0  0  0
 12   6  13  12  3  0  0  0
 13   7  14  11  0  0  0  0
 13   7  14   3  0  0  0  0
 13   7  14   6  1  0  0  0
 13   7  14   9  1  0  0  0
 13   7  14  13  1  0  0  0
 14   8   9   1  0  0  0  0
 14   8   9   2  0  0  0  0
 14   8   9   3  1  0  0  0
 14   8   9   6  1  0  0  0
 14   8   9   9  1  0  0  0
 15   9  10   1  0  0  0  0
 15   9  10   2  0  0  0  0
 15   9  10   3  1  0  0  0
 15   9  10   6  1  0  0  0
 15   9  10   9  1  0  0  0
 16  10  11   1  0  0  0  0
 16  10  11   2  0  0  0  0
 16  10  11   3  1  0  0  0
 16  10  11   6  1  0  0  0
 16  10  11   9  1  0  0  0
 17  11  12   1  0  0  0  0
 17  11  12   2  0  0  0  0
 17  11  12   3  1  0  0  0
 17  11  12   6  1  0  0  0
 17  11  12   9  1  0  0  0
 18  12  13   1  0  0  0  0
 18  12  13   7  0  0  0  0
 18  12  13  10  1  0  0  0
```

OUTPUT FOR CASE STUDY #2

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 18 | 12 | 13 | 5 | 1 | 0 | 0 | 0 |
| 18 | 12 | 13 | 8 | 1 | 0 | 0 | 0 |
| 19 | 13 | 14 | 1 | 0 | 0 | 0 | 0 |
| 19 | 13 | 14 | 2 | 0 | 0 | 0 | 0 |
| 19 | 13 | 14 | 3 | 1 | 0 | 0 | 0 |
| 19 | 13 | 14 | 6 | 1 | 0 | 0 | 0 |
| 19 | 13 | 14 | 9 | 1 | 0 | 0 | 0 |
| 20 | 8 | 15 | 11 | 0 | 0 | 0 | 0 |
| 20 | 8 | 15 | 3 | 0 | 0 | 0 | 0 |
| 20 | 8 | 15 | 6 | 1 | 0 | 0 | 0 |
| 20 | 8 | 15 | 9 | 1 | 0 | 0 | 0 |
| 20 | 8 | 15 | 13 | 1 | 0 | 0 | 0 |
| 21 | 9 | 16 | 7 | 0 | 0 | 0 | 0 |
| 21 | 9 | 16 | 6 | 2 | 0 | 0 | 0 |
| 21 | 9 | 16 | 12 | 3 | 0 | 0 | 0 |
| 22 | 10 | 17 | 7 | 0 | 0 | 0 | 0 |
| 22 | 10 | 17 | 10 | 0 | 0 | 0 | 0 |
| 22 | 10 | 17 | 6 | 1 | 0 | 0 | 0 |
| 22 | 10 | 17 | 12 | 3 | 0 | 0 | 0 |
| 23 | 11 | 18 | 7 | 0 | 0 | 0 | 0 |
| 23 | 11 | 18 | 10 | 0 | 0 | 0 | 0 |
| 23 | 11 | 18 | 5 | 1 | 0 | 0 | 0 |
| 23 | 11 | 18 | 11 | 3 | 0 | 0 | 0 |
| 24 | 12 | 19 | 7 | 0 | 0 | 0 | 0 |
| 24 | 12 | 19 | 3 | 0 | 0 | 0 | 0 |
| 24 | 12 | 19 | 6 | 1 | 0 | 0 | 0 |
| 24 | 12 | 19 | 11 | 3 | 0 | 0 | 0 |
| 25 | 13 | 20 | 7 | 0 | 0 | 0 | 0 |
| 25 | 13 | 20 | 6 | 2 | 0 | 0 | 0 |
| 25 | 13 | 20 | 12 | 3 | 0 | 0 | 0 |
| 26 | 14 | 21 | 11 | 0 | 0 | 0 | 0 |
| 26 | 14 | 21 | 3 | 0 | 0 | 0 | 0 |
| 26 | 14 | 21 | 6 | 1 | 0 | 0 | 0 |
| 26 | 14 | 21 | 9 | 1 | 0 | 0 | 0 |
| 26 | 14 | 21 | 13 | 1 | 0 | 0 | 0 |
| 27 | 15 | 16 | 1 | 0 | 0 | 0 | 0 |
| 27 | 15 | 16 | 2 | 0 | 0 | 0 | 0 |
| 27 | 15 | 16 | 3 | 1 | 0 | 0 | 0 |
| 27 | 15 | 16 | 6 | 1 | 0 | 0 | 0 |
| 27 | 15 | 16 | 9 | 1 | 0 | 0 | 0 |
| 28 | 16 | 17 | 1 | 0 | 0 | 0 | 0 |
| 28 | 16 | 17 | 2 | 0 | 0 | 0 | 0 |
| 28 | 16 | 17 | 3 | 1 | 0 | 0 | 0 |
| 28 | 16 | 17 | 6 | 1 | 0 | 0 | 0 |
| 28 | 16 | 17 | 9 | 1 | 0 | 0 | 0 |
| 29 | 17 | 18 | 1 | 0 | 0 | 0 | 0 |
| 29 | 17 | 18 | 2 | 0 | 0 | 0 | 0 |
| 29 | 17 | 18 | 3 | 1 | 0 | 0 | 0 |
| 29 | 17 | 18 | 6 | 1 | 0 | 0 | 0 |
| 29 | 17 | 18 | 9 | 1 | 0 | 0 | 0 |
| 30 | 18 | 19 | 1 | 0 | 0 | 0 | 0 |
| 30 | 18 | 19 | 2 | 0 | 0 | 0 | 0 |
| 30 | 18 | 19 | 3 | 1 | 0 | 0 | 0 |
| 30 | 18 | 19 | 6 | 1 | 0 | 0 | 0 |
| 30 | 18 | 19 | 9 | 1 | 0 | 0 | 0 |
| 31 | 19 | 20 | 1 | 0 | 0 | 0 | 0 |
| 31 | 19 | 20 | 2 | 0 | 0 | 0 | 0 |
| 31 | 19 | 20 | 3 | 1 | 0 | 0 | 0 |
| 31 | 19 | 20 | 6 | 1 | 0 | 0 | 0 |
| 31 | 19 | 20 | 9 | 1 | 0 | 0 | 0 |
| 32 | 20 | 21 | 1 | 0 | 0 | 0 | 0 |
| 32 | 20 | 21 | 2 | 0 | 0 | 0 | 0 |
| 32 | 20 | 21 | 3 | 1 | 0 | 0 | 0 |
| 32 | 20 | 21 | 6 | 1 | 0 | 0 | 0 |
| 32 | 20 | 21 | 9 | 1 | 0 | 0 | 0 |
| 33 | 15 | 22 | 11 | 0 | 0 | 0 | 0 |
| 33 | 15 | 22 | 3 | 0 | 0 | 0 | 0 |
| 33 | 15 | 22 | 6 | 1 | 0 | 0 | 0 |
| 33 | 15 | 22 | 9 | 1 | 0 | 0 | 0 |
| 33 | 15 | 22 | 13 | 1 | 0 | 0 | 0 |
| 34 | 16 | 23 | 7 | 0 | 0 | 0 | 0 |
| 34 | 16 | 23 | 6 | 2 | 0 | 0 | 0 |
| 34 | 16 | 23 | 12 | 3 | 0 | 0 | 0 |
| 35 | 17 | 24 | 7 | 0 | 0 | 0 | 0 |
| 35 | 17 | 24 | 6 | 2 | 0 | 0 | 0 |
| 35 | 17 | 24 | 12 | 3 | 0 | 0 | 0 |
| 36 | 18 | 25 | 7 | 0 | 0 | 0 | 0 |
| 36 | 18 | 25 | 6 | 2 | 0 | 0 | 0 |
| 36 | 18 | 25 | 12 | 3 | 0 | 0 | 0 |
| 37 | 19 | 26 | 7 | 0 | 0 | 0 | 0 |
| 37 | 19 | 26 | 6 | 2 | 0 | 0 | 0 |
| 37 | 19 | 26 | 12 | 3 | 0 | 0 | 0 |
| 38 | 20 | 27 | 7 | 0 | 0 | 0 | 0 |
| 38 | 20 | 27 | 6 | 2 | 0 | 0 | 0 |
| 38 | 20 | 27 | 12 | 3 | 0 | 0 | 0 |
| 39 | 21 | 28 | 11 | 0 | 0 | 0 | 0 |
| 39 | 21 | 28 | 3 | 0 | 0 | 0 | 0 |
| 39 | 21 | 28 | 6 | 1 | 0 | 0 | 0 |
| 39 | 21 | 28 | 9 | 1 | 0 | 0 | 0 |
| 39 | 21 | 28 | 13 | 1 | 0 | 0 | 0 |
| 40 | 22 | 23 | 7 | 0 | 0 | 0 | 0 |
| 40 | 22 | 23 | 6 | 2 | 0 | 0 | 0 |
| 40 | 22 | 23 | 9 | 1 | 0 | 0 | 0 |
| 40 | 22 | 23 | 12 | 1 | 0 | 0 | 0 |
| 41 | 23 | 24 | 11 | 0 | 0 | 0 | 0 |
| 41 | 23 | 24 | 6 | 2 | 0 | 0 | 0 |
| 41 | 23 | 24 | 9 | 1 | 0 | 0 | 0 |
| 41 | 23 | 24 | 12 | 1 | 0 | 0 | 0 |
| 42 | 24 | 25 | 11 | 0 | 0 | 0 | 0 |

```
42 24 25  6  2  0  0  0
42 24 25  9  1  0  0  0
42 24 25 12  1  0  0  0
43 25 26 11  0  0  0  0
43 25 26  6  2  0  0  0
43 25 26  9  1  0  0  0
43 25 26 12  1  0  0  0
44 26 27 11  0  0  0  0
44 26 27  6  2  0  0  0
44 26 27  9  1  0  0  0
44 26 27 12  1  0  0  0
45 27 28 11  0  0  0  0
45 27 28  6  2  0  0  0
45 27 28 12  3  0  0  0
COLUMNS LOCATION
  1   3   2   7
  2   7   3   7
  3   7   4   7
  4   7   5   6
  4   2   5   0
  5   1   6   1
  5   2   6   2
  5   3   6   1
  5   5   6   0
  6   1   7   1
  6   2   7   2
  6   3   7   1
  6   5   7   0
  7   3   6   7
  8   7   9   7
  9   1  10   1
  9   2  10   1
  9   3  10   1
  9   5  10   1
 10   2  11   3
 10   4  11   1
 10   6  11   1
 11   1  12   1
 11   2  12   1
 11   3  12   1
 11   5  12   1
 12   1  13   1
 12   2  13   1
 12   3  13   1
 12   5  13   1
 13   1  14   1
 13   2  14   1
 13   3  14   1
 13   5  14   1
 14   7  13   7
 15   7  16   7
 16   1  17   1
 16   2  17   1
 16   3  17   1
 16   5  17   1
 17   1  18   1
 17   2  18   1
 17   3  18   1
 17   5  18   1
 18   1  19   1
 18   2  19   1
 18   3  19   1
 18   5  19   1
 19   1  20   1
 19   2  20   1
 19   3  20   1
 19   5  20   1
 20   1  21   1
 20   2  21   1
 20   3  21   1
 20   5  21   1
 21   7  20   7
 22   3  23   7
 23   7  24   7
 24   7  25   7
 25   7  26   7
 26   7  27   7
 27   7  28   7
 28   3  27   7
FRAME 1 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 0.05 0.05 0.05
ECCENTRICITIES OF MASS
0 0
0 0
0 0
0 0
0 0
0 0
0 0
0 0
HEIGHT OF FLOOR
1176 1029 882 735 588 441 294 147 0
****  BASE ISOLATION SYSTEM DATA ****
STIFFNESS DATA FOR LINEAR ELASTIC BEARING
136.73 136.73 87155787 0 0
MASS OF BASE
3.581 749231
```

OUTPUT FOR CASE STUDY #2

```
GLOBAL DAMPING
0 0 0 0 0
BEARING DATA
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
3 4
0.08 0.04 0.6 0.01 0.08 0.04 0.6 0.01 430
COORDINATES OF BEARING
-349.5 711
-349.5 474
-349.5 237
-349.5 0
-349.5 -237
-349.5 -474
-349.5 -711
-116.5 711
-116.5 474
-116.5 237
-116.5 0
-116.5 -237
-116.5 -474
-116.5 -711
116.5 711
116.5 474
116.5 237
116.5 0
116.5 -237
116.5 -474
116.5 -711
349.5 711
349.5 474
349.5 237
349.5 0
349.5 -237
349.5 -474
349.5 -711
OUTPUT CONTROL PARAMETERS
1 10 1 2 3 4
COORDINATES OF DESIRED INTERSTORY DRIFT
349.5 711
-349.5 -711
0 0
0 0
0 0
0 0
LOAD CASE DATA
0 0 0 1
```

[redacted]

OUTPUT FOR CASE STUDY #2

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

******** START OF PROCESSED DATA *******

EIGHT STORIES R/C BUILDING IN CALIFORNIA

POINTER WITHIN MASTER ARRAY... MAX STORAGE = 13262

SUPERSTRUCTURE CONTROL INFORMATION

UNIT KIPS-IN-SEC

```
TOTAL NUMBER OF STORIES--   8
NUMBER OF DIFF. FRAMES---   1
TOTAL NUMBER OF FRAMES---   1
NUMBER OF LOAD CONDITIONS   1
TYPE OF ANALYSIS---------   2
EQ.1-STATIC LOAD ANALYSIS+MODE SHAPES AND FREQUENCIES
+LATERAL EARTHQUAKE RESPONSE AND PEAK RESPONSE PRINTOUT
EQ.2-STATIC LOAD ANALYSIS+MODE SHAPES AND FREQUENCIES
+LATERAL EARTHQUAKE RESPONSE AND TIME HISTORY PRINTOUT
NUMBER OF FREQUENCIES----  12
STORY TRANSLATION CODE---   0


NO. OF FLOORS(EXCL. BASE)...............=          8
NO. OF BEARINGS.........................=         28
NO. OF EIGEN VECTORS CONSIDERED.........=         12
INDEX FOR  SUPERSTRUCTURE STIFFNESS DATA=          2

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

TIME STEP OF INTEGRATION (NEWMARK)......=     0.0050
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.........=     0.0010
REFERENCE MOMENT OF CONVERGENCE.........=     5000.0
MAX NUMBER OF ITERATIONS WITHIN T.S.....=        200
INDEX FOR GROUND MOTION INPUT...........=          2

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

TIME STEP OF RECORD ....................=      0.010
LENGTH OF RECORD........................=       3000
LOAD FACTOR.............................=     386.22
ANGLE OF EARTHQUAKE INCIDENCE...........=       0.00
```

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

STORY DATA

| LEVEL NO. | ID | HEIGHT | MASS(M) | MR**2 | X(M) | Y(M) | K-X | K-Y |
|---|---|---|---|---|---|---|---|---|
| | EIGHTH STORY-GENERAL INFORM | | | | | | | |
| 8 | | 147.00 | 2.82 | 589802.00 | 421.50 | 639.00 | 0.00 | 0.00 |
| | SEVENTH | | | | | | | |
| 7 | | 147.00 | 3.53 | 738351.00 | 421.50 | 639.00 | 0.00 | 0.00 |
| | SIXTH | | | | | | | |
| 6 | | 147.00 | 3.53 | 738351.00 | 421.50 | 639.00 | 0.00 | 0.00 |
| | FIFTH | | | | | | | |
| 5 | | 147.00 | 3.53 | 738351.00 | 421.50 | 639.00 | 0.00 | 0.00 |
| | FORTH | | | | | | | |
| 4 | | 147.00 | 3.53 | 738351.00 | 421.50 | 639.00 | 0.00 | 0.00 |
| | THIRD | | | | | | | |
| 3 | | 147.00 | 3.56 | 743790.00 | 421.50 | 639.00 | 0.00 | 0.00 |
| | SECOND | | | | | | | |
| 2 | | 147.00 | 3.56 | 743790.00 | 421.50 | 639.00 | 0.00 | 0.00 |
| | FIRST | | | | | | | |
| 1 | | 147.00 | 3.56 | 743790.00 | 421.50 | 639.00 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| 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 |

[redacted]

OUTPUT FOR CASE STUDY #2

EXTERNAL FRAME

| | |
|---|---|
| FRAME ID NUMBER----------- | 1 |
| NUMBER OF STORY LEVELS---- | 8 |
| NUMBER OF COLUMN LINES---- | 28 |
| NUMBER OF BAYS----------- | 45 |
| NUMBER OF DIFF. COL. PROP- | 7 |
| NUMBER OF DIFF. BEAM PROP- | 13 |
| NUMBER OF DIFF. FEF------- | 0 |
| NUMBER OF PANEL ELEMENTS-- | 0 |
| NUMBER OF BRACING ELEMENTS | 0 |

COLUMN LINE COORDINATES

| LINE | X | Y |
|---|---|---|
| 1 | 0.00 | 0.00 |
| 2 | 0.00 | 237.00 |
| 3 | 0.00 | 474.00 |
| 4 | 0.00 | 711.00 |
| 5 | 0.00 | 948.00 |
| 6 | 0.00 | 1185.00 |
| 7 | 0.00 | 1422.00 |
| 8 | 233.00 | 0.00 |
| 9 | 233.00 | 237.00 |
| 10 | 233.00 | 474.00 |
| 11 | 233.00 | 711.00 |
| 12 | 233.00 | 948.00 |
| 13 | 233.00 | 1185.00 |
| 14 | 233.00 | 1422.00 |
| 15 | 466.00 | 0.00 |
| 16 | 466.00 | 237.00 |
| 17 | 466.00 | 474.00 |
| 18 | 466.00 | 711.00 |
| 19 | 466.00 | 948.00 |
| 20 | 4[illegible] | 1185.00 |
| 21 | 466.00 | 1422.00 |
| 22 | 699.00 | 0.00 |
| 23 | 699.00 | 237.00 |
| 24 | 699.00 | 474.00 |
| 25 | 699.00 | 711.00 |
| 26 | 699.00 | 948.00 |
| 27 | 699.00 | 1185.00 |
| 28 | 699.00 | 1422.00 |

| COLUMN ID | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | RIGID TOP | RIGID BOT |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 672.00 | 558.00 | 558.00 | 75866.00 | 43904.00 | 32256.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 768.00 | 637.00 | 637.00 | 80179.00 | 65536.00 | 36864.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |

| BEAM ID | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | RIGID I | RIGID J |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 256.00 | 12073.00 | 12423.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 365.00 | 26400.00 | 17747.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 |
| 8 | 3150.00 | 402.00 | 32942.00 | 19521.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 |
| 9 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 |
| 10 | 3150.00 | 329.00 | 21331.00 | 15972.00 | 4.00 | 4.00 | 2.00 | 13.00 | 13.00 |
| 11 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 |
| 12 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 |
| 13 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 |

BEAM LOCATIONS

| BAY | LEV | IC | JC | BID | GEN | VL1 | VL2 | VL3 |
|---|---|---|---|---|---|---|---|---|
| 1 | 8 | 1 | 2 | 7 | 0 | 0 | 0 | 0 |
| 1 | 7 | 1 | 2 | 6 | 2 | 0 | 0 | 0 |
| 1 | 4 | 1 | 2 | 9 | 1 | 0 | 0 | 0 |
| 1 | 2 | 1 | 2 | 12 | 1 | 0 | 0 | 0 |
| 2 | 8 | 2 | 3 | 11 | 0 | 0 | 0 | 0 |
| 2 | 7 | 2 | 3 | 6 | 2 | 0 | 0 | 0 |
| 2 | 4 | 2 | 3 | 9 | 1 | 0 | 0 | 0 |
| 2 | 2 | 2 | 3 | 12 | 1 | 0 | 0 | 0 |
| 3 | 8 | 3 | 4 | 11 | 0 | 0 | 0 | 0 |
| 3 | 7 | 3 | 4 | 6 | 2 | 0 | 0 | 0 |
| 3 | 4 | 3 | 4 | 9 | 1 | 0 | 0 | 0 |
| 3 | 2 | 3 | 4 | 12 | 1 | 0 | 0 | 0 |
| 4 | 8 | 4 | 5 | 11 | 0 | 0 | 0 | 0 |
| 4 | 7 | 4 | 5 | 2 | 0 | 0 | 0 | 0 |
| 4 | 6 | 4 | 5 | 4 | 1 | 0 | 0 | 0 |
| 4 | 4 | 4 | 5 | 9 | 1 | 0 | 0 | 0 |
| 4 | 2 | 4 | 5 | 12 | 1 | 0 | 0 | 0 |
| 5 | 8 | 5 | 6 | 11 | 0 | 0 | 0 | 0 |
| 5 | 7 | 5 | 6 | 2 | 0 | 0 | 0 | 0 |
| 5 | 6 | 5 | 6 | 4 | 1 | 0 | 0 | 0 |
| 5 | 4 | 5 | 6 | 2 | 1 | 0 | 0 | 0 |
| 5 | 2 | 5 | 6 | 3 | 1 | 0 | 0 | 0 |
| 6 | 8 | 6 | 7 | 11 | 0 | 0 | 0 | 0 |
| 6 | 7 | 6 | 7 | 2 | 0 | 0 | 0 | 0 |
| 6 | 6 | 6 | 7 | 4 | 1 | 0 | 0 | 0 |
| 6 | 4 | 6 | 7 | 9 | 1 | 0 | 0 | 0 |
| 6 | 2 | 6 | 7 | 12 | 1 | 0 | 0 | 0 |

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

[redacted]



| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 26 | 7 | 14 | 21 | 3 | 0 | 0 | 0 | 0 |
| 26 | 6 | 14 | 21 | 6 | 1 | 0 | 0 | 0 |
| 26 | 4 | 14 | 21 | 9 | 1 | 0 | 0 | 0 |
| 26 | 2 | 14 | 21 | 13 | 1 | 0 | 0 | 0 |
| 27 | 8 | 15 | 16 | 1 | 0 | 0 | 0 | 0 |
| 27 | 7 | 15 | 16 | 2 | 0 | 0 | 0 | 0 |
| 27 | 6 | 15 | 16 | 3 | 1 | 0 | 0 | 0 |
| 27 | 4 | 15 | 16 | 6 | 1 | 0 | 0 | 0 |
| 27 | 2 | 15 | 16 | 9 | 1 | 0 | 0 | 0 |
| 28 | 8 | 16 | 17 | 1 | 0 | 0 | 0 | 0 |
| 28 | 7 | 16 | 17 | 2 | 0 | 0 | 0 | 0 |
| 28 | 6 | 16 | 17 | 3 | 1 | 0 | 0 | 0 |
| 28 | 4 | 16 | 17 | 6 | 1 | 0 | 0 | 0 |
| 28 | 2 | 16 | 17 | 9 | 1 | 0 | 0 | 0 |
| 29 | 8 | 17 | 18 | 1 | 0 | 0 | 0 | 0 |
| 29 | 7 | 17 | 18 | 2 | 0 | 0 | 0 | 0 |
| 29 | 6 | 17 | 18 | 3 | 1 | 0 | 0 | 0 |
| 29 | 4 | 17 | 18 | 6 | 1 | 0 | 0 | 0 |
| 29 | 2 | 17 | 18 | 9 | 1 | 0 | 0 | 0 |
| 30 | 8 | 18 | 19 | 1 | 0 | 0 | 0 | 0 |
| 30 | 7 | 18 | 19 | 2 | 0 | 0 | 0 | 0 |
| 30 | 6 | 18 | 19 | 3 | 1 | 0 | 0 | 0 |
| 30 | 4 | 18 | 19 | 6 | 1 | 0 | 0 | 0 |
| 30 | 2 | 18 | 19 | 9 | 1 | 0 | 0 | 0 |
| 31 | 8 | 19 | 20 | 1 | 0 | 0 | 0 | 0 |
| 31 | 7 | 19 | 20 | 2 | 0 | 0 | 0 | 0 |
| 31 | 6 | 19 | 20 | 3 | 1 | 0 | 0 | 0 |
| 31 | 4 | 19 | 20 | 6 | 1 | 0 | 0 | 0 |
| 31 | 2 | 19 | 20 | 9 | 1 | 0 | 0 | 0 |
| 32 | 8 | 20 | 21 | 1 | 0 | 0 | 0 | 0 |
| 32 | 7 | 20 | 21 | 2 | 0 | 0 | 0 | 0 |
| 32 | 6 | 20 | 21 | 3 | 1 | 0 | 0 | 0 |
| 32 | 4 | 20 | 21 | 6 | 1 | 0 | 0 | 0 |
| 32 | 2 | 20 | 21 | 9 | 1 | 0 | 0 | 0 |
| 33 | 9 | 15 | 22 | 11 | 0 | 0 | 0 | 0 |
| 33 | 7 | 15 | 22 | 3 | 0 | 0 | 0 | 0 |
| 33 | 6 | 15 | 22 | 6 | 1 | 0 | 0 | 0 |
| 33 | 4 | 15 | 22 | 9 | 1 | 0 | 0 | 0 |
| 33 | 2 | 15 | 22 | 13 | 1 | 0 | 0 | 0 |
| 34 | 8 | 16 | 23 | 7 | 0 | 0 | 0 | 0 |
| 34 | 7 | 16 | 23 | 6 | 2 | 0 | 0 | 0 |
| 34 | 4 | 16 | 23 | 12 | 3 | 0 | 0 | 0 |
| 35 | 8 | 17 | 24 | 7 | 0 | 0 | 0 | 0 |
| 35 | 7 | 17 | 24 | 6 | 2 | 0 | 0 | 0 |
| 35 | 4 | 17 | 24 | 12 | 3 | 0 | 0 | 0 |
| 36 | 8 | 18 | 25 | 7 | 0 | 0 | 0 | 0 |
| 36 | 7 | 18 | 25 | 6 | 2 | 0 | 0 | 0 |
| 36 | 4 | 18 | 25 | 12 | 3 | 0 | 0 | 0 |
| 37 | 8 | 19 | 26 | 7 | 0 | 0 | 0 | 0 |
| 37 | 7 | 19 | 26 | 6 | 2 | 0 | 0 | 0 |
| 37 | 4 | 19 | 26 | 12 | 3 | 0 | 0 | 0 |
| 38 | 8 | 20 | 27 | 7 | 0 | 0 | 0 | 0 |
| 38 | 7 | 20 | 27 | 6 | 2 | 0 | 0 | 0 |
| 38 | 4 | 20 | 27 | 12 | 3 | 0 | 0 | 0 |
| 39 | 8 | 21 | 28 | 11 | 0 | 0 | 0 | 0 |
| 39 | 7 | 21 | 28 | 3 | 0 | 0 | 0 | 0 |
| 39 | 6 | 21 | 28 | 6 | 1 | 0 | 0 | 0 |
| 39 | 4 | 21 | 28 | 9 | 1 | 0 | 0 | 0 |
| 39 | 2 | 21 | 28 | 13 | 1 | 0 | 0 | 0 |
| 40 | 8 | 22 | 23 | 7 | 0 | 0 | 0 | 0 |
| 40 | 7 | 22 | 23 | 6 | 2 | 0 | 0 | 0 |
| 40 | 4 | 22 | 23 | 9 | 1 | 0 | 0 | 0 |
| 40 | 2 | 22 | 23 | 12 | 1 | 0 | 0 | 0 |
| 41 | 8 | 23 | 24 | 11 | 0 | 0 | 0 | 0 |
| 41 | 7 | 23 | 24 | 6 | 2 | 0 | 0 | 0 |
| 41 | 4 | 23 | 24 | 9 | 1 | 0 | 0 | 0 |
| 41 | 2 | 23 | 24 | 12 | 1 | 0 | 0 | 0 |
| 42 | 8 | 24 | 25 | 11 | 0 | 0 | 0 | 0 |
| 42 | 7 | 24 | 25 | 6 | 2 | 0 | 0 | 0 |
| 42 | 4 | 24 | 25 | 9 | 1 | 0 | 0 | 0 |
| 42 | 2 | 24 | 25 | 12 | 1 | 0 | 0 | 0 |
| 43 | 8 | 25 | 26 | 11 | 0 | 0 | 0 | 0 |
| 43 | 7 | 25 | 26 | 6 | 2 | 0 | 0 | 0 |
| 43 | 4 | 25 | 26 | 9 | 1 | 0 | 0 | 0 |
| 43 | 2 | 25 | 26 | 12 | 1 | 0 | 0 | 0 |
| 44 | 8 | 26 | 27 | 11 | 0 | 0 | 0 | 0 |
| 44 | 7 | 26 | 27 | 6 | 2 | 0 | 0 | 0 |
| 44 | 4 | 26 | 27 | 9 | 1 | 0 | 0 | 0 |
| 44 | 2 | 26 | 27 | 12 | 1 | 0 | 0 | 0 |
| 45 | 8 | 27 | 28 | 11 | 0 | 0 | 0 | 0 |

[redacted]

OUTPUT FOR CASE STUDY #2

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 45 | 7 | 27 | 28 | 6 | 2 | 0 | 0 | 0 |
| 45 | 4 | 27 | 28 | 12 | 3 | 0 | 0 | 0 |

GENERATED BEAM LOCATIONS

| DSTORY | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 7 | 11 | 11 | 11 | 11 | 11 | 11 | 7 | 7 | 7 | 7 | 7 | 11 | 1 | 1 | 1 | 1 | 1 | 1 | 11 | 7 | 7 | 7 | 7 | 7 | 11 | 1 | 1 | 1 | 1 |
| 7 | 6 | 6 | 6 | 2 | 2 | 2 | 3 | 6 | 6 | 6 | 6 | 6 | 3 | 2 | 2 | 2 | 2 | 7 | 2 | 3 | 6 | 10 | 10 | 3 | 6 | 3 | 2 | 2 | 2 | 2 |
| 6 | 6 | 6 | 6 | 4 | 4 | 4 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 3 | 3 | 3 | 3 | 10 | 3 | 6 | 6 | 6 | 5 | 6 | 6 | 6 | 3 | 3 | 3 | 3 |
| 5 | 6 | 6 | 6 | 4 | 4 | 4 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 3 | 3 | 3 | 3 | 10 | 3 | 6 | 6 | 6 | 5 | 6 | 6 | 6 | 3 | 3 | 3 | 3 |
| 4 | 9 | 9 | 9 | 9 | 2 | 9 | 9 | 12 | 12 | 12 | 12 | 12 | 9 | 6 | 6 | 6 | 6 | 5 | 6 | 9 | 12 | 12 | 11 | 11 | 12 | 9 | 6 | 6 | 6 | 6 |
| 3 | 9 | 9 | 9 | 9 | 2 | 9 | 9 | 12 | 12 | 12 | 12 | 12 | 9 | 6 | 6 | 6 | 6 | 5 | 6 | 9 | 12 | 12 | 11 | 11 | 12 | 9 | 6 | 6 | 6 | 6 |
| 2 | 12 | 12 | 12 | 12 | 3 | 12 | 13 | 12 | 12 | 12 | 12 | 12 | 13 | 9 | 9 | 9 | 9 | 8 | 9 | 13 | 12 | 12 | 11 | 11 | 12 | 13 | 9 | 9 | 9 | 9 |
| 1 | 12 | 12 | 12 | 12 | 3 | 12 | 13 | 12 | 12 | 12 | 12 | 12 | 13 | 9 | 9 | 9 | 9 | 8 | 9 | 13 | 12 | 12 | 11 | 11 | 12 | 13 | 9 | 9 | 9 | 9 |

| DSTORY | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 1 | 1 | 11 | 7 | 7 | 7 | 7 | 7 | 11 | 7 | 11 | 11 | 11 | 11 | 11 |
| 7 | 2 | 2 | 3 | 6 | 6 | 6 | 6 | 6 | 3 | 6 | 6 | 6 | 6 | 6 | 6 |
| 6 | 3 | 3 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 5 | 3 | 3 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 4 | 6 | 6 | 9 | 12 | 12 | 12 | 12 | 12 | 9 | 9 | 9 | 9 | 9 | 9 | 12 |
| 3 | 6 | 6 | 9 | 12 | 12 | 12 | 12 | 12 | 9 | 9 | 9 | 9 | 9 | 9 | 12 |
| 2 | 9 | 9 | 13 | 12 | 12 | 12 | 12 | 12 | 13 | 12 | 12 | 12 | 12 | 12 | 12 |
| 1 | 9 | 9 | 13 | 12 | 12 | 12 | 12 | 12 | 13 | 12 | 12 | 12 | 12 | 12 | 12 |

DCOLUMN LOCATIONS

O LINE LEV CID KCOL GEN

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

| | | | | |
|---|---|---|---|---|
| 20 | 8 | 1 | 21 | 1 |
| 20 | 6 | 2 | 21 | 1 |
| 20 | 4 | 3 | 21 | 1 |
| 20 | 2 | 5 | 21 | 1 |
| 21 | 8 | 7 | 20 | 7 |
| 22 | 8 | 3 | 23 | 7 |
| 23 | 8 | 7 | 24 | 7 |
| 24 | 8 | 7 | 25 | 7 |
| 25 | 8 | 7 | 26 | 7 |
| 26 | 8 | 7 | 27 | 7 |
| 27 | 8 | 7 | 28 | 7 |
| 28 | 8 | 3 | 27 | 7 |

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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3 | 7 | 7 | 7 | 1 | 1 | 3 | 7 | 1 | 2 | 1 | 1 | 1 | 7 | 7 | 1 | 1 | 1 | 1 | 1 | 7 | 3 | 7 | 7 | 7 | 7 | 7 | 3 |
| 7 | 3 | 7 | 7 | 7 | 1 | 1 | 3 | 7 | 1 | 2 | 1 | 1 | 1 | 7 | 7 | 1 | 1 | 1 | 1 | 1 | 7 | 3 | 7 | 7 | 7 | 7 | 7 | 3 |
| 6 | 3 | 7 | 7 | 7 | 2 | 2 | 3 | 7 | 2 | 2 | 2 | 2 | 2 | 7 | 7 | 2 | 2 | 2 | 2 | 2 | 7 | 3 | 7 | 7 | 7 | 7 | 7 | 3 |
| 5 | 3 | 7 | 7 | 7 | 2 | 2 | 3 | 7 | 2 | 2 | 2 | 2 | 2 | 7 | 7 | 2 | 2 | 2 | 2 | 2 | 7 | 3 | 7 | 7 | 7 | 7 | 7 | 3 |
| 4 | 3 | 7 | 7 | 7 | 2 | 2 | 3 | 7 | 3 | 4 | 3 | 3 | 3 | 7 | 7 | 3 | 3 | 3 | 3 | 3 | 7 | 3 | 7 | 7 | 7 | 7 | 7 | 3 |
| 3 | 3 | 7 | 7 | 7 | 3 | 3 | 3 | 7 | 3 | 4 | 3 | 3 | 3 | 7 | 7 | 3 | 3 | 3 | 3 | 3 | 7 | 3 | 7 | 7 | 7 | 7 | 7 | 3 |
| 2 | 3 | 7 | 7 | 7 | 3 | 3 | 3 | 7 | 5 | 6 | 5 | 5 | 5 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 7 | 3 | 7 | 7 | 7 | 7 | 7 | 3 |
| 1 | 3 | 7 | 7 | 2 | 5 | 5 | 3 | 7 | 5 | 6 | 5 | 5 | 5 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 7 | 3 | 7 | 7 | 7 | 7 | 7 | 3 |

BEAM PROPERTIES AND LOADS

BAY NUMBERS 1

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 2

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 3

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 4

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 256.00 | 12073.00 | 12423.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 256.00 | 12073.00 | 12423.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 5

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 256.00 | 12073.00 | 12423.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 256.00 | 12073.00 | 12423.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |

BAY NUMBERS 6

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 256.00 | 12073.00 | 12423.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 256.00 | 12073.00 | 12423.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 7

OUTPUT FOR CASE STUDY #2

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 8

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 9

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 10

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 11

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 12

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 13

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 14

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 15

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 |  | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 16

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

OUTPUT FOR CASE STUDY #2

BAY NUMBERS 17

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 18

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 329.00 | 21331.00 | 15972.00 | 4.00 | 4.00 | 2.00 | 13.00 | 13.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 329.00 | 21331.00 | 15972.00 | 4.00 | 4.00 | 2.00 | 13.00 | 13.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 365.00 | 26400.00 | 17747.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 365.00 | 26400.00 | 17747.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 402.00 | 32942.00 | 19521.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 402.00 | 32942.00 | 19521.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 19

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 20

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 21

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 22

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 329.00 | 21331.00 | 15972.00 | 4.00 | 4.00 | 2.00 | 13.00 | 13.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 23

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 329.00 | 21331.00 | 15972.00 | 4.00 | 4.00 | 2.00 | 13.00 | 13.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 365.00 | 26400.00 | 17747.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 365.00 | 26400.00 | 17747.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 24

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 25

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 26

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 27

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 28

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 29

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 30

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 31

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 32

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 219.00 | 8696.00 | 10648.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 319.00 | 19268.00 | 18432.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 33

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 433.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 34

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 35

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 36

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

[redacted]



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 37

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040 [illegible] | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648 [illegible] | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 38

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 39

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 359.00 | 25369.00 | 20736.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 518.00 | 53914.00 | 29952.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 40

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 292.00 | 16896.00 | 14197.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2 00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 41

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 42

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 43

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 44

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 438.00 | 38333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 438.00 | 33333.00 | 25344.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

BAY NUMBERS 45

| LEVEL | E | SA | TORS I | FLEX I | KII | KJJ | KIJ | WI | WJ | VERT1 | VERT2 | VERT3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 438.00 | 21331.00 | 21296.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 7 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 6 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 5 | 3150.00 | 398.00 | 31872.00 | 23040.00 | 4.00 | 4.00 | 2.00 | 12.00 | 12.00 | 0 | 0 | 0 |
| 4 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 3 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 2 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |
| 1 | 3150.00 | 478.00 | 46656.00 | 27648.00 | 4.00 | 4.00 | 2.00 | 14.00 | 14.00 | 0 | 0 | 0 |

COLUMN PROPERTIES

COLUMN LINE NO. 1

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

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |

COLUMN LINE NO. 2

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |

COLUMN LINE NO. 3

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |

COLUMN LINE NO. 4

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |

COLUMN LINE NO. 5

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |

COLUMN LINE NO. 6

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |

COLUMN LINE NO. 7

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |

COLUMN LINE NO. 8

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |

COLUMN LINE NO. 9

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |

COLUMN LINE NO. 10

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

OUTPUT FOR CASE STUDY #2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 672.00 | 558.00 | 558.00 | 75866.00 | 43904.00 | 32256.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 672.00 | 558.00 | 558.00 | 75866.00 | 43904.00 | 32256.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 768.00 | 637.00 | 637.00 | 80179.00 | 65536.00 | 36864.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 768.00 | 637.00 | 637.00 | 80179.00 | 65536.00 | 36864.00 | 12.00 | 12.00 |
| COLUMN LINE NO. 11 | | | | | | | | | |
| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| COLUMN LINE NO. 12 | | | | | | | | | |
| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| COLUMN LINE NO. 13 | | | | | | | | | |
| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| COLUMN LINE NO. 14 | | | | | | | | | |
| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| COLUMN LINE NO. 15 | | | | | | | | | |
| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| COLUMN LINE NO. 16 | | | | | | | | | |
| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| COLUMN LINE NO. 17 | | | | | | | | | |
| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| COLUMN LINE NO. 18 | | | | | | | | | |
| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| COLUMN LINE NO. 19 | | | | | | | | | |
| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |

[redacted]

OUTPUT FOR CASE STUDY #2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |

COLUMN LINE NO. 20

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 324.00 | 269.00 | 269.00 | 14762.00 | 8748.00 | 8748.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 576.00 | 478.00 | 478.00 | 46656.00 | 27648.00 | 27648.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 784.00 | 651.00 | 651.00 | 86436.00 | 51221.00 | 51221.00 | 12.00 | 12.00 |

COLUMN LINE NO. 21

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |

COLUMN LINE NO. 22

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |

COLUMN LINE NO. 23

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |

COLUMN LINE NO. 24

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |

COLUMN LINE NO. 25

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |

COLUMN LINE NO. 26

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |

COLUMN LINE NO. 27

| LEVEL | E | A | MAJ SA | MIN SA | TORS I | MAJ I | MIN I | DT | DB |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 432.00 | 359.00 | 359.00 | 25369.00 | 20736.00 | 11664.00 | 12.00 | 12.00 |

COLUMN LINE NO. 28

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

OUTPUT FOR CASE STUDY #2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 7 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 6 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 5 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 4 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 3 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 2 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |
| 1 | 3150.00 | 676.00 | 561.00 | 561.00 | 64262.00 | 38081.00 | 38081.00 | 12.00 | 12.00 |

FRAME 1 LOCAT

FRAME POSITION DATA

| FRAME | ID | FORCE CODE | X1 | Y1 | ANG |
|---|---|---|---|---|---|
| 1 | 1 | 0 | 0.00 | 0.00 | 0.00 |

SUPERSTRUCTURE DAMPING.......

| MODE SHAPE | DAMPING RATIO (%) |
|---|---|
| 1 | 5.0 |
| 2 | 5.0 |
| 3 | 5.0 |
| 4 | 5.0 |
| 5 | 5.0 |
| 6 | 5.0 |
| 7 | 5.0 |
| 8 | 5.0 |
| 9 | 5.0 |
| 10 | 5.0 |
| 11 | 5.0 |
| 12 | 5.0 |

HEIGHT.........

| FLOOR | HEIGHT |
|---|---|
| 8 | 1176.0 |
| 7 | 1029.0 |
| 6 | 882.0 |
| 5 | 735.0 |
| 4 | 588.0 |
| 3 | 441.0 |
| 2 | 294.0 |
| 1 | 147.0 |
| 0 | 0.0 |

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

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

| | TRANSL. MASS | ROTATIONAL MASS |
|---|---|---|
| MASS | 3.581 | 749231.000 |

BASE ISOLATION DATA: OPTION ONE: EQUIVALENT GLOBAL DEVICE PROPERTIES

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

| | X | Y | R | ECX | ECY |
|---|---|---|---|---|---|
| LINEAR STIFFNESS[F/L] | 136.7300 | 136.7300 | 87155787.0000 | 0.0000 | 0.0000 |
| VISCOUS DAMPING[F/L/T] | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

BASE ISOLATION DATA: OPTION TWO: INDIVIDUAL ISOLATION ELEMENTS

SLIDING BEARING PARAMETERS.......

| BEARING | FMAX X | FMAX Y | DF X | DF Y | PA X | PA Y | Y.DIS.X | Y.DIS.Y | NORM. FORCE |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 2 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 3 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 4 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 5 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 6 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 7 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 8 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 9 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 10 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 11 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 12 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 13 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 14 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 15 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 16 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 17 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 18 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 19 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 20 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 21 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 22 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 23 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 24 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |

[redacted]

OUTPUT FOR CASE STUDY #2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 25 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 26 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 27 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |
| 28 | 0.080 | 0.080 | 0.040 | 0.040 | 0.600 | 0.600 | 0.01000 | 0.01000 | 430.00000 |

BEARING LOCATION .........

| BEARING | X | Y |
|---|---|---|
| 1 | -349.50 | 711.00 |
| 2 | -349.50 | 474.00 |
| 3 | -349.50 | 237.00 |
| 4 | -349.50 | 0.00 |
| 5 | -349.50 | -237.00 |
| 6 | -349.50 | -474.00 |
| 7 | -349.50 | -711.00 |
| 8 | -116.50 | 711.00 |
| 9 | -116.50 | 474.00 |
| 10 | -116.50 | 237.00 |
| 11 | -116.50 | 0.00 |
| 12 | -116.50 | -237.00 |
| 13 | -116.50 | -474.00 |
| 14 | -116.50 | -711.00 |
| 15 | 116.50 | 711.00 |
| 16 | 116.50 | 474.00 |
| 17 | 116.50 | 237.00 |
| 18 | 116.50 | 0.00 |
| 19 | 116.50 | -237.00 |
| 20 | 116.50 | -474.00 |
| 21 | 116.50 | -711.00 |
| 22 | 349.50 | 711.00 |
| 23 | 349.50 | 474.00 |
| 24 | 349.50 | 237.00 |
| 25 | 349.50 | 0.00 |
| 26 | 349.50 | -237.00 |
| 27 | 349.50 | -474.00 |
| 28 | 349.50 | -711.00 |

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 | 349.50 | 711.00 |
| 2 | -349.50 | -711.00 |
| 3 | 0.00 | 0.00 |
| 4 | 0.00 | 0.00 |
| 5 | 0.00 | 0.00 |
| 6 | 0.00 | 0.00 |

1
************************* OUTPUT *************************

MODE SHAPES

| LEVEL | ID | DIRN | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 | | X | 0.249714 | -0.122192 | 0.076935 | -0.267828 | 0.107977 | 0.083118 | -0.243863 | -0.107025 |
| 8 | | Y | 0.093042 | 0.252221 | 0.097560 | -0.080031 | -0.268304 | 0.095273 | -0.079748 | 0.249172 |
| 8 | | ROTN | 0.000226 | 0.000122 | -0.000560 | -0.000210 | -0.000130 | -0.000574 | -0.000224 | 0.000126 |
| 7 | | X | 0.233910 | -0.114066 | 0.071206 | -0.155596 | 0.061064 | 0.042178 | 0.005004 | 0.005005 |
| 7 | | Y | 0.087966 | 0.237689 | 0.091065 | -0.048517 | -0.159050 | 0.051995 | -0.001746 | 0.000642 |
| 7 | | ROTN | 0.000215 | 0.000117 | -0.000530 | -0.000133 | -0.000083 | -0.000354 | -0.000030 | 0.000015 |
| 6 | | X | 0.207903 | -0.100717 | 0.061870 | 0.003747 | -0.004685 | -0.011817 | 0.216438 | 0.095711 |
| 6 | | Y | 0.079180 | 0.212550 | 0.079850 | -0.002505 | -0.000779 | -0.008136 | 0.067969 | -0.214666 |
| 6 | | ROTN | 0.000195 | 0.000106 | -0.000477 | -0.000019 | -0.000013 | -0.000025 | 0.000159 | -0.000095 |
| 5 | | X | 0.176855 | -0.085298 | 0.052087 | 0.134722 | -0.055207 | -0.044239 | 0.197317 | 0.080818 |
| 5 | | Y | 0.067916 | 0.181158 | 0.066616 | 0.038776 | 0.134890 | -0.052535 | 0.067704 | -0.203153 |
| 5 | | ROTN | 0.000167 | 0.000093 | -0.000408 | 0.000094 | 0.000055 | 0.000280 | 0.000187 | -0.000111 |
| 4 | | X | 0.140608 | -0.067458 | 0.040836 | 0.215987 | -0.085105 | -0.059323 | 0.013226 | 0.000691 |
| 4 | | Y | 0.054322 | 0.143850 | 0.051625 | 0.065637 | 0.219596 | -0.074855 | 0.008869 | -0.018765 |
| 4 | | ROTN | 0.000135 | 0.000075 | -0.000326 | 0.000169 | 0.000102 | 0.000480 | 0.000058 | -0.000033 |
| 3 | | X | 0.102575 | -0.048933 | 0.029308 | 0.224470 | -0.086449 | -0.055264 | -0.169732 | -0.072206 |
| 3 | | Y | 0.039594 | 0.104069 | 0.036484 | 0.069849 | 0.228273 | -0.070773 | -0.054987 | 0.170202 |
| 3 | | ROTN | 0.000099 | 0.000056 | -0.000238 | 0.000184 | 0.000114 | 0.000513 | -0.000103 | 0.000068 |
| 2 | | X | 0.062149 | -0.029389 | 0.017245 | 0.167592 | -0.063231 | -0.037326 | -0.222236 | -0.089150 |
| 2 | | Y | 0.024022 | 0.062547 | 0.021309 | 0.052948 | 0.169604 | -0.048359 | -0.075663 | 0.224464 |
| 2 | | ROTN | 0.000061 | 0.000034 | -0.000145 | 0.000143 | 0.000089 | 0.000390 | -0.000169 | 0.000110 |
| 1 | | X | 0.023752 | -0.011011 | 0.006184 | 0.071487 | -0.026246 | -0.014160 | -0.118005 | -0.045499 |
| 1 | | Y | 0.009309 | 0.023805 | 0.007725 | 0.023021 | 0.071913 | -0.018726 | -0.041169 | 0.118592 |
| 1 | | ROTN | 0.000024 | 0.000014 | -0.000055 | 0.000064 | 0.000040 | 0.000168 | -0.000098 | 0.000063 |

[redacted]

OUTPUT FOR CASE STUDY #2

MODE SHAPES

| LEVEL | ID | DIRN | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| 8 | | X | -0.088752 | 0.197754 | 0.093476 | -0.140636 |
| 8 | | Y | -0.098758 | 0.060847 | -0.210382 | -0.101985 |
| 8 | | ROTN | 0.000524 | 0.000248 | -0.000122 | 0.000323 |
| 7 | | X | 0.019702 | -0.155572 | -0.075889 | 0.175690 |
| 7 | | Y | 0.012183 | -0.045596 | 0.153468 | 0.101504 |
| 7 | | ROTN | 0.000035 | -0.000100 | 0.000063 | -0.000162 |
| 6 | | X | 0.081666 | -0.177559 | -0.076920 | 0.014269 |
| 6 | | Y | 0.089193 | -0.058190 | 0.190967 | 0.052718 |
| 6 | | ROTN | -0.000436 | -0.000234 | 0.000121 | -0.000374 |
| 5 | | X | 0.040525 | 0.097294 | 0.046486 | -0.131701 |
| 5 | | Y | 0.061023 | 0.029019 | -0.089507 | -0.076762 |
| 5 | | ROTN | -0.000470 | -0.000015 | -0.000011 | 0.000038 |
| 4 | | X | -0.024311 | 0.225482 | 0.093653 | -0.001483 |
| 4 | | Y | -0.014222 | 0.074970 | -0.229512 | -0.054331 |
| 4 | | ROTN | -0.000095 | 0.000184 | -0.000118 | 0.000458 |
| 3 | | X | -0.050049 | 0.021889 | 0.004963 | 0.091119 |
| 3 | | Y | -0.062996 | 0.008666 | -0.026116 | 0.037317 |
| 3 | | ROTN | 0.000355 | 0.000093 | -0.000045 | 0.000164 |
| 2 | | X | -0.035951 | -0.213495 | -0.085799 | -0.006917 |
| 2 | | Y | -0.060747 | -0.072918 | 0.211524 | 0.045573 |
| 2 | | ROTN | 0.000522 | -0.000102 | 0.000087 | -0.000422 |
| 1 | | X | -0.011222 | -0.167508 | -0.063636 | -0.058080 |
| 1 | | Y | -0.025768 | -0.058539 | 0.165784 | 0.008413 |
| 1 | | ROTN | 0.000289 | -0.000112 | 0.000084 | -0.000402 |

| MODE NUMBER | PERIOD |
|---|---|
| 1 | 1.022028 |
| 2 | 0.945899 |
| 3 | 0.778801 |
| 4 | 0.352704 |
| 5 | 0.326493 |
| 6 | 0.268552 |
| 7 | 0.202725 |
| 8 | 0.188306 |
| 9 | 0.154192 |
| 10 | 0.137615 |
| 11 | 0.127467 |
| 12 | 0.105327 |

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

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

| FLOOR | X DISP. | Y DISP. | ROTN.(rad) |
|---|---|---|---|
| 8 | 2.3783 | -2.0325 | 0.0012 |
| 7 | 2.1318 | -1.8459 | 0.0011 |
| 6 | 1.7578 | -1.5539 | 0.0010 |
| 5 | 1.3803 | -1.2939 | 0.0009 |
| 4 | 1.0863 | -1.0447 | 0.0007 |
| 3 | 0.8074 | -0.7713 | 0.0006 |
| 2 | 0.4962 | -0.4707 | 0.0003 |
| 1 | 0.1904 | -0.1805 | 0.0001 |

MAX INTERSTORY DRIFT

| STORY | X DST. | Y DST. | TIME | X DRIFT/FL. HT.(%) | TIME | Y DRIFT/FL. HT.(%) |
|---|---|---|---|---|---|---|
| 8 | 349.50 | 711.00 | 9.44 | 0.26 | 7.61 | 0.13 |
| 7 | 349.50 | 711.00 | 9.45 | 0.36 | 7.61 | 0.21 |
| 6 | 349.50 | 711.00 | 9.47 | 0.36 | 7.62 | 0.23 |
| 5 | 349.50 | 711.00 | 9.49 | 0.34 | 3.51 | 0.25 |
| 4 | 349.50 | 711.00 | 9.53 | 0.31 | 3.51 | 0.24 |
| 3 | 349.50 | 711.00 | 3.56 | 0.27 | 3.53 | 0.22 |
| 2 | 349.50 | 711.00 | 3.58 | 0.27 | 7.73 | 0.21 |
| 1 | 349.50 | 711.00 | 3.59 | 0.17 | 7.73 | 0.13 |
| 8 | -349.50 | -711.00 | 8.10 | 0.14 | 7.58 | 0.15 |
| 7 | -349.50 | -711.00 | 8.10 | 0.21 | 7.59 | 0.23 |
| 6 | -349.50 | -711.00 | 8.08 | 0.21 | 7.60 | 0.24 |
| 5 | -349.50 | -711.00 | 8.06 | 0.22 | 7.61 | 0.23 |
| 4 | -349.50 | -711.00 | 8.04 | 0.21 | 7.65 | 0.20 |
| 3 | -349.50 | -711.00 | 8.03 | 0.20 | 7.69 | 0.20 |
| 2 | -349.50 | -711.00 | 6.43 | 0.18 | 7.71 | 0.19 |
| 1 | -349.50 | -711.00 | 6.43 | 0.11 | 7.72 | 0.11 |
| 8 | 0.00 | 0.00 | 9.43 | 0.19 | 7.59 | 0.14 |

OUTPUT FOR CASE STUDY #2

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | 0.00 | 0.00 | 9.45 | 0.26 | 7.60 | 0.22 |
| 6 | 0.00 | 0.00 | 8.09 | 0.26 | 7.61 | 0.23 |
| 5 | 0.00 | 0.00 | 8.09 | 0.26 | 7.62 | 0.22 |
| 4 | 0.00 | 0.00 | 8.08 | 0.23 | 3.50 | 0.20 |
| 3 | 0.00 | 0.00 | 6.42 | 0.21 | 7.70 | 0.21 |
| 2 | 0.00 | 0.00 | 6.43 | 0.21 | 7.72 | 0.20 |
| 1 | 0.00 | 0.00 | 6.43 | 0.13 | 7.73 | 0.12 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 8 | 0.00 | 0.00 | 9.43 | 0.19 | 7.59 | 0.14 |
| 7 | 0.00 | 0.00 | 9.45 | 0.26 | 7.60 | 0.22 |
| 6 | 0.00 | 0.00 | 8.09 | 0.26 | 7.61 | 0.23 |
| 5 | 0.00 | 0.00 | 8.09 | 0.26 | 7.62 | 0.22 |
| 4 | 0.00 | 0.00 | 8.08 | 0.23 | 3.50 | 0.20 |
| 3 | 0.00 | 0.00 | 6.42 | 0.21 | 7.70 | 0.21 |
| 2 | 0.00 | 0.00 | 6.43 | 0.21 | 7.72 | 0.20 |
| 1 | 0.00 | 0.00 | 6.43 | 0.13 | 7.73 | 0.12 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 8 | 0.00 | 0.00 | 9.43 | 0.19 | 7.59 | 0.14 |
| 7 | 0.00 | 0.00 | 9.45 | 0.26 | 7.60 | 0.22 |
| 6 | 0.00 | 0.00 | 8.09 | 0.26 | 7.61 | 0.23 |
| 5 | 0.00 | 0.00 | 8.09 | 0.26 | 7.62 | 0.22 |
| 4 | 0.00 | 0.00 | 8.08 | 0.23 | 3.50 | 0.20 |
| 3 | 0.00 | 0.00 | 6.42 | 0.21 | 7.70 | 0.21 |
| 2 | 0.00 | 0.00 | 6.43 | 0.21 | 7.72 | 0.20 |
| 1 | 0.00 | 0.00 | 6.43 | 0.13 | 7.73 | 0.12 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 8 | 0.00 | 0.00 | 9.43 | 0.19 | 7.59 | 0.14 |
| 7 | 0.00 | 0.00 | 9.45 | 0.26 | 7.60 | 0.22 |
| 6 | 0.00 | 0.00 | 8.09 | 0.26 | 7.61 | 0.23 |
| 5 | 0.00 | 0.00 | 8.09 | 0.26 | 7.62 | 0.22 |
| 4 | 0.00 | 0.00 | 8.08 | 0.23 | 3.50 | 0.20 |
| 3 | 0.00 | 0.00 | 6.42 | 0.21 | 7.70 | 0.21 |
| 2 | 0.00 | 0.00 | 6.43 | 0.21 | 7.72 | 0.20 |
| 1 | 0.00 | 0.00 | 6.43 | 0.13 | 7.73 | 0.12 |

MAX. DISP. AT THE CENTER OF MASS OF BASE

| X DISP. | Y DISP. | ROTN... |
|---|---|---|
| 4.179 | -3.885 | 0.001 |

MAX RESULTANT DISP. AT THE CENTER OF MASS OF BASE

| TIME | RES. DISP. | X COMP. | Y COMP. |
|---|---|---|---|
| 6.530 | 4.181 | 4.179 | -0.139 |

MAX RESULTANT BEARING DISP.

| BEARING | TIME | MAX. DISP | ANG. WITH X AXIS |
|---|---|---|---|
| 1 | 7.950 | 4.071 | -1.199 |
| 2 | 6.530 | 4.096 | -0.050 |
| 3 | 6.530 | 4.140 | -0.049 |
| 4 | 6.530 | 4.184 | -0.049 |

MAX BEARING DISP. IN X

| BEARING | TIME | MAX. DISP X |
|---|---|---|
| 1 | 6.530 | 4.047 |
| 2 | 6.530 | 4.091 |
| 3 | 6.530 | 4.135 |
| 4 | 6.525 | 4.179 |

MAX BEARING DISP. IN Y

| BEARING | TIME | MAX. DISP Y |
|---|---|---|
| 1 | 7.910 | -3.824 |
| 2 | 7.910 | -3.824 |
| 3 | 7.910 | -3.824 |
| 4 | 7.910 | -3.824 |

MAX. TOTAL ACCL. AT CENTER OF MASS OF FLOORS

| FLOOR | ACCL. X | ACCL. Y | ACCL. R |
|---|---|---|---|
| 8 | -214.550604 | 180.995723 | 0.175983 |
| 7 | -134.563699 | 134.638067 | 0.090314 |
| 6 | -130.949157 | 100.961109 | 0.117748 |
| 5 | -118.849912 | 96.802594 | 0.095176 |
| 4 | -125.603274 | 105.409048 | -0.108708 |
| 3 | -147.182195 | -95.078372 | -0.120051 |
| 2 | -137.656128 | 125.215132 | -0.085355 |
| 1 | -130.613581 | 119.011254 | 0.076115 |

MAX STORY SHEAR

| STORY | TIME | X SHEAR | TIME | Y SHEAR |
|---|---|---|---|---|
| 8 | 9.430 | -604.818 | 7.580 | 510.227 |
| 7 | 9.445 | -980.805 | 7.595 | 956.330 |
| 6 | 8.090 | -1153.268 | 7.610 | 1182.156 |
| 5 | 8.085 | -1235.748 | 7.620 | 1196.858 |
| 4 | 8.070 | -1195.793 | 3.485 | -1179.024 |

| | | | | |
|---|---|---|---|---|
| 3 | 8.020 | -1197.970 | 7.695 | 1271.135 |
| 2 | 6.425 | -1294.622 | 7.710 | 1368.953 |
| 1 | 6.415 | -1337.075 | 7.725 | 1383.064 |

MAX. STRUCTURE SHEAR (TOP OF BASE)

| FORCE X | FORCE Y | Z MOMENT |
|---|---|---|
| -1337.07 | 1383.06 | 291671.74 |

MAX. BASE SHEAR (BEARING LEVEL)

| FORCE X | FORCE Y | Z MOMENT |
|---|---|---|
| 1386.97 | -1379.05 | -294848.21 |

LOAD CONDITION DEFINITION CARDS

| OLOAD | I | II | III | RESPONSE |
|---|---|---|---|---|
| 1 | 0.00 | 0.00 | 0.00 | 1.00 |

MEMB.R FORCES ..... FRAME ID F RAME 1 L OCAT FRAME TYPE 1

LEVEL NO 1 ... LEVEL ID

COLUMN FORCES

| O 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 | 94.1477 | 1029.3267 | 3825.6511 | 327.0174 | 1809.7969 | 5788.9766 | 38.9714 | 61.7787 |
| | 1 | MIN | -94.1477 | -1029.3267 | -3825.6511 | -327.0174 | -1809.7969 | -5788.9766 | -38.9714 | -61.7787 |
| 2 | 1 | MAX | 37.1671 | 1838.6495 | 2785.3750 | 222.9761 | 1348.4757 | 2055.4622 | 37.5937 | 27.6743 |
| | 1 | MIN | -37.1671 | -1838.6495 | -2785.3750 | -222.9761 | -1348.4757 | -2055.4622 | -37.5937 | -27.6743 |
| 3 | 1 | MAX | 37.1671 | 1731.4460 | 2728.8564 | 222.7598 | 1161.5450 | 1840.4996 | 36.2626 | 24.4069 |
| | 1 | MIN | -37.1671 | -1731.4460 | -2728.8564 | -222.7598 | -1161.5450 | -1840.4996 | -36.2626 | -24.4069 |
| 4 | 1 | MAX | 68.3539 | 2197.9854 | 3579.9724 | 218.3739 | 1806.7393 | 3647.1091 | 46.9753 | 44.3402 |
| | 1 | MIN | -68.3539 | -2197.9854 | -3579.9724 | -218.3739 | -1806.7393 | -3647.1091 | -46.9753 | -44.3402 |
| 5 | 1 | MAX | 126.6340 | 2091.8799 | 5524.1089 | 238.1900 | 1394.9258 | 5397.3125 | 61.9186 | 55.1908 |
| | 1 | MIN | -126.6340 | -2091.8799 | -5524.1089 | -238.1900 | -1394.9258 | -5397.3125 | -61.9186 | -55.1908 |
| 6 | 1 | MAX | 126.6340 | 2219.9961 | 5590.0073 | 221.3384 | 1290.5078 | 5135.1758 | 63.4960 | 52.2413 |
| | 1 | MIN | -126.6340 | -2219.9961 | -5590.0073 | -221.3384 | -1290.5078 | -5135.1758 | -63.4960 | -52.2413 |
| 7 | 1 | MAX | 94.1477 | 1151.9565 | 3893.6401 | 243.3604 | 923.1533 | 3666.9253 | 40.5852 | 37.3177 |
| | 1 | MIN | -94.1477 | -1151.9565 | -3893.6401 | -243.3604 | -923.1533 | -3666.9253 | -40.5852 | -37.3177 |
| 8 | 1 | MAX | 37.1671 | 1077.0076 | 2433.0559 | 169.3345 | 2289.5591 | 2749.1309 | 28.3106 | 40.9650 |
| | 1 | MIN | -37.1671 | -1077.0076 | -2433.0559 | -169.3345 | -2289.5591 | -2749.1309 | -28.3106 | -40.9650 |
| 9 | 1 | MAX | 126.6340 | 2199.9312 | 5693.0391 | 33.4426 | 3171.4531 | 7334.1196 | 63.4876 | 85.4112 |
| | 1 | MIN | -126.6340 | -2199.9312 | -5693.0391 | -33.4426 | -3171.4531 | -7334.1196 | -63.4876 | -85.4112 |
| 10 | 1 | MAX | 117.4671 | 2170.9502 | 6861.6440 | 28.0006 | 2562.1436 | 5128.1675 | 72.4901 | 62.4220 |
| | 1 | MIN | -117.4671 | -2170.9502 | -6861.6440 | -28.0006 | -2562.1436 | -5128.1675 | -72.4901 | -62.4220 |
| 11 | 1 | MAX | 126.6340 | 2245.6377 | 5722.6982 | 12.3857 | 2280.1514 | 6122.0322 | 64.1976 | 68.2922 |
| | 1 | MIN | -126.6340 | -2245.6377 | -5722.6982 | -12.3857 | -2280.1514 | -6122.0322 | -64.1976 | -68.2922 |
| 12 | 1 | MAX | 126.6340 | 1973.8369 | 5577.7104 | 36.2118 | 2204.6870 | 5812.6113 | 60.7271 | 65.1605 |
| | 1 | MIN | -126.6340 | -1973.8369 | -5577.7104 | -36.2118 | -2204.6870 | -5812.6113 | -60.7271 | -65.1605 |
| 13 | 1 | MAX | 126.6340 | 1926.3296 | 5548.7983 | 20.5606 | 2376.3970 | 5693.7178 | 60.0351 | 65.6107 |
| | 1 | MIN | -126.6340 | -1926.3296 | -5548.7983 | -20.5606 | -2376.3970 | -5693.7178 | -60.0351 | -65.6107 |
| 14 | 1 | MAX | 37.1671 | 1086.3875 | 2439.4609 | 161.1983 | 1453.5331 | 1779.2917 | 28.4614 | 26.2831 |
| | 1 | MIN | -37.1671 | -1086.3875 | -2439.4609 | -161.1983 | -1453.5331 | -1779.2917 | -28.4614 | -26.2831 |
| 15 | 1 | MAX | 37.1671 | 1133.5432 | 2533.8875 | 189.3585 | 2277.8767 | 2742.7874 | 29.8165 | 40.8184 |
| | 1 | MIN | -37.1671 | -1133.5432 | -2533.8875 | -189.3585 | -2277.8767 | -2742.7874 | -29.8165 | -40.8184 |
| 16 | 1 | MAX | 126.6340 | 2308.0303 | 5929.8271 | 29.1342 | 3153.2070 | 7324.7349 | 66.9744 | 85.1865 |
| | 1 | MIN | -126.6340 | -2308.0303 | -5929.8271 | -29.1342 | -3153.2070 | -7324.7349 | -66.9744 | -85.1865 |
| 17 | 1 | MAX | 126.6340 | 2352.2622 | 5952.5786 | 32.9047 | 2602.8926 | 6511.1724 | 67.5190 | 73.4417 |
| | 1 | MIN | -126.6340 | -2352.2622 | -5952.5786 | -32.9047 | -2602.8926 | -6511.1724 | -67.5190 | -73.4417 |
| 18 | 1 | MAX | 126.6340 | 2354.2632 | 5953.6079 | 4.0879 | 2144.1665 | 6047.5122 | 67.5436 | 66.5085 |
| | 1 | MIN | -126.6340 | -2354.2632 | -5953.6079 | -4.0879 | -2144.1665 | -6047.5122 | -67.5436 | -66.5085 |
| 19 | 1 | MAX | 126.6340 | 2351.3081 | 5952.0879 | 5.2400 | 1997.7646 | 5706.1187 | 67.5073 | 62.6129 |
| | 1 | MIN | -126.6340 | -2351.3081 | -5952.0879 | -5.2400 | -1997.7646 | -5706.1187 | -67.5073 | -62.6129 |
| 20 | 1 | MAX | 126.6340 | 2308.2773 | 5929.9541 | 24.2385 | 2187.8325 | 5596.7271 | 66.9775 | 63.2891 |
| | 1 | MIN | -126.6340 | -2308.2773 | -5929.9541 | -24.2385 | -2187.8325 | -5596.7271 | -66.9775 | -63.2891 |
| 21 | 1 | MAX | 37.1671 | 1138.5903 | 2536.5483 | 175.7642 | 1445.5922 | 1774.9797 | 29.8792 | 26.1835 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | MIN | -37.1671 | -1138.5903 | -2536.5483 | -175.7642 | -1445.5922 | -1774.9797 | -29.8792 | -26.1835 |
| 22 | 1 | MAX | 94.1477 | 1341.8486 | 4400.2866 | 260.9391 | 1794.3340 | 5780.9209 | 45.8123 | 61.5875 |
| | 1 | MIN | -94.1477 | -1341.8486 | -4400.2866 | -260.9391 | -1794.3340 | -5780.9209 | -45.8123 | -61.5875 |
| 23 | 1 | MAX | 37.1671 | 2148.2896 | 3186.8110 | 226.6622 | 1345.8661 | 2054.0449 | 43.3748 | 27.6416 |
| | 1 | MIN | -37.1671 | -2148.2896 | -3186.8110 | -226.6622 | -1345.8661 | -2054.0449 | -43.3748 | -27.6416 |
| 24 | 1 | MAX | 37.1671 | 2021.0852 | 3119.7478 | 220.0908 | 1218.6875 | 1871.5289 | 41.7954 | 25.1237 |
| | 1 | MIN | -37.1671 | -2021.0852 | -3119.7478 | -220.0908 | -1218.6875 | -1871.5289 | -41.7954 | -25.1237 |
| 25 | 1 | MAX | 37.1671 | 2035.0054 | 3127.0867 | 208.9518 | 1158.0663 | 1777.4692 | 41.9682 | 23.8661 |
| | 1 | MIN | -37.1671 | -2035.0054 | -3127.0867 | -208.9518 | -1158.0663 | -1777.4692 | -41.9682 | -23.8661 |
| 26 | 1 | MAX | 37.1671 | 2021.5325 | 3119.9836 | 201.3477 | 1090.0591 | 1678.2981 | 41.8009 | 22.4955 |
| | 1 | MIN | -37.1671 | -2021.5325 | -3119.9836 | -201.3477 | -1090.0591 | -1678.2981 | -41.8009 | -22.4955 |
| 27 | 1 | MAX | 37.1671 | 2155.9839 | 3190.8677 | 186.3189 | 1002.1134 | 1581.6499 | 43.4703 | 21.0062 |
| | 1 | MIN | -37.1671 | -2155.9839 | -3190.8677 | -186.3189 | -1002.1134 | -1581.6499 | -43.4703 | -21.0062 |
| 28 | 1 | MAX | 94.1477 | 1351.0234 | 4406.3740 | 297.1165 | 963.3462 | 3687.8645 | 45.9568 | 37.8147 |
| | 1 | MIN | -94.1477 | -1351.0234 | -4406.3740 | -297.1165 | -963.3462 | -3687.8645 | -45.9568 | -37.8147 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 249.4030 | 3344.0308 | 2865.8228 |
| | 1 | MIN | -249.4030 | -3344.0308 | -2865.8228 |
| 2 | 1 | MAX | 54.6928 | 2485.5928 | 2525.3647 |
| | 1 | MIN | -54.6928 | -2485.5928 | -2525.3647 |
| 3 | 1 | MAX | 54.2622 | 2586.5117 | 2617.1772 |
| | 1 | MIN | -54.2622 | -2586.5117 | -2617.1772 |
| 4 | 1 | MAX | 81.6601 | 2957.7395 | 3234.7288 |
| | 1 | MIN | -81.6601 | -2957.7395 | -3234.7288 |
| 5 | 1 | MAX | 44.5769 | 2586.2813 | 2571.7361 |
| | 1 | MIN | -44.5769 | -2586.2813 | -2571.7361 |
| 6 | 1 | MAX | 78.9115 | 3521.5073 | 3645.3413 |
| | 1 | MIN | -78.9115 | -3521.5073 | -3645.3413 |
| 7 | 1 | MAX | 108.6672 | 4742.3906 | 3572.6155 |
| | 1 | MIN | -108.6672 | -4742.3906 | -3572.6155 |
| 8 | 1 | MAX | 143.6314 | 3597.0679 | 3939.7271 |
| | 1 | MIN | -143.6314 | -3597.0679 | -3939.7271 |
| 9 | 1 | MAX | 148.5756 | 3211.1799 | 3405.8486 |
| | 1 | MIN | -148.5756 | -3211.1799 | -3405.8486 |
| 10 | 1 | MAX | 115.5135 | 3633.6721 | 3774.4333 |
| | 1 | MIN | -115.5135 | -3633.6721 | -3774.4333 |
| 11 | 1 | MAX | 78.8522 | 3988.4897 | 3861.5002 |
| | 1 | MIN | -78.8522 | -3988.4897 | -3861.5002 |
| 12 | 1 | MAX | 82.8089 | 3785.9187 | 3615.1284 |
| | 1 | MIN | -82.8089 | -3785.9187 | -3615.1284 |
| 13 | 1 | MAX | 104.2521 | 3206.1194 | 2413.1873 |
| | 1 | MIN | -104.2521 | -3206.1194 | -2413.1873 |
| 14 | 1 | MAX | 202.9785 | 3190.3552 | 3236.5461 |
| | 1 | MIN | -202.9785 | -3190.3552 | -3236.5461 |
| 15 | 1 | MAX | 81.0417 | 3465.3921 | 3517.7842 |
| | 1 | MIN | -81.0417 | -3465.3921 | -3517.7842 |
| 16 | 1 | MAX | 51.3041 | 3513.4780 | 3452.9314 |
| | 1 | MIN | -51.3041 | -3513.4780 | -3452.9314 |
| 17 | 1 | MAX | 60.5119 | 3421.6567 | 3461.5188 |
| | 1 | MIN | -60.5119 | -3421.6567 | -3461.5188 |
| 18 | 1 | MAX | 51.2339 | 2749.1633 | 2755.2859 |
| | 1 | MIN | -51.2339 | -2749.1633 | -2755.2859 |
| 19 | 1 | MAX | 172.0992 | 3298.4895 | 3208.5107 |
| | 1 | MIN | -172.0992 | -3298.4895 | -3208.5107 |
| 20 | 1 | MAX | 84.2962 | 2428.9980 | 2437.2234 |
| | 1 | MIN | -84.2962 | -2428.9980 | -2437.2234 |
| 21 | 1 | MAX | 74.1919 | 4399.3794 | 4402.2490 |
| | 1 | MIN | -74.1919 | -4399.3794 | -4402.2490 |
| 22 | 1 | MAX | 77.5491 | 3922.3855 | 4054.0017 |
| | 1 | MIN | -77.5491 | -3922.3855 | -4054.0017 |
| 23 | 1 | MAX | 34.0238 | 3189.7903 | 3207.3420 |
| | 1 | MIN | -34.0238 | -3189.7903 | -3207.3420 |
| 24 | 1 | MAX | 35.2693 | 3018.8208 | 3043.9028 |
| | 1 | MIN | -35.2693 | -3018.8208 | -3043.9028 |
| 25 | 1 | MAX | 76.4073 | 3549.7737 | 3579.4309 |

| | | | | | |
|---|---|---|---|---|---|
| | 1 | MIN | -76.4073 | -3549.7737 | -3579.4309 |
| 26 | 1 | MAX | 83.9827 | 1705.5425 | 1711.1334 |
| | 1 | MIN | -83.9827 | -1705.5425 | -1711.1334 |
| 27 | 1 | MAX | 204.0952 | 3275.5935 | 3324.9812 |
| | 1 | MIN | -204.0952 | -3275.5935 | -3324.9812 |
| 28 | 1 | MAX | 57.5715 | 3512.1895 | 3505.1768 |
| | 1 | MIN | -57.5715 | -3512.1895 | -3505.1768 |
| 29 | 1 | MAX | 58.8300 | 3504.3743 | 3503.8066 |
| | 1 | MIN | -58.8300 | -3504.3743 | -3503.8066 |
| 30 | 1 | MAX | 61.9436 | 3500.4434 | 3500.6135 |
| | 1 | MIN | -61.9436 | -3500.4434 | -3500.6135 |
| 31 | 1 | MAX | 61.4767 | 3508.2043 | 3516.0969 |
| | 1 | MIN | -61.4767 | -3508.2043 | -3516.0969 |
| 32 | 1 | MAX | 178.9155 | 3325.8635 | 3275.6292 |
| | 1 | MIN | -178.9155 | -3325.8635 | -3275.6292 |
| 33 | 1 | MAX | 138.3543 | 3528.3772 | 4693.4224 |
| | 1 | MIN | -138.3543 | -3528.3772 | -4693.4224 |
| 34 | 1 | MAX | 129.9458 | 3920.2236 | 3576.3906 |
| | 1 | MIN | -129.9458 | -3920.2236 | -3576.3906 |
| 35 | 1 | MAX | 111.2991 | 3643.0972 | 3279.6731 |
| | 1 | MIN | -111.2991 | -3643.0972 | -3279.6731 |
| 36 | 1 | MAX | 112.7435 | 3526.9009 | 3140.0598 |
| | 1 | MIN | -112.7435 | -3526.9009 | -3140.0598 |
| 37 | 1 | MAX | 111.2087 | 3359.6506 | 2992.8967 |
| | 1 | MIN | -111.2087 | -3359.6506 | -2992.8967 |
| 38 | 1 | MAX | 130.3772 | 3150.9749 | 2871.1758 |
| | 1 | MIN | -130.3772 | -3150.9749 | -2871.1758 |
| 39 | 1 | MAX | 138.2659 | 2394.3406 | 3172.5955 |
| | 1 | MIN | -138.2659 | -2394.3406 | -3172.5955 |
| 40 | 1 | MAX | 249.9274 | 3694.7761 | 3157.0652 |
| | 1 | MIN | -249.9274 | -3694.7761 | -3157.0652 |
| 41 | 1 | MAX | 58.3831 | 2747.8259 | 2795.0181 |
| | 1 | MIN | -58.3831 | -2747.8259 | -2795.0181 |
| 42 | 1 | MAX | 52.7853 | 2832.2808 | 2827.1165 |
| | 1 | MIN | -52.7853 | -2832.2808 | -2827.1165 |
| 43 | 1 | MAX | 52.3023 | 2827.2385 | 2832.2368 |
| | 1 | MIN | -52.3023 | -2827.2385 | -2832.2368 |
| 44 | 1 | MAX | 56.3919 | 2798.6833 | 2748.8027 |
| | 1 | MIN | -56.3919 | -2798.6833 | -2748.8027 |
| 45 | 1 | MAX | 137.4427 | 3174.8494 | 3713.0234 |
| | 1 | MIN | -137.4427 | -3174.8494 | -3713.0234 |

MEMBER FORCES ..... FRAME ID F RAME 1 L OCAT FRAME TYPE 1

LEVEL NO 2 ... LEVEL ID

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 | 142.2906 | 1658.3032 | 2021.6929 | 294.6620 | 2600.3848 | 2664.2676 | 29.8695 | 41.5473 |
| | 1 | MIN | -142.2906 | -1658.3032 | -2021.6929 | -294.6620 | -2600.3848 | -2664.2676 | -29.8695 | -41.5473 |
| 2 | 1 | MAX | 56.1727 | 2891.0933 | 3089.6699 | 199.8299 | 1824.6326 | 1881.3312 | 48.6241 | 30.0168 |
| | 1 | MIN | -56.1727 | -2891.0933 | -3089.6699 | -199.8299 | -1824.6326 | -1881.3312 | -48.6241 | -30.0168 |
| 3 | 1 | MAX | 56.1727 | 2735.8232 | 2930.4038 | 200.2973 | 1695.2843 | 1807.0782 | 46.0669 | 28.4745 |
| | 1 | MIN | -56.1727 | -2735.8232 | -2930.4038 | -200.2973 | -1695.2843 | -1807.0782 | -46.0669 | -28.4745 |
| 4 | 1 | MAX | 56.1727 | 2805.3999 | 2907.4028 | 191.7336 | 1527.9084 | 1486.8330 | 46.4455 | 24.5101 |
| | 1 | MIN | -56.1727 | -2805.3999 | -2907.4028 | -191.7336 | -1527.9084 | -1486.8330 | -46.4455 | -24.5101 |
| 5 | 1 | MAX | 142.2906 | 2805.1736 | 3087.8638 | 207.3650 | 1903.0852 | 2164.3232 | 47.9109 | 33.0393 |
| | 1 | MIN | -142.2906 | -2805.1736 | -3087.8638 | -207.3650 | -1903.0852 | -2164.3232 | -47.9109 | -33.0393 |
| 6 | 1 | MAX | 142.2906 | 2959.2112 | 3238.4673 | 190.1634 | 1782.4370 | 2051.0195 | 50.3876 | 30.8976 |
| | 1 | MIN | -142.2906 | -2959.2112 | -3238.4673 | -190.1634 | -1782.4370 | -2051.0195 | -50.3876 | -30.8976 |
| 7 | 1 | MAX | 142.2906 | 1804.7036 | 2196.2021 | 219.8750 | 1610.8267 | 1913.2593 | 32.5277 | 28.2417 |
| | 1 | MIN | -142.2906 | -1804.7036 | -2196.2021 | -219.8750 | -1610.8267 | -1913.2593 | -32.5277 | -28.2417 |
| 8 | 1 | MAX | 56.1727 | 1605.6086 | 1827.4609 | 154.0992 | 3237.4624 | 3288.4668 | 27.9111 | 53.0563 |
| | 1 | MIN | -56.1727 | -1605.6086 | -1827.4609 | -154.0992 | -3237.4624 | -3288.4668 | -27.9111 | -53.0563 |
| 9 | 1 | MAX | 191.3888 | 3739.0876 | 4085.7998 | 26.3811 | 4752.8560 | 4795.5469 | 63.6170 | 76.2068 |
| | 1 | MIN | -191.3888 | -3739.0876 | -4085.7998 | -26.3811 | -4752.8560 | -4795.5469 | -63.6170 | -76.2068 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 1 | MAX | 177.5344 | 3975.5073 | 4381.8584 | 22.7412 | 3898.3882 | 4167.3359 | 67.9460 | 65.5749 |
| | 1 | MIN | -177.5344 | -3975.5073 | -4381.8584 | -22.7412 | -3898.3882 | -4167.3359 | -67.9460 | -65.5749 |
| 11 | 1 | MAX | 191.3888 | 3842.1689 | 4181.2280 | 10.8394 | 3726.5615 | 4090.8438 | 65.2309 | 63.5561 |
| | 1 | MIN | -191.3888 | -3842.1689 | -4181.2280 | -10.8394 | -3726.5615 | -4090.8438 | -65.2309 | -63.5561 |
| 12 | 1 | MAX | 191.3888 | 3408.8550 | 3751.0454 | 29.6323 | 3757.1040 | 4099.5352 | 58.2106 | 63.8751 |
| | 1 | MIN | -191.3888 | -3408.8550 | -3751.0454 | -29.6323 | -3757.1040 | -4099.5352 | -58.2106 | -63.8751 |
| 13 | 1 | MAX | 191.3888 | 3316.6360 | 3662.2729 | 18.1679 | 4039.0559 | 4375.4292 | 56.7391 | 68.2474 |
| | 1 | MIN | -191.3888 | -3316.6360 | -3662.2729 | -18.1679 | -4039.0559 | -4375.4292 | -56.7391 | -68.2474 |
| 14 | 1 | MAX | 56.1727 | 1616.5243 | 1841.9875 | 139.7222 | 2269.6921 | 2349.5764 | 28.1180 | 37.5153 |
| | 1 | MIN | -56.1727 | -1616.5243 | -1841.9875 | -139.7222 | -2269.6921 | -2349.5764 | -28.1180 | -37.5153 |
| 15 | 1 | MAX | 56.1727 | 1647.7618 | 1857.9709 | 153.0584 | 3210.6912 | 3265.6917 | 28.3669 | 52.6535 |
| | 1 | MIN | -56.1727 | -1647.7618 | -1857.9709 | -153.0584 | -3210.6912 | -3265.[illegible] | -28.3669 | -52.6535 |
| 16 | 1 | MAX | 191.3888 | 3792.7004 | 4135.4878 | 22.6338 | 4724.6489 | 4785.1084 | 64.4093 | 75.8651 |
| | 1 | MIN | -191.3888 | -3792.7004 | -4135.4878 | -22.6338 | -4724.6489 | -4785.1084 | -64.4093 | -75.8651 |
| 17 | 1 | MAX | 191.3888 | 3879.0083 | 4219.3540 | 28.7697 | 4210.2427 | 4460.6328 | 65.8403 | 70.4949 |
| | 1 | MIN | -191.3888 | -3879.0083 | -4219.3540 | -28.7697 | -4210.2427 | -4460.6328 | -65.8403 | -70.4949 |
| 18 | 1 | MAX | 191.3888 | 3883.7590 | 4224.7500 | 3.8809 | 3680.1001 | 3960.3994 | 65.9228 | 62.1179 |
| | 1 | MIN | -191.3888 | -3883.7590 | -4224.7500 | -3.8809 | -3680.1001 | -3960.3994 | -65.9228 | -62.1179 |
| 19 | 1 | MAX | 191.3888 | 3882.8821 | 4223.4136 | 5.6390 | 3505.5840 | 3817.8999 | 65.9048 | 59.5405 |
| | 1 | MIN | -191.3888 | -3882.8821 | -4223.4136 | -5.6390 | -3505.5840 | -3817.8999 | -65.9048 | -59.5405 |
| 20 | 1 | MAX | 191.3888 | 3800.0581 | 4130.8008 | 19.5833 | 3800.9580 | 4114.3809 | 64.3368 | 64.1621 |
| | 1 | MIN | -191.3888 | -3800.0581 | -4130.8008 | -19.5833 | -3800.9580 | -4114.3809 | -64.3368 | -64.1621 |
| 21 | 1 | MAX | 56.1727 | 1658.0345 | 1858.7214 | 152.4532 | 2257.5120 | 2336.7952 | 28.3726 | 37.3170 |
| | 1 | MIN | -56.1727 | -1658.0345 | -1858.7214 | -152.4532 | -2257.5120 | -2336.7952 | -28.3726 | -37.3170 |
| 22 | 1 | MAX | 142.2906 | 1885.2341 | 2123.1631 | 246.7505 | 2563.5049 | 2627.2744 | 32.2893 | 40.9997 |
| | 1 | MIN | -142.2906 | -1885.2341 | -2123.1631 | -246.7505 | -2563.5049 | -2627.2744 | -32.2893 | -40.9997 |
| 23 | 1 | MAX | 56.1727 | 3158.2095 | 3326.3545 | 201.2463 | 1814.3341 | 1889.4198 | 52.6301 | 29.8727 |
| | 1 | MIN | -56.1727 | -3158.2095 | -3326.3545 | -201.2463 | -1814.3341 | -1889.4198 | -52.6301 | -29.8727 |
| 24 | 1 | MAX | 56.1727 | 3023.2410 | 3169.8655 | 196.3856 | 1741.0988 | 1872.2490 | 50.2075 | 29.3768 |
| | 1 | MIN | -56.1727 | -3023.2410 | -3169.8655 | -196.3856 | -1741.0988 | -1872.2490 | -50.2075 | -29.3768 |
| 25 | 1 | MAX | 56.1727 | 3032.2791 | 3182.9358 | 185.7559 | 1674.9229 | 1808.9227 | 50.4015 | 28.3239 |
| | 1 | MIN | -56.1727 | -3032.2791 | -3182.9358 | -185.7559 | -1674.9229 | -1808.9227 | -50.4015 | -28.3239 |
| 26 | 1 | MAX | 56.1727 | 3027.6135 | 3172.7751 | 176.1627 | 1601.6174 | 1735.0878 | 50.2644 | 27.1277 |
| | 1 | MIN | -56.1727 | -3027.6135 | -3172.7751 | -176.1627 | -1601.6174 | -1735.0878 | -50.2644 | -27.1277 |
| 27 | 1 | MAX | 56.1727 | 3166.4097 | 3325.1665 | 162.5540 | 1484.8125 | 1609.2052 | 52.7771 | 25.1174 |
| | 1 | MIN | -56.1727 | -3166.4097 | -3325.1665 | -162.5540 | -1484.8125 | -1609.2052 | -52.7771 | -25.1174 |
| 28 | 1 | MAX | 142.2906 | 1881.7717 | 2114.6904 | 267.0108 | 1649.5930 | 1959.4063 | 32.3157 | 28.9591 |
| | 1 | MIN | -142.2906 | -1881.7717 | -2114.6904 | -267.0108 | -1649.5930 | -1959.4063 | -32.3157 | -28.9591 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 229.1980 | 3772.0181 | 3291.7744 |
| | 1 | MIN | -229.1980 | -3772.0181 | -3291.7744 |
| 2 | 1 | MAX | 62.0560 | 2992.7524 | 3029.3887 |
| | 1 | MIN | -62.0560 | -2992.7524 | -3029.3887 |
| 3 | 1 | MAX | 67.7198 | 2992.3494 | 2950.3699 |
| | 1 | MIN | -67.7198 | -2992.3494 | -2950.3699 |
| 4 | 1 | MAX | 129.7722 | 3246.6750 | 3564.4124 |
| | 1 | MIN | -129.7722 | -3246.6750 | -3564.4124 |
| 5 | 1 | MAX | 44.4156 | 2886.2107 | 2870.5857 |
| | 1 | MIN | -44.4156 | -2886.2107 | -2870.5857 |
| 6 | 1 | MAX | 82.0718 | 3866.7837 | 4038.5767 |
| | 1 | MIN | -82.0718 | -3866.7837 | -4038.5767 |
| 7 | 1 | MAX | 109.6167 | 4975.4741 | 3850.0625 |
| | 1 | MIN | -109.6167 | -4975.4741 | -3850.0625 |
| 8 | 1 | MAX | 125.6276 | 3824.5503 | 4061.4131 |
| | 1 | MIN | -125.6276 | -3824.5503 | -4061.4131 |
| 9 | 1 | MAX | 129.2792 | 3541.9011 | 3698.6016 |
| | 1 | MIN | -129.2792 | -3541.9011 | -3698.6016 |
| 10 | 1 | MAX | 122.1807 | 3487.4133 | 3804.5718 |
| | 1 | MIN | -122.1807 | -3487.4133 | -3804.5718 |
| 11 | 1 | MAX | 76.6511 | 4241.4053 | 4109.9604 |
| | 1 | MIN | -76.6511 | -4241.4053 | -4109.9604 |
| 12 | 1 | MAX | 80.9703 | 4075.1694 | 3891.9719 |
| | 1 | MIN | -80.9703 | -4075.1694 | -3891.9719 |
| 13 | 1 | MAX | 106.2854 | 3579.8809 | 2752.6924 |
| | 1 | MIN | -106.2854 | -3579.8809 | -27[illegible]2.6924 |

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| | | | | | |
|---|---|---|---|---|---|
| 14 | 1 | MAX | 190.1197 | 3549.3411 | 3536.9153 |
| | 1 | MIN | -190.1197 | -3549.3411 | -3536.9153 |
| 15 | 1 | MAX | 75.9540 | 3780.4299 | 3824.3423 |
| | 1 | MIN | -75.9540 | -3780.4299 | -3824.3423 |
| 16 | 1 | MAX | 54.9509 | 3821.2178 | 3766.9226 |
| | 1 | MIN | -54.9509 | -3821.2178 | -3766.9226 |
| 17 | 1 | MAX | 63.8786 | 3738.9495 | 3779.7231 |
| | 1 | MIN | -63.8786 | -3738.9495 | -3779.7231 |
| 18 | 1 | MAX | 54.8307 | 3015.5242 | 3022.4197 |
| | 1 | MIN | -54.8307 | -3015.5242 | -3022.4197 |
| 19 | 1 | MAX | 170.5765 | 3586.7485 | 3558.2969 |
| | 1 | MIN | -170.5765 | -3586.7485 | -3558.2969 |
| 20 | 1 | MAX | 89.8799 | 2935.7690 | 2953.4170 |
| | 1 | MIN | -89.8799 | -2935.7690 | -2953.4170 |
| 21 | 1 | MAX | 75.3132 | 4569.4771 | 4570.9370 |
| | 1 | MIN | -75.3132 | -4569.4771 | -4570.9370 |
| 22 | 1 | MAX | 76.4758 | 4247.6138 | 4339.2964 |
| | 1 | MIN | -76.4758 | -4247.6138 | -4339.2964 |
| 23 | 1 | MAX | 34.0547 | 3468.0942 | 3464.6948 |
| | 1 | MIN | -34.0547 | -3468.0942 | -3464.6948 |
| 24 | 1 | MAX | 35.2215 | 3295.2043 | 3312.7742 |
| | 1 | MIN | -35.2215 | -3295.2043 | -3312.7742 |
| 25 | 1 | MAX | 76.5932 | 3901.8381 | 3924.7578 |
| | 1 | MIN | -76.5932 | -3901.8381 | -3924.7578 |
| 26 | 1 | MAX | 88.5640 | 2212.4116 | 2216.3862 |
| | 1 | MIN | -88.5640 | -2212.4116 | -2216.3862 |
| 27 | 1 | MAX | 191.3507 | 3624.9548 | 3612.7141 |
| | 1 | MIN | -191.3507 | -3624.9548 | -3612.7141 |
| 28 | 1 | MAX | 58.9131 | 3837.2739 | 3827.8496 |
| | 1 | MIN | -58.9131 | -3837.2739 | -3827.8496 |
| 29 | 1 | MAX | 59.2399 | 3831.4482 | 3831.0684 |
| | 1 | MIN | -59.2399 | -3831.4482 | -3831.0684 |
| 30 | 1 | MAX | 62.3541 | 3824.8203 | 3824.8567 |
| | 1 | MIN | -62.3541 | -3824.8203 | -3824.8567 |
| 31 | 1 | MAX | 65.1969 | 3833.8882 | 3844.0061 |
| | 1 | MIN | -65.1969 | -3833.8882 | -3844.0061 |
| 32 | 1 | MAX | 175.4253 | 3615.0129 | 3627.1101 |
| | 1 | MIN | -175.4253 | -3615.0129 | -3627.1101 |
| 33 | 1 | MAX | 140.7469 | 3754.8684 | 4870.6240 |
| | 1 | MIN | -140.7469 | -3754.8684 | -4870.6240 |
| 34 | 1 | MAX | 109.0518 | 4053.7178 | 3816.7939 |
| | 1 | MIN | -109.0518 | -4053.7178 | -3816.7939 |
| 35 | 1 | MAX | 96.3743 | 3883.0955 | 3625.1035 |
| | 1 | MIN | -96.3743 | -3883.0955 | -3625.1035 |
| 36 | 1 | MAX | 96.3442 | 3784.1211 | 3497.0784 |
| | 1 | MIN | -96.3442 | -3784.1211 | -3497.0784 |
| 37 | 1 | MAX | 96.8486 | 3648.2114 | 3370.1333 |
| | 1 | MIN | -96.8486 | -3648.2114 | -3370.1333 |
| 38 | 1 | MAX | 108.0263 | 3448.4883 | 3244.8362 |
| | 1 | MIN | -108.0263 | -3448.4883 | -3244.8362 |
| 39 | 1 | MAX | 143.6313 | 2735.6750 | 3554.0046 |
| | 1 | MIN | -143.6313 | -2735.6750 | -3554.0045 |
| 40 | 1 | MAX | 229.3925 | 4065.6443 | 3547.6235 |
| | 1 | MIN | -229.3925 | -4065.6443 | -3547.6235 |
| 41 | 1 | MAX | 65.7346 | 3270.7795 | 3296.0967 |
| | 1 | MIN | -65.7346 | -3270.7795 | -3296.0967 |
| 42 | 1 | MAX | 60.0357 | 3307.1030 | 3306.7732 |
| | 1 | MIN | -60.0357 | -3307.1030 | -3306.7732 |
| 43 | 1 | MAX | 59.9143 | 3305.1333 | 3303.7566 |
| | 1 | MIN | -59.9143 | -3305.1333 | -3303.7566 |
| 44 | 1 | MAX | 62.8171 | 3306.4246 | 3286.0757 |
| | 1 | MIN | -62.8171 | -3306.4246 | -3286.0757 |
| 45 | 1 | MAX | 133.5737 | 3557.4368 | 4077.5154 |
| | 1 | MIN | -133.5737 | -3557.4368 | -4077.5154 |

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OUTPUT FOR CASE STUDY #2

MEMBFR FORCES ..... FRAME ID     F RAME  1 L OCAT          FRAME TYPE  1

LEVEL NO  3   ...   LEVE. ID

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 | 146.2077 | 1956.4485 | 1932.9634 | 249.1122 | 2748.5483 | 3172.0273 | 31.4066 | 44.5043 |
| | 1 | MIN | -146.2077 | -1956.4485 | -1932.9634 | -249.1122 | -2748.5483 | -3172.0273 | -31.4066 | -44.5043 |
| 2 | 1 | MAX | 57.7191 | 2964.0745 | 2982.5095 | 171.1200 | 1862.4192 | 1820.1161 | 48.3462 | 29.9393 |
| | : | MIN | -57.7191 | -2964.0745 | -2982.5095 | -171.1200 | -1862.4192 | -1820.1161 | -48.3462 | -29.9393 |
| 3 | 1 | MAX | 57.7191 | 2849.1975 | 2850.6421 | 172.1930 | 1702.2511 | 1678.9120 | 46.3402 | 27.4891 |
| | 1 | MIN | -57.7191 | -2849.1975 | -2850.6421 | -172.1930 | -1702.2511 | -1678.9120 | -46.3402 | -27.4891 |
| 4 | 1 | MAX | 57.7191 | 2953.4636 | 2987.3149 | 162.8062 | 1674.6465 | 1682.0414 | 48.2990 | 27.2901 |
| | 1 | MIN | -57.7191 | -2953.4636 | -2987.3149 | -162.8062 | -1674.6465 | -1682.0414 | -48.2990 | -27.2901 |
| 5 | 1 | MAX | 146.2077 | 3282.2939 | 3206.8408 | 170.6651 | 2358.5569 | 2425.5874 | 52.6591 | 37.1089 |
| | 1 | MIN | -146.2077 | -3282.2939 | -3206.8408 | -170.6651 | -2358.5569 | -2425.5874 | -52.6591 | -37.1089 |
| 6 | 1 | MAX | 146.2077 | 3405.2544 | 3334.4048 | 153.1593 | 2226.0444 | 2328.0903 | 54.7940 | 35.8884 |
| | 1 | MIN | -146.2077 | -3405.2544 | -3334.4048 | -153.1593 | -2226.0444 | -2328.0903 | -54.7940 | -35.8884 |
| 7 | 1 | MAX | 146.2077 | 2052.9773 | 2046.6533 | 191.8948 | 1735.9031 | 1992.7598 | 33.1006 | 29.9848 |
| | 1 | MIN | -146.2077 | -2052.9773 | -2046.6533 | -191.8948 | -1735.9031 | -1992.7598 | -33.1006 | -29.9848 |
| 8 | 1 | MAX | 57.7191 | 1649.3832 | 1692.8728 | 134.1147 | 3243.8760 | 3290.5154 | 27.'728 | 53.1251 |
| | 1 | MIN | -57.7191 | -1649.3832 | -1692.8728 | -134.1147 | -3243.8760 | -3290.5154 | -27.,728 | -53.1251 |
| 9 | 1 | MAX | 146.2077 | 3292.0710 | 3269.1089 | 20.4467 | 4347.3594 | 4448.4390 | 53.3430 | 68.1663 |
| | 1 | MIN | -146.2077 | -3292.0710 | -3269.1089 | -20.4467 | -4347.3594 | -4448.4390 | -53.3430 | -68.1663 |
| 10 | 1 | MAX | 172.6089 | 3419.8813 | 3347.2153 | 16.6567 | 3736.7764 | 3625.9790 | 55.0170 | 59.4038 |
| | 1 | MIN | -172.6089 | -3419.8813 | -3347.2153 | -16.6567 | -3736.7764 | -3625.9790 | -55.0170 | -59.4038 |
| 11 | 1 | MAX | 146.2077 | 3373.9414 | 3352.0796 | 10.1357 | 3415.3984 | 3360.9795 | 54.6832 | 53.4469 |
| | 1 | MIN | -146.2077 | -3373.9414 | -3352.0796 | -10.1357 | -3415.3984 | -3360.9795 | -54.6832 | -53.4469 |
| 12 | 1 | MAX | 146.2077 | 3055.4153 | 3027.8022 | 21.0389 | 3479.1475 | 3493.6646 | 49.4571 | 54.6969 |
| | 1 | MIN | -146.2077 | -3055.4153 | -3027.8022 | -21.0389 | -3479.1475 | -3493.6646 | -49.4571 | -54.6969 |
| 13 | 1 | MAX | 146.2077 | 2978.6626 | 2953.0522 | 15.9444 | 3683.7666 | 3767.1909 | 48.2254 | 59.7342 |
| | 1 | MIN | -146.2077 | -2978.6626 | -2953.0522 | -15.9444 | -3683.7666 | -3767.1909 | -48.2254 | -59.7342 |
| 14 | 1 | MAX | 57.7191 | 1651.7037 | 1697.3535 | 114.8672 | 2366.6143 | 2456.6250 | 27.2281 | 39.2133 |
| | 1 | MIN | -57.7191 | -1651.7037 | -1697.3535 | -114.8672 | -2366.6143 | -2456.6250 | -27.2281 | -39.2133 |
| 15 | 1 | MAX | 57.7191 | 1674.5131 | 1739.0991 | 117.6532 | 3201.1384 | 3249.6340 | 27.7530 | 52.4453 |
| | 1 | MIN | -57.7191 | -1674.5131 | -1739.0991 | -117.6532 | -3201.1384 | -3249.6340 | -27.7530 | -52.4453 |
| 16 | 1 | MAX | 146.2077 | 3346.5608 | 3357.0923 | 17.3772 | 4320.7515 | 4447.9346 | 54.5012 | 67.7423 |
| | 1 | MIN | -146.2077 | -3346.5608 | -3357.0923 | -17.3772 | -4320.7515 | -4447.9346 | -54.5012 | -67.7423 |
| 17 | 1 | MAX | 146.2077 | 3428.5452 | 3436.4004 | 23.8218 | 3803.3152 | 3796.0015 | 55.8126 | 59.7220 |
| | 1 | MIN | -146.2077 | -3428.5452 | -3436.4004 | -23.8218 | -3803.3152 | -3796.0015 | -55.8126 | -59.7220 |
| 18 | 1 | MAX | 146.2077 | 3430.9648 | 3439.1372 | 4.9540 | 3396.7344 | 3358.2417 | 55.8545 | 53.3414 |
| | 1 | MIN | -146.2077 | -3430.9648 | -3439.1372 | -4.9540 | -3396.7344 | -3358.2417 | -55.8545 | 53.3414 |
| 19 | 1 | MAX | 146.2077 | 3428.5959 | 3437.7607 | 6.7049 | 3280.8335 | 3303.7515 | 55.8241 | 51.5971 |
| | 1 | MIN | -146.2077 | -3428.5959 | -3437.7607 | -6.7049 | -3280.8335 | -3303.7515 | -55.8241 | -51.5971 |
| 20 | 1 | MAX | 146.2077 | 3347.4492 | 3356.1958 | 14.8231 | 3492.1252 | 3584.3994 | 54.5012 | 56.6724 |
| | 1 | MIN | -146.2077 | -3347.4492 | -3356.1958 | -14.8231 | -3492.1252 | -3584.3994 | -54.5012 | -56.6724 |
| 21 | 1 | MAX | 57.7191 | 1676.8721 | 1739.9041 | 128.2196 | 2356.9417 | 2447.3931 | 27.7787 | 39.0596 |
| | 1 | MIN | -57.7191 | -1676.8721 | -1739.9041 | -128.2196 | -2356.9417 | -2447.3931 | -27.7787 | -39.0596 |
| 22 | 1 | MAX | 146.2077 | 2088.6899 | 2320.2866 | 225.7012 | 2693.2334 | 3180.5972 | 34.0454 | 43.6109 |
| | 1 | MIN | -146.2077 | -2088.6899 | -2320.2866 | -225.7012 | -2693.2334 | -3180.5972 | -34.0454 | -43.6109 |
| 23 | 1 | MAX | 57.7191 | 3225.6672 | 3310.6965 | 170.4969 | 1843.3805 | 1820.4991 | 52.9367 | 29.6404 |
| | 1 | MIN | -57.7191 | -3225.6672 | -3310.6965 | -170.4969 | -1843.3805 | -1820.4991 | -52.9367 | -29.6404 |
| 24 | 1 | MAX | 57.7191 | 3143.6011 | 3264.9714 | 166.9194 | 1729.5140 | 1704.1423 | 51.5171 | 27.9159 |
| | 1 | MIN | -57.7191 | -3143.6011 | -3264.9714 | -166.9194 | -1729.5140 | -1704.1423 | -51.5171 | -27.9159 |
| 25 | 1 | MAX | 57.7191 | 3145.5256 | 3265.2368 | 157.2298 | 1674.8702 | 1654.2770 | 51.5463 | 27.0662 |
| | 1 | MIN | -57.7191 | -3145.5256 | -3265.2368 | -157.2298 | -1674.8702 | -1654.2770 | -51.5463 | -27.0662 |
| 26 | 1 | MAX | 57.7191 | 3141.5784 | 3268.6262 | 146.7174 | 1618.1818 | 1630.6547 | 51.5190 | 2:.'793 |
| | 1 | MIN | -57.7191 | -3141.5784 | -3268.6262 | -146.7174 | -1618.1818 | -1630.6547 | -51.5190 | -26.1793 |
| 27 | 1 | MAX | 57.7191 | 3292.3970 | 3381.3738 | 132.9351 | 1518.6025 | 1570.7178 | 53.7136 | 25.0075 |
| | 1 | MIN | -57.7191 | -3292.3970 | -3381.3738 | -132.9351 | -1518.6025 | -1570.7178 | -53.7136 | -25.0075 |
| 28 | 1 | MAX | 146.2077 | 2200.9941 | 2396.6289 | 225.7128 | 1764.7593 | 2029.8564 | 35.0490 | 30.5826 |
| | 1 | MIN | -146.2077 | -2200.9941 | -2396.6289 | -225.7128 | -1764.7593 | -2029.8564 | -35.0490 | -30.5826 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 209.1411 | 3412.3125 | 2998.9836 |
| | 1 | MIN | -209.1411 | -3412.3125 | -2998.9836 |
| 2 | 1 | MAX | 52.3894 | 2890.1619 | 2902.7236 |
| | 1 | MIN | -52.3894 | -2890.1619 | -2902.7236 |

| | | | | | |
|---|---|---|---|---|---|
| 3 | 1 | MAX | 50.7290 | 2865.2039 | 2848.4329 |
| | 1 | MIN | -50.7290 | -2865.2039 | -2848.4329 |
| 4 | 1 | MAX | 94.8361 | 3130.4844 | 3362.4673 |
| | 1 | MIN | -94.8361 | -3130.4844 | -3362.4673 |
| 5 | 1 | MAX | 33.5451 | 2586.7854 | 2581.9231 |
| | 1 | MIN | -33.5451 | -2586.7854 | -2581.9231 |
| 6 | 1 | MAX | 70.5950 | 3472.2056 | 3655.4978 |
| | 1 | MIN | -70.5950 | -3472.2056 | -3655.4978 |
| 7 | 1 | MAX | 69.5007 | 4503.4082 | 3541.9055 |
| | 1 | MIN | -69.5007 | -4503.4082 | -3541.9055 |
| 8 | 1 | MAX | 134.6584 | 3864.2068 | 4060.4946 |
| | 1 | MIN | -134.6584 | -3864.2068 | -4060.4946 |
| 9 | 1 | MAX | 136.9990 | 3369.0767 | 3474.1042 |
| | 1 | MIN | -136.9990 | -3369.0767 | -3474.1042 |
| 10 | 1 | MAX | 128.1462 | 3442.4512 | 3656.8870 |
| | 1 | MIN | -128.1462 | -3442.4512 | -3656.8870 |
| 11 | 1 | MAX | 88.3678 | 4209.8120 | 4049.5261 |
| | 1 | MIN | -88.3678 | -4209.8120 | -4049.5261 |
| 12 | 1 | MAX | 94.5981 | 4153.4961 | 3940.9814 |
| | 1 | MIN | -94.5981 | -4153.4961 | -3940.9814 |
| 13 | 1 | MAX | 68.2778 | 3390.1367 | 2679.3318 |
| | 1 | MIN | -68.2778 | -3390.1367 | -2679.3318 |
| 14 | 1 | MAX | 121.8885 | 3103.6917 | 3056.6804 |
| | 1 | MIN | -121.8885 | -3103.6917 | -3056.6804 |
| 15 | 1 | MAX | 57.3012 | 3266.7349 | 3291.9080 |
| | 1 | MIN | -57.3012 | -3266.7349 | -3291.9080 |
| 16 | 1 | MAX | 42.1942 | 3292.0847 | 3258.0342 |
| | 1 | MIN | -42.1942 | -3292.0847 | -3258.0342 |
| 17 | 1 | MAX | 52.6691 | 3245.7092 | 3280.0715 |
| | 1 | MIN | -52.6691 | -3245.7092 | -3280.0715 |
| 18 | 1 | MAX | 42.8495 | 2627.3247 | 2636.7415 |
| | 1 | MIN | -42.8495 | -2627.3247 | -2636.7415 |
| 19 | 1 | MAX | 113.0368 | 3088.4534 | 3101.3120 |
| | 1 | MIN | -113.0368 | -3088.4534 | -3101.3120 |
| 20 | 1 | MAX | 69.8715 | 3007.6838 | 3005.4497 |
| | 1 | MIN | -69.8715 | -3007.6838 | -3005.4497 |
| 21 | 1 | MAX | 78.5655 | 4652.3691 | 4652.7197 |
| | 1 | MIN | -78.5655 | -4652.3691 | -4652.7197 |
| 22 | 1 | MAX | 67.0153 | 4164.3267 | 4236.7026 |
| | 1 | MIN | -67.0153 | -4164.3267 | -4236.7026 |
| 23 | 1 | MAX | 34.7884 | 3477.9260 | 3482.2905 |
| | 1 | MIN | -34.7884 | -3477.9260 | -3482.2905 |
| 24 | 1 | MAX | 32.1977 | 3374.7661 | 3399.0413 |
| | 1 | MIN | -32.1977 | -3374.7661 | -3399.0413 |
| 25 | 1 | MAX | 68.7824 | 4075.4050 | 4104.9053 |
| | 1 | MIN | -68.7824 | -4075.4050 | -4104.9053 |
| 26 | 1 | MAX | 65.5807 | 2376.8516 | 2380.3286 |
| | 1 | MIN | -65.5807 | -2376.8516 | -2380.3286 |
| 27 | 1 | MAX | 122.2211 | 3195.4094 | 3146.7300 |
| | 1 | MIN | -122.2211 | -3195.4094 | -3146.7300 |
| 28 | 1 | MAX | 46.1371 | 3381.7422 | 3367.0476 |
| | 1 | MIN | -46.1371 | -3381.7422 | -3367.0476 |
| 29 | 1 | MAX | 43.8478 | 3390.3833 | 3391.3147 |
| | 1 | MIN | -43.8478 | -3390.3833 | -3391.3147 |
| 30 | 1 | MAX | 50.1178 | 3362.2644 | 3363.5063 |
| | 1 | MIN | -50.1178 | -3362.2644 | -3363.5063 |
| 31 | 1 | MAX | 53.4379 | 3368.8159 | 3377.6956 |
| | 1 | MIN | -53.4379 | -3368.8159 | -3377.6956 |
| 32 | 1 | MAX | 118.9407 | 3149.3408 | 3197.5188 |
| | 1 | MIN | -118.9407 | -3149.3408 | -3197.5188 |
| 33 | 1 | MAX | 101.9316 | 3556.7041 | 4519.4971 |
| | 1 | MIN | -101.9316 | -3556.7041 | -4519.4971 |
| 34 | 1 | MAX | 102.7289 | 4072.0442 | 3872.9221 |
| | 1 | MIN | -102.7289 | -4072.0442 | -3872.9221 |
| 35 | 1 | MAX | 93.7896 | 3631.3220 | 3436.4165 |
| | 1 | MIN | -93.7896 | -3631.3220 | -3436.4165 |

| | | | | | |
|---|---|---|---|---|---|
| 36 | 1 | MAX | 93.4186 | 3618.8357 | 3385.7141 |
| | 1 | MIN | -93.4186 | -3618.8357 | -3385.7141 |
| 37 | 1 | MAX | 92.9348 | 3587.9873 | 3359.0962 |
| | 1 | MIN | -92.9348 | -3587.9873 | -3359.0962 |
| 38 | 1 | MAX | 109.5751 | 3504.4387 | 3346.0718 |
| | 1 | MIN | -109.5751 | -3504.4387 | -3346.0718 |
| 39 | 1 | MAX | 96.2729 | 2663.2458 | 3365.4341 |
| | 1 | MIN | -96.2729 | -2663.2458 | -3365.4341 |
| 40 | 1 | MAX | 209.5505 | 3947.1025 | 3457.4055 |
| | 1 | MIN | -209.5505 | -3947.1025 | -3457.4055 |
| 41 | 1 | MAX | 56.6408 | 3386.3550 | 3393.8904 |
| | 1 | MIN | -56.6408 | -3386.3550 | -3393.8904 |
| 42 | 1 | MAX | 51.0472 | 3395.4502 | 3395.1106 |
| | 1 | MIN | -51.0472 | -3395.4502 | -3395.1106 |
| 43 | 1 | MAX | 50.0761 | 3397.5232 | 3398.9163 |
| | 1 | MIN | -50.0761 | -3397.5232 | -3398.9163 |
| 44 | 1 | MAX | 50.7266 | 3388.2974 | 3344.0254 |
| | 1 | MIN | -50.7266 | -3388.2974 | -3344.0254 |
| 45 | 1 | MAX | 143.8351 | 3795.9084 | 4339.8530 |
| | 1 | MIN | -143.8351 | -3795.9084 | -4339.8530 |

MEMBER FORCES ..... FRAME ID F RAME 1 L OCAT FRAME TYPE 1

LEVEL NO 4 ... LEVEL ID

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 | 135.7873 | 1742.0203 | 1673.2715 | 197.8210 | 2528.6758 | 2626.5801 | 25.9279 | 41.4199 |
| | 1 | MIN | -135.7873 | -1742.0203 | -1673.2715 | -197.8210 | -2528.6758 | -2626.5801 | -25.9279 | -41.4199 |
| 2 | 1 | MAX | 53.6053 | 2791.8853 | 2825.9282 | 138.3190 | 1937.9519 | 1967.5487 | 45.6733 | 31.7521 |
| | 1 | MIN | -53.6053 | -2791.8853 | -2825.9282 | -138.3190 | -1937.9519 | -1967.5487 | -45.6733 | -31.7521 |
| 3 | 1 | MAX | 53.6053 | 2710.5225 | 2756.3613 | 139.4363 | 1718.2511 | 1757.4067 | 44.4462 | 28.1713 |
| | 1 | MIN | -53.6053 | -2710.5225 | -2756.3613 | -139.4363 | -1718.2511 | -1757.4067 | -44.4462 | -28.1713 |
| 4 | 1 | MAX | 53.6053 | 2856.4771 | 2868.9187 | 130.3550 | 1580.9030 | 1656.4104 | 46.5479 | 26.3196 |
| | 1 | MIN | -53.6053 | -2856.4771 | -2868.9187 | -130.3550 | -1580.9030 | -1656.4104 | -46.5479 | -26.3196 |
| 5 | 1 | MAX | 98.5853 | 2717.4297 | 2593.0327 | 133.7252 | 1872.2483 | 1951.5322 | 43.1745 | 31.0877 |
| | 1 | MIN | -98.5853 | -2717.4297 | -2593.0327 | -133.7252 | -1872.2483 | -1951.5322 | -43.1745 | 31.0877 |
| 6 | 1 | MAX | 98.5853 | 2764.0989 | 2636.9238 | 115.2685 | 1798.1177 | 1876.6699 | 43.9107 | 29.8764 |
| | 1 | MIN | -98.5853 | -2764.0989 | -2636.9238 | -115.2685 | -1798.1177 | -1876.6699 | -43.9107 | -29.8764 |
| 7 | 1 | MAX | 135.7873 | 1865.8254 | 1818.9912 | 159.4647 | 1571.9280 | 1663.2832 | 28.7119 | 25.1343 |
| | 1 | MIN | -135.7873 | -1865.8254 | -1818.9912 | -159.4647 | -1571.9280 | -1663.2832 | -28.7119 | -25.1343 |
| 8 | 1 | MAX | 53.6053 | 1428.1069 | 1399.4673 | 111.6129 | 3333.6763 | 3336.3750 | 21.9929 | 54.2281 |
| | 1 | MIN | -53.6053 | -1428.1069 | -1399.4673 | -111.6129 | -3333.6763 | -3336.3750 | -21.9929 | -54.2281 |
| 9 | 1 | MAX | 135.7873 | 3153.4104 | 3106.6904 | 13.5551 | 4947.9155 | 4903.5659 | 50.6375 | 79.5576 |
| | 1 | MIN | -135.7873 | -3153.4104 | -3106.6904 | -13.5551 | -4947.9155 | -4903.5659 | -50.6375 | -79.5576 |
| 10 | 1 | MAX | 160.3068 | 3382.2607 | 3319.1807 | 10.4381 | 3962.5198 | 4085.8921 | 54.2561 | 64.4267 |
| | 1 | MIN | -160.3068 | -3382.2607 | -3319.1807 | -10.4381 | -3962.5198 | -4085.8921 | -54.2561 | -64.4267 |
| 11 | 1 | MAX | 135.7873 | 3250.1133 | 3229.7637 | 10.0928 | 3645.9380 | 3748.1782 | 52.6820 | 59.8748 |
| | 1 | MIN | -135.7873 | -3250.1133 | -3229.7637 | -10.0928 | -3645.9380 | -3748.1782 | -52.6820 | -59.8748 |
| 12 | 1 | MAX | 135.7873 | 2961.2808 | 2913.2349 | 11.9989 | 3755.6882 | 3839.3828 | 47.4210 | 61.7486 |
| | 1 | MIN | -135.7873 | -2961.2808 | -2913.2349 | -11.9989 | -3755.6882 | -3839.3828 | -47.4210 | -61.7486 |
| 13 | 1 | MAX | 135.7873 | 2865.6160 | 2802.6138 | 14.5793 | 4165.9077 | 4186.3643 | 45.6259 | 67.9047 |
| | 1 | MIN | -135.7873 | -2865.6160 | -2802.6138 | -14.5793 | -4165.9077 | -4186.3643 | -45.6259 | -67.9047 |
| 14 | 1 | MAX | 53.6053 | 1427.7875 | 1408.8296 | 90.4364 | 2415.4453 | 2438.5432 | 22.1747 | 39.4633 |
| | 1 | MIN | -53.6053 | -1427.7875 | -1408.8296 | -90.4364 | -2415.4453 | -2438.5432 | -22.1747 | -39.4633 |
| 15 | 1 | MAX | 53.6053 | 1459.5532 | 1484.1270 | 85.8123 | 3339.2908 | 3342.0684 | 23.5345 | 54.3200 |
| | 1 | MIN | -53.6053 | -1459.5532 | -1484.1270 | -85.8123 | -3339.2908 | -3342.0684 | -23.5345 | -54.3200 |
| 16 | 1 | MAX | 135.7873 | 3316.1443 | 3277.0396 | 11.1997 | 4948.6567 | 4894.8877 | 53.6032 | 79.5568 |
| | 1 | MIN | -135.7873 | -3316.1443 | -3277.0396 | -11.1997 | -4948.6567 | -4894.8877 | -53.6032 | -79.5568 |
| 17 | 1 | MAX | 135.7873 | 3460.0881 | 3415.9990 | 17.6221 | 4236.0825 | 4334.9102 | 55.9032 | 68.2444 |
| | 1 | MIN | -135.7873 | -3460.0881 | -3415.9990 | -17.6221 | -4236.0825 | -4334.9102 | -55.9032 | -68.2444 |
| 18 | 1 | MAX | 135.7873 | 3450.4358 | 3406.9155 | 6.7389 | 3621.8115 | 3718.6831 | 55.7509 | 59.4156 |
| | 1 | MIN | -135.7873 | -3450.4358 | -3406.9155 | -6.7389 | -3621.8115 | -3718.6831 | -55.7509 | -59.4156 |
| 19 | 1 | MAX | 135.7873 | 3433.9333 | 3392.9136 | 7.7168 | 3532.9412 | 3613.3042 | 55.5029 | 58.0995 |
| | 1 | MIN | -135.7873 | -3433.9333 | -3392.9136 | -7.7168 | -3532.9412 | -3613.3042 | -55.5029 | -58.0995 |
| 20 | 1 | MAX | 135.7873 | 3355.1008 | 3312.0176 | 9.5497 | 3955.5017 | 3973.7500 | 54.2043 | 64.4655 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | MIN | -135.7873 | -3355.1008 | -3312.0176 | -9.5497 | -3955.5017 | -3973.7500 | -54.2043 | -64.4655 |
| 21 | 1 | MAX | 53.6053 | 1464.6024 | 1520.3826 | 105.1590 | 2405.2351 | 2428.8838 | 24.1414 | 39.3018 |
| | 1 | MIN | -53.6053 | -1464.6024 | -1520.3826 | -105.1590 | -2405.2351 | -2428.8838 | -24.1414 | -39.3018 |
| 22 | 1 | MAX | 135.7873 | 1869.3359 | 2057.4580 | 196.7046 | 2535.8325 | 2613.8682 | 31.8696 | 41.5414 |
| | 1 | MIN | -135.7873 | -1869.3359 | -2057.4580 | -196.7046 | -2535.8325 | -2613.8682 | -31.8696 | -41.5414 |
| 23 | 1 | MAX | 53.6053 | 3342.9102 | 3396.5415 | 138.6699 | 1942.9109 | 1972.9359 | 54.7923 | 31.8362 |
| | 1 | MIN | -53.6053 | -3342.9102 | -3396.5415 | -138.6699 | -1942.9109 | -1972.9359 | -54.7923 | -31.8362 |
| 24 | 1 | MAX | 53.6053 | 3313.0681 | 3364.8091 | 132.7991 | 1739.8539 | 1789.2501 | 54.2917 | 28.5636 |
| | 1 | MIN | -53.6053 | -3313.0681 | -3364.8091 | -132.7991 | -1739.8539 | -1789.2501 | -54.2917 | -28.5636 |
| 25 | 1 | MAX | 53.6053 | 3316.1475 | 3367.1536 | 124.8547 | 1601.3656 | 1681.6464 | 54.3358 | 26.6912 |
| | 1 | MIN | -53.6053 | -3316.1475 | -3367.1536 | -124.8547 | -1601.3656 | -1681.6464 | -54.3358 | -26.6912 |
| 26 | 1 | MAX | 53.6053 | 3308.5789 | 3360.2046 | 115.9136 | 1598.3613 | 1667.1257 | 54.2177 | 26.5487 |
| | 1 | MIN | -53.6053 | -3308.5789 | -3360.2046 | -115.9136 | -1598.3613 | -1667.1257 | -54.2177 | -26.5487 |
| 27 | 1 | MAX | 53.6053 | 3513.6558 | 3562.3208 | 103.9625 | 1529.5621 | 1596.8514 | 57.5282 | 25.4180 |
| | 1 | MIN | -53.6053 | -3513.6558 | -3562.3208 | -103.9625 | -1529.5621 | -1596.8514 | -57.5282 | -25.4180 |
| 28 | 1 | MAX | 135.7873 | 2096.0840 | 2283.0762 | 178.1348 | 1603.7551 | 1701.6055 | 35.6029 | 25.7385 |
| | 1 | MIN | -135.7873 | -2096.0840 | -2283.0762 | -178.1348 | -1603.7551 | -1701.6055 | -35.6029 | -25.7385 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 219.9478 | 3496.1895 | 3045.6892 |
| | 1 | MIN | -219.9478 | -3496.1895 | -3045.6892 |
| 2 | 1 | MAX | 50.0025 | 3033.6658 | 3050.8096 |
| | 1 | MIN | -50.0025 | -3033.6658 | -3050.8096 |
| 3 | 1 | MAX | 46.0920 | 2979.4575 | 2929.8989 |
| | 1 | MIN | -46.0920 | -2979.4575 | -2929.8989 |
| 4 | 1 | MAX | 74.8228 | 3175.5911 | 3332.6030 |
| | 1 | MIN | -74.8228 | -3175.5911 | -3332.6030 |
| 5 | 1 | MAX | 27.6624 | 2476.8728 | 2474.5955 |
| | 1 | MIN | -27.6624 | -2476.8728 | -2474.5955 |
| 6 | 1 | MAX | 68.5735 | 3328.5718 | 3618.5671 |
| | 1 | MIN | -68.5735 | -3328.5718 | -3618.5671 |
| 7 | 1 | MAX | 63.2299 | 4999.7749 | 3909.5632 |
| | 1 | MIN | -63.2299 | -4999.7749 | -3909.5632 |
| 8 | 1 | MAX | 124.6875 | 4264.6143 | 4348.4375 |
| | 1 | MIN | -124.6875 | -4264.6143 | -4348.4375 |
| 9 | 1 | MAX | 121.5614 | 3833.4541 | 3901.4041 |
| | 1 | MIN | -121.5614 | -3833.4541 | -3901.4041 |
| 10 | 1 | MAX | 118.9506 | 3642.6475 | 3779.3230 |
| | 1 | MIN | -118.9506 | -3642.6475 | -3779.3230 |
| 11 | 1 | MAX | 87.3449 | 4247.5435 | 4076.1475 |
| | 1 | MIN | -87.3449 | -4247.5435 | -4076.1475 |
| 12 | 1 | MAX | 97.3986 | 4170.4839 | 3919.7507 |
| | 1 | MIN | -97.3986 | -4170.4839 | -3919.7507 |
| 13 | 1 | MAX | 60.2183 | 3548.2563 | 2773.7085 |
| | 1 | MIN | -60.2183 | -3548.2563 | -2773.7085 |
| 14 | 1 | MAX | 119.7386 | 3059.0723 | 2952.3362 |
| | 1 | MIN | -119.7386 | -3059.0723 | -2952.3362 |
| 15 | 1 | MAX | 44.2912 | 3237.4292 | 3253.1440 |
| | 1 | MIN | -44.2912 | -3237.4292 | -3253.1440 |
| 16 | 1 | MAX | 36.5845 | 3254.7776 | 3224.2979 |
| | 1 | MIN | -36.5845 | -3254.7776 | -3224.2979 |
| 17 | 1 | MAX | 44.6517 | 3211.7380 | 3249.7944 |
| | 1 | MIN | -44.6517 | -3211.7380 | -3249.7944 |
| 18 | 1 | MAX | 42.8793 | 2629.8242 | 2639.1226 |
| | 1 | MIN | -42.8793 | -2629.8242 | -2639.1226 |
| 19 | 1 | MAX | 107.5391 | 3002.8296 | 3070.8181 |
| | 1 | MIN | -107.5391 | -3002.8296 | -3070.8181 |
| 20 | 1 | MAX | 65.2412 | 3502.6165 | 3507.0520 |
| | 1 | MIN | -65.2412 | -3502.6165 | -3507.0520 |
| 21 | 1 | MAX | 68.8258 | 5035.6753 | 5036.1680 |
| | 1 | MIN | -68.8258 | -5035.6753 | -5036.1680 |
| 22 | 1 | MAX | 59.8411 | 4637.6426 | 4661.8320 |
| | 1 | MIN | -59.8411 | -4637.6426 | -4661.8320 |
| 23 | 1 | MAX | 28.6050 | 3627.8184 | 3629.1301 |
| | 1 | MIN | -28.6050 | -3627.8184 | -3629.1301 |
| 24 | 1 | MAX | 28.8096 | 3463.4673 | 3486.6233 |

[redacted]



| | | | | | |
|---|---|---|---|---|---|
| | 1 | MIN | -28.8896 | -3463.4673 | -3486.6233 |
| 25 | 1 | MAX | 60.8497 | 4098.6704 | 4127.2085 |
| | 1 | MIN | -60.8497 | -4098.6704 | -4127.2085 |
| 26 | 1 | MAX | 56.1406 | 2489.6665 | 2493.8613 |
| | 1 | MIN | -56.1406 | -2489.6665 | -2493.8613 |
| 27 | 1 | MAX | 119.2743 | 3126.7734 | 3021.1062 |
| | 1 | MIN | -119.2743 | -3126.7734 | -3021.1062 |
| 28 | 1 | MAX | 37.9130 | 3332.1628 | 3315.7271 |
| | 1 | MIN | -37.9130 | -3332.1628 | -3315.7271 |
| 29 | 1 | MAX | 38.2677 | 3346.9072 | 3348.0376 |
| | 1 | MIN | -38.2677 | -3346.9072 | -3348.0376 |
| 30 | 1 | MAX | 40.4008 | 3311.8523 | 3313.9668 |
| | 1 | MIN | -40.4008 | -3311.8523 | -3313.9668 |
| 31 | 1 | MAX | 52.9128 | 3320.4934 | 3328.9211 |
| | 1 | MIN | -52.9128 | -3320.4934 | -3328.9211 |
| 32 | 1 | MAX | 113.0422 | 3104.3411 | 3206.6716 |
| | 1 | MIN | -113.0422 | -3104.3411 | -3206.6716 |
| 33 | 1 | MAX | 92.2180 | 3881.6941 | 4969.4219 |
| | 1 | MIN | -92.2180 | -3881.6941 | -4969.4219 |
| 34 | 1 | MAX | 87.3385 | 4341.0972 | 4258.3237 |
| | 1 | MIN | -87.3385 | -4341.0972 | -4258.3237 |
| 35 | 1 | MAX | 79.0352 | 3983.8193 | 3886.5205 |
| | 1 | MIN | -79.0352 | -3983.8193 | -3886.5205 |
| 36 | 1 | MAX | 78.2324 | 3751.4966 | 3606.7642 |
| | 1 | MIN | -78.2324 | -3751.4966 | -3606.7642 |
| 37 | 1 | MAX | 77.3893 | 3659.3708 | 3493.2712 |
| | 1 | MIN | -77.3893 | -3659.3708 | -3493.2712 |
| 38 | 1 | MAX | 93.1536 | 3528.1594 | 3457.5417 |
| | 1 | MIN | -93.1536 | -3528.1594 | -3457.5417 |
| 39 | 1 | MAX | 85.5783 | 2753.6790 | 3519.8269 |
| | 1 | MIN | -85.5783 | -2[illegible].6790 | -3519.8269 |
| 40 | 1 | MAX | 220.1129 | 4074.3262 | 3546.8479 |
| | 1 | MIN | -220.1129 | -4074.3262 | -3546.8479 |
| 41 | 1 | MAX | 51.7754 | 3517.2505 | 3523.4263 |
| | 1 | MIN | -51.7754 | -3517.2505 | -3523.4263 |
| 42 | 1 | MAX | 45.8690 | 3527.3511 | 3526.4834 |
| | 1 | MIN | -45.8690 | -3527.3511 | -3526.4834 |
| 43 | 1 | MAX | 47.1756 | 3529.2983 | 3531.1375 |
| | 1 | MIN | -47.1756 | -3529.2983 | -3531.1375 |
| 44 | 1 | MAX | 45.8026 | 3520.4194 | 3474.0181 |
| | 1 | MIN | -45.8026 | -3520.4194 | -3474.0181 |
| 45 | 1 | MAX | 141.9179 | 3907.5469 | 4493.2031 |
| | 1 | MIN | -141.9179 | -3907.5469 | -4493.2031 |

MEMBER FORCES .... FRAME ID F RAME 1 L OCAT FRAME TYPE 1

LEVEL NO 5 ... LEVEL ID

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 | 138.6134 | 1805.7783 | 2260.4854 | 148.3398 | 2671.8408 | 3117.1943 | 32.0693 | 47.0654 |
| | 1 | MIN | -138.6134 | -1805.7783 | -2260.4854 | -148.3398 | -2671.8408 | -3117.1943 | -32.0693 | -47.0654 |
| 2 | 1 | MAX | 54.7210 | 2969.4658 | 3278.2783 | 106.7984 | 1981.5580 | 2175.4514 | 50.7947 | 33.6504 |
| | 1 | MIN | -54.7210 | -2969.4658 | -3278.2783 | -106.7984 | -1981.5580 | -2175.4514 | -50.7947 | -33.6504 |
| 3 | 1 | MAX | 54.7210 | 2987.4255 | 3251.3472 | 107.1642 | 1834.3805 | 2040.0127 | 50.7217 | 31.4992 |
| | 1 | MIN | -54.7210 | -2987.4255 | -3251.3472 | -107.1642 | -1834.3805 | -2040.0127 | -50.7217 | -31.4992 |
| 4 | 1 | MAX | 54.7210 | 2666.1077 | 3187.1680 | 94.9360 | 1715.9137 | 1893.5526 | 47.5876 | 29.3453 |
| | 1 | MIN | -54.7210 | -2666.1077 | -3187.1680 | -94.9360 | -1715.9137 | -1893.5526 | -47.5876 | -29.3453 |
| 5 | 1 | MAX | 100.6372 | 2184.2231 | 3076.4209 | 93.3191 | 1926.3389 | 2318.0474 | 42.6786 | 33.8834 |
| | 1 | MIN | -100.6372 | -2184.2231 | -3076.4209 | -93.3191 | -1926.3389 | -2318.0474 | -42.6786 | -33.8834 |
| 6 | 1 | MAX | 100.6372 | 2188.6714 | 3080.6150 | 80.0938 | 1917.4390 | 2133.2949 | 42.6380 | 32.9328 |
| | 1 | MIN | -100.6372 | -2188.6714 | -3080.6150 | -80.0938 | -1917.4390 | -2133.2949 | -42.6380 | -32.9328 |
| 7 | 1 | MAX | 138.6134 | 1413.9712 | 2185.0830 | 118.2079 | 1942.4133 | 1909.7661 | 27.9101 | 31.3186 |
| | 1 | MIN | -138.6134 | -1413.9712 | -2185.0830 | -118.2079 | -1942.4133 | -1909.7661 | -27.9101 | -31.3186 |
| 8 | 1 | MAX | 54.7210 | 1477.8147 | 1696.7358 | 83.0975 | 3669.6863 | 3819.1331 | 25.4261 | 60.8847 |
| | 1 | MIN | -54.7210 | -1477.8147 | -1696.7358 | -83.0975 | -3669.6863 | -3819.1331 | -25.4261 | -60.8847 |

[redacted]

OUTPUT FOR CASE STUDY #2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 1 | MAX | 100.6372 | 2688.3606 | 3027.2358 | 8.3798 | 4152.0757 | 4567.6870 | 46.1784 | 70.4435 |
| | 1 | MIN | -100.6372 | -2688.3606 | -3027.2358 | -8.3798 | -4152.0757 | -4567.6870 | -46.1784 | -70.4435 |
| 10 | 1 | MAX | 100.6372 | 2934.0222 | 3131.4346 | 7.2769 | 3948.3557 | 4357.4829 | 49.3126 | 67.5272 |
| | 1 | MIN | -100.6372 | -2934.0222 | -3131.4346 | -7.2769 | -3948.3557 | -4357.4829 | -49.3126 | -67.5272 |
| 11 | 1 | MAX | 100.6372 | 2791.2585 | 3142.7485 | 9.9975 | 3183.7788 | 3586.8267 | 48.1288 | 55.0456 |
| | 1 | MIN | -100.6372 | -2791.2585 | -3142.7485 | -9.9975 | -3183.7788 | -3586.8267 | -48.1288 | -55.0456 |
| 12 | 1 | MAX | 100.6372 | 2592.0867 | 2912.7510 | 8.4772 | 3357.2195 | 3523.4917 | 44.5562 | 55.4585 |
| | 1 | MIN | -100.6372 | -2592.0867 | -2912.7510 | -8.4772 | -3357.2195 | -3523.4917 | -44.5562 | -55.4585 |
| 13 | 1 | MAX | 100.6372 | 2485.6316 | 2810.2168 | 11.7167 | 3414.3708 | 3560.6001 | 42.7155 | 56.7071 |
| | 1 | MIN | -100.6372 | -2485.6316 | -2810.2168 | -11.7167 | -3414.3708 | -3560.6001 | -42.7155 | -56.7071 |
| 14 | 1 | MAX | 54.7210 | 1475.8822 | 1712.5652 | 64.5379 | 2489.4143 | 2547.5088 | 25.6101 | 40.9506 |
| | 1 | MIN | -54.7210 | -1475.8822 | -1712.5652 | -64.5379 | -2489.4143 | -2547.5088 | -25.6101 | -40.9506 |
| 15 | 1 | MAX | 54.7210 | 1537.1143 | 1659.8911 | 61.2324 | 3658.3076 | 3807.7056 | 24.9873 | 60.6993 |
| | 1 | MIN | -54.7210 | -1537.1143 | -1659.8911 | -61.2324 | -3658.3076 | -3807.7056 | -24.9873 | -60.6993 |
| 16 | 1 | MAX | 100.6372 | 2831.5361 | 2955.3823 | 6.8309 | 4143.4644 | 4563.2568 | 45.4045 | 70.3263 |
| | 1 | MIN | -100.6372 | -2831.5361 | -2955.3823 | -6.8309 | -4143.4644 | -4563.2568 | -45.4045 | -70.3263 |
| 17 | 1 | MAX | 100.6372 | 2958.6729 | 3044.9814 | 11.1954 | 3712.0806 | 4171.3613 | 47.0477 | 64.0930 |
| | 1 | MIN | -100.6372 | -2958.6729 | 3044.9814 | -11.1954 | -3712.0806 | -4171.3613 | -47.0477 | -64.0930 |
| 18 | 1 | MAX | 100.6372 | 2948.5574 | 3045.1147 | 7.5608 | 3167.0669 | 3573.6826 | 46.9715 | 54.8028 |
| | 1 | MIN | -100.6372 | -2948.5574 | -3045.1147 | -7.5608 | -3167.0669 | -3573.6826 | -46.9715 | -54.8028 |
| 19 | 1 | MAX | 100.6372 | 2938.4163 | 3055.9487 | 8.8492 | 3190.8586 | 3359.6392 | 47.1733 | 52.7435 |
| | 1 | MIN | -100.6372 | -2938.4163 | -3055.9487 | -8.8492 | -3190.8586 | -3359.6392 | -47.1733 | -52.7435 |
| 20 | 1 | MAX | 100.6372 | 2863.4688 | 2933.2773 | 5.5210 | 3257.9724 | 3405.5166 | 45.3684 | 54.1747 |
| | 1 | MIN | -100.6372 | -2863.4688 | -2933.2773 | -5.5210 | -3257.9724 | -3405.5166 | -45.3684 | -54.1747 |
| 21 | 1 | MAX | 54.7210 | 1572.6184 | 1637.3203 | 79.3139 | 2479.2471 | 2537.0242 | 24.9080 | 40.7827 |
| | 1 | MIN | -54.7210 | -1572.6184 | -1637.3203 | -78.3139 | -2479.2471 | -2537.0242 | -24.9080 | -40.7827 |
| 22 | 1 | MAX | 138.6134 | 2224.4556 | 2059.0024 | 155.3374 | 2657.9199 | 3102.5068 | 34.4930 | 46.8327 |
| | 1 | MIN | -138.6134 | -2224.4556 | -2059.0024 | -155.3374 | -2657.9199 | -3102.5068 | -34.4930 | -46.8327 |
| 23 | 1 | MAX | 54.7210 | 3333.7148 | 3347.3367 | 104.5696 | 1980.4563 | 2175.0886 | 54.3174 | 33.6480 |
| | 1 | MIN | -54.7210 | -3333.7148 | -3347.3367 | -104.5696 | -1980.4563 | -2175.0886 | -54.3174 | -33.6480 |
| 24 | 1 | MAX | 54.7210 | 3346.2520 | 3340.8328 | 98.5339 | 1872.6831 | 2066.4075 | 54.3665 | 32.0251 |
| | 1 | MIN | -54.7210 | -3346.2520 | -3340.8328 | -98.5339 | -1872.6831 | -2066.4075 | -54.3665 | -32.0251 |
| 25 | 1 | MAX | 54.7210 | 3346.0544 | 3342.5725 | 88.9832 | 1729.4380 | 1907.7894 | 54.3790 | 29.5710 |
| | 1 | MIN | -54.7210 | -3346.0544 | -3342.5725 | -88.9832 | -1729.4380 | -1907.7894 | -54.3790 | -29.5710 |
| 26 | 1 | MAX | 54.7210 | 3353.2441 | 3342.4570 | 82.2348 | 1609.1064 | 1757.4105 | 54.4366 | 27.1978 |
| | 1 | MIN | -54.7210 | -3353.2441 | -3342.4570 | -82.2348 | -1609.1064 | -1757.4105 | -54.4366 | -27.1978 |
| 27 | 1 | MAX | 54.7210 | 3420.0261 | 3476.1860 | 75.8605 | 1562.3010 | 1644.5121 | 56.0667 | 26.0717 |
| | 1 | MIN | -54.7210 | -3420.0261 | -3476.1860 | -75.8605 | -1562.3010 | -1644.5121 | -56.0667 | -26.0717 |
| 28 | 1 | MAX | 138.6134 | 2312.1870 | 2179.9229 | 127.5383 | 1963.2017 | 1936.6123 | 36.5212 | 31.7059 |
| | 1 | MIN | -138.6134 | -2312.1870 | -2179.9229 | -127.5383 | -1963.2017 | -1936.6123 | -36.5212 | -31.7059 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 166.5486 | 3649.8232 | 3244.7097 |
| | 1 | MIN | -166.5486 | -3649.8232 | -3244.7097 |
| 2 | 1 | MAX | 45.4031 | 3261.2966 | 3247.7864 |
| | 1 | MIN | -45.4031 | -3261.2966 | -3247.7864 |
| 3 | 1 | MAX | 47.7214 | 3320.8445 | 3441.6245 |
| | 1 | MIN | -47.7214 | -3320.8445 | -3441.6245 |
| 4 | 1 | MAX | 23.7649 | 2170.8479 | 2300.4990 |
| | 1 | MIN | -23.7649 | -2170.8479 | -2300.4990 |
| 5 | 1 | MAX | 21.5370 | 2445.3176 | 2447.2529 |
| | 1 | MIN | -21.5370 | -2445.3176 | -2447.2529 |
| 6 | 1 | MAX | 23.1800 | 2262.7856 | 2340.9531 |
| | 1 | MIN | -23.1800 | -2262.7856 | 2340.9531 |
| 7 | 1 | MAX | 53.8517 | 4852.6313 | 3895.6548 |
| | 1 | MIN | -53.8517 | -4852.6313 | -3895.6548 |
| 8 | 1 | MAX | 65.9947 | 4069.4414 | 4118.3354 |
| | 1 | MIN | -65.9947 | -4069.4414 | -4118.3354 |
| 9 | 1 | MAX | 55.7558 | 3717.4795 | 3734.6230 |
| | 1 | MIN | -55.7558 | -3717.4795 | -3734.6230 |
| 10 | 1 | MAX | 48.4639 | 3493.4258 | 3596.3047 |
| | 1 | MIN | -48.4639 | -3493.4258 | -3596.3047 |
| 11 | 1 | MAX | 57.0619 | 3846.5464 | 3583.3606 |
| | 1 | MIN | -57.0619 | -3846.5464 | -3583.3606 |
| 12 | 1 | MAX | 54.3973 | 3602.6484 | 3363.5544 |
| | 1 | MIN | -54.3973 | -3602.6484 | -3363.5544 |

| | | | | | |
|---|---|---|---|---|---|
| 13 | 1 | MAX | 69.0806 | 3119.2715 | 2507.7737 |
| | 1 | MIN | -69.0806 | -3119.2715 | -2507.7737 |
| 14 | 1 | MAX | 102.6446 | 3125.0261 | 3028.0205 |
| | 1 | MIN | -102.6446 | -3125.0261 | -3028.0205 |
| 15 | 1 | MAX | 41.5641 | 3300.0542 | 3235.8540 |
| | 1 | MIN | -41.5641 | -3300.0542 | -3235.8540 |
| 16 | 1 | MAX | 29.9255 | 3232.2275 | 3278.4216 |
| | 1 | MIN | -29.9255 | -3232.2275 | -3278.4216 |
| 17 | 1 | MAX | 52.2100 | 3335.1885 | 3360.1987 |
| | 1 | MIN | -52.2100 | -3335.1885 | -3360.1987 |
| 18 | 1 | MAX | 31.5987 | 2769.3162 | 2784.7109 |
| | 1 | MIN | -31.5987 | -2769.3162 | -2784.7109 |
| 19 | 1 | MAX | 92.6872 | 3090.4373 | 3161.2192 |
| | 1 | MIN | -92.6872 | -3090.4373 | -3161.2192 |
| 20 | 1 | MAX | 58.1948 | 3648.8022 | 3652.6992 |
| | 1 | MIN | -58.1948 | -3648.8022 | -3652.6992 |
| 21 | 1 | MAX | 50.3753 | 4763.7744 | 4765.7378 |
| | 1 | MIN | -50.3753 | -4763.7744 | -4765.7378 |
| 22 | 1 | MAX | 51.1692 | 4388.4678 | 4432.8359 |
| | 1 | MIN | -51.1692 | -4388.4678 | -4432.8359 |
| 23 | 1 | MAX | 39.5152 | 3411.8794 | 3414.2993 |
| | 1 | MIN | -39.5152 | -3411.8794 | -3414.2993 |
| 24 | 1 | MAX | 45.8597 | 3819.8513 | 3846.7356 |
| | 1 | MIN | -45.8597 | -3819.8513 | -3846.7356 |
| 25 | 1 | MAX | 45.0308 | 3520.7014 | 3544.6724 |
| | 1 | MIN | -45.0308 | -3520.7014 | -3544.6724 |
| 26 | 1 | MAX | 55.7331 | 2399.8193 | 2403.1897 |
| | 1 | MIN | 55.7331 | -2399.8193 | -2403.1897 |
| 27 | 1 | MAX | 102.7874 | 3071.4163 | 2971.1567 |
| | 1 | MIN | -102.7874 | -3071.4163 | -2971.1567 |
| 28 | 1 | MAX | 36.1796 | 3247.0356 | 3228.5229 |
| | 1 | MIN | -36.1796 | -3247.0356 | -3228.5229 |
| 29 | 1 | MAX | 35.4761 | 3191.7651 | 3194.4788 |
| | 1 | MIN | -35.4761 | -3191.7651 | -3194.4788 |
| 30 | 1 | MAX | 48.4022 | 3229.8848 | 3227.5371 |
| | 1 | MIN | -48.4022 | -3229.8848 | -3227.5371 |
| 31 | 1 | MAX | 37.9324 | 3235.9170 | 3257.0020 |
| | 1 | MIN | -37.9324 | -3235.9170 | -3257.0020 |
| 32 | 1 | MAX | 97.8395 | 2912.7224 | 3015.0320 |
| | 1 | MIN | -97.8395 | -2912.7224 | -3015.0320 |
| 33 | 1 | MAX | 76.5347 | 3867.3774 | 4821.9253 |
| | 1 | MIN | -76.5347 | -3867.3774 | -4821.9253 |
| 34 | 1 | MAX | 57.7264 | 4119.4019 | 4067.4846 |
| | 1 | MIN | -57.7264 | -4119.4019 | -4067.4846 |
| 35 | 1 | MAX | 50.9320 | 3850.1448 | 3770.5745 |
| | 1 | MIN | -50.9320 | -3850.1448 | -3770.5745 |
| 36 | 1 | MAX | 51.3907 | 3584.0693 | 3473.6836 |
| | 1 | MIN | -51.3907 | -3584.0693 | -3473.6836 |
| 37 | 1 | MAX | 51.4086 | 3218.0417 | 3176.3792 |
| | 1 | MIN | -51.4086 | -3218.0417 | -3176.3792 |
| 38 | 1 | MAX | 55.3796 | 3036.4026 | 3001.8926 |
| | 1 | MIN | -55.3796 | -3036.4026 | -3001.8926 |
| 39 | 1 | MAX | 77.4934 | 2487.2839 | 3093.8193 |
| | 1 | MIN | -77.4934 | -2487.2839 | -3093.8193 |
| 40 | 1 | MAX | 166.9890 | 3419.1577 | 3044.6604 |
| | 1 | MIN | -166.9890 | -3419.1577 | -3044.6604 |
| 41 | 1 | MAX | 49.2652 | 3096.6497 | 3089.9417 |
| | 1 | MIN | -49.2652 | -3096.6497 | -3089.9417 |
| 42 | 1 | MAX | 45.7714 | 3087.4910 | 3087.9590 |
| | 1 | MIN | -45.7714 | -3087.4910 | -3087.9590 |
| 43 | 1 | MAX | 45.5635 | 3087.3323 | 3084.2859 |
| | 1 | MIN | -45.5635 | -3087.3323 | -3084.2859 |
| 44 | 1 | MAX | 46.3505 | 3113.2642 | 3114.8271 |
| | 1 | MIN | -46.3505 | -3113.2642 | -3114.8271 |
| 45 | 1 | MAX | 72.3318 | 3133.0249 | 3529.6636 |
| | 1 | MIN | -72.3318 | -3133.0249 | -3529.6636 |

MEMBER FORCES ..... FRAME ID    F RAME 1 L OCAT    FRAME TYPE 1

LEVEL NO 6 ... LEVEL ID

COLUMN FORCES

| O 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 | 136.1103 | 1601.0854 | 1690.8662 | 102.1211 | 2427.7197 | 2564.2852 | 26.7638 | 35.9845 |
| | 1 | MIN | -136.1103 | -1601.0854 | -1690.8662 | -102.1211 | -2427.7197 | -2564.2852 | -26.7638 | -35.9845 |
| 2 | 1 | MAX | 53.7329 | 3054.6401 | 3043.1233 | 71.5000 | 1734.4032 | 1844.1321 | 49.5753 | 28.5603 |
| | 1 | MIN | -53.7329 | -3054.6401 | -3043.1233 | -71.5000 | -1734.4032 | -1844.1321 | -49.5753 | -28.5603 |
| 3 | 1 | MAX | 53.7329 | 3083.7378 | 3090.6213 | 75.4920 | 1645.9304 | 1652.4099 | 50.1980 | 26.5349 |
| | 1 | MIN | -53.7329 | -3083.7378 | -3090.6213 | -75.4920 | -1645.9304 | -1652.4099 | -50.1980 | -26.5349 |
| 4 | 1 | MAX | 53.7329 | 2527.3533 | 2509.8093 | 59.8046 | 1479.6669 | 1493.0300 | 40.9525 | 24.1683 |
| | 1 | MIN | -53.7329 | -2527.3533 | -2509.8093 | -59.8046 | -1479.6669 | -1493.0300 | -40.9525 | -24.1683 |
| 5 | 1 | MAX | 98.8198 | 2599.8604 | 2177.2266 | 57.4941 | 2010.3728 | 1695.3931 | 38.8381 | 30.1282 |
| | 1 | MIN | -98.8198 | -2599.8604 | -2177.2266 | -57.4941 | -2010.3728 | -1695.3931 | -38.8381 | -30.1282 |
| 6 | 1 | MAX | 98.8198 | 2582.8018 | 2156.8452 | 47.2548 | 1818.0212 | 1566.8560 | 38.5337 | 27.5193 |
| | 1 | MIN | -98.8198 | -2582.8018 | -2156.8452 | -47.2548 | -1818.0212 | -1566.8560 | -38.5337 | -27.5193 |
| 7 | 1 | MAX | 136.1103 | 952.9568 | 912.7432 | 84.1323 | 1258.3242 | 1128.0190 | 14.4883 | 17.6363 |
| | 1 | MIN | -136.1103 | -952.9568 | -912.7432 | -84.1323 | -1258.3242 | -1128.0190 | -14.4883 | -17.6363 |
| 8 | 1 | MAX | 53.7329 | 1368.5593 | 1431.2354 | 51.9779 | 3558.2610 | 3626.7307 | 22.7626 | 58.4146 |
| | 1 | MIN | -53.7329 | -1368.5593 | -1431.2354 | -51.9779 | -3558.2610 | -3626.7307 | -22.7626 | -58.4146 |
| 9 | 1 | MAX | 98.8198 | 3665.4875 | 3220.6079 | 8.5447 | 4903.3267 | 4589.3667 | 55.9845 | 77.1763 |
| | 1 | MIN | -98.8198 | -3665.4875 | -3220.6079 | -8.5447 | -4903.3267 | -4589.3667 | -55.9845 | -77.1763 |
| 10 | 1 | MAX | 98.8198 | 3016.3289 | 3104.7778 | 8.7274 | 3651.9333 | 3671.3809 | 49.7651 | 58.7188 |
| | 1 | MIN | -98.8198 | -3016.3289 | -3104.7778 | -8.7274 | -3551.9333 | -3671.3809 | -49.7651 | -58.7188 |
| 11 | 1 | MAX | 98.8198 | 3750.3071 | 3328.8149 | 9.5509 | 3808.7932 | 3305.1606 | 57.5539 | 57.8370 |
| | 1 | MIN | -98.8198 | -3750.3071 | -3328.8149 | -9.5509 | -3608.7932 | -3305.1606 | -57.5539 | -57.8370 |
| 12 | 1 | MAX | 98.8198 | 3438.5159 | 3076.2603 | 6.0021 | 3972.8987 | 3549.4946 | 52.9657 | 61.1577 |
| | 1 | MIN | -98.8198 | -3438.5159 | -3076.2603 | -6.0021 | -3972.8987 | -3549.4946 | -52.9657 | -61.1577 |
| 13 | 1 | MAX | 98.8198 | 3361.8464 | 2966.0283 | 9.1430 | 3631.3486 | 3248.3032 | 51.4461 | 55.9321 |
| | 1 | MIN | -98.8198 | -3361.8464 | -2966.0283 | -9.1430 | -3631.3486 | -3248.3032 | -51.4461 | -55.9321 |
| 14 | 1 | MAX | 53.7329 | 1378.2676 | 1434.8198 | 38.0595 | 2106.7639 | 2057.0652 | 22.8707 | 33.6731 |
| | 1 | MIN | -53.7329 | -1378.2676 | -1434.8198 | -38.0595 | -2106.7639 | -2057.0652 | -22.8707 | -33.6731 |
| 15 | 1 | MAX | 53.7329 | 1340.5479 | 1400.7874 | 36.9241 | 3536.8538 | 3605.4761 | 22.2873 | 58.0678 |
| | 1 | MIN | -53.7329 | -1340.5479 | -1400.7874 | -36.9241 | -3536.8538 | -3605.4761 | -22.2873 | -58.0678 |
| 16 | 1 | MAX | 98.8198 | 3536.3181 | 3143.0825 | 7.0522 | 4914.5313 | 4585.3252 | 54.3041 | 77.2345 |
| | 1 | MIN | -98.8198 | -3536.3181 | -3143.0825 | -7.0522 | -4914.5313 | -4585.3252 | -54.3041 | -77.2345 |
| 17 | 1 | MAX | 98.8198 | 3574.1804 | 3228.3188 | 6.0823 | 4565.0488 | 4064.7383 | 55.3049 | 69.2594 |
| | 1 | MIN | -98.8198 | -3574.1804 | -3228.3188 | -6.0823 | -4565.0488 | -4064.7383 | -55.3049 | -69.2594 |
| 18 | 1 | MAX | 98.8198 | 3592.3826 | 3228.3447 | 8.4617 | 3814.9512 | 3298.6230 | 55.4531 | 57.8340 |
| | 1 | MIN | -98.8198 | -3592.3826 | -3228.3447 | -8.4617 | -3814.9512 | -3298.6230 | -55.4531 | -57.8340 |
| 19 | 1 | MAX | 98.8198 | 3605.3552 | 3243.4644 | 6.1538 | 3833.3506 | 3392.2148 | 55.6814 | 58.7445 |
| | 1 | MIN | -98.8198 | -3605.3552 | -3243.4644 | -6.1538 | -3833.3506 | -3392.2148 | -55.6814 | -58.7445 |
| 20 | 1 | MAX | 98.8198 | 3497.3362 | 3112.1714 | 6.1873 | 3509.0515 | 3107.0327 | 53.7358 | 53.7893 |
| | 1 | MIN | -98.8198 | -3497.3362 | -3112.1714 | -6.1873 | -3509.0515 | -3107.0327 | -53.7358 | -53.7893 |
| 21 | 1 | MAX | 53.7329 | 1313.0981 | 1373.1206 | 49.5349 | 2096.2764 | 2051.7451 | 21.8392 | 33.5051 |
| | 1 | MIN | -53.7329 | -1313.0981 | -1373.1206 | -49.5349 | -2096.2764 | -2051.7451 | -21.8392 | -33.5051 |
| 22 | 1 | MAX | 136.1103 | 1804.9907 | 1542.0332 | 107.6692 | 2412.7031 | 2538.0479 | 24.2723 | 35.5441 |
| | 1 | MIN | -136.1103 | -1804.9907 | -1542.0332 | -107.6692 | -2412.7031 | -2538.0479 | -24.2723 | -35.5441 |
| 23 | 1 | MAX | 53.7329 | 2811.1306 | 2805.3901 | 68.0496 | 1733.6973 | 1840.6621 | 45.6628 | 28.4851 |
| | 1 | MIN | -53.7329 | -2811.1306 | -2805.3901 | -68.0496 | -1733.6973 | -1840.6621 | -45.6628 | -28.4851 |
| 24 | 1 | MAX | 53.7329 | 2787.9189 | 2786.6995 | 65.4426 | 1621.7537 | 1666.5396 | 45.3221 | 26.4264 |
| | 1 | MIN | -53.7329 | -2787.9189 | -2786.6995 | -65.4426 | -1621.7537 | -1666.5396 | -45.3221 | -26.4264 |
| 25 | 1 | MAX | 53.7329 | 2781.7813 | 2780.0264 | 57.9753 | 1486.3585 | 1502.4565 | 45.2180 | 24.2994 |
| | 1 | MIN | -53.7329 | -2781.7813 | -2780.0264 | -57.9753 | -1486.3585 | -1502.4565 | -45.2180 | -24.2994 |
| 26 | 1 | MAX | 53.7329 | 2790.1533 | 2790.7959 | 51.6837 | 1339.6554 | 1367.3357 | 45.3736 | 22.0081 |
| | 1 | MIN | -53.7329 | -2790.1533 | -2790.7959 | -51.6837 | -1339.6554 | -1367.3357 | -45.3736 | -22.0081 |
| 27 | 1 | MAX | 53.7329 | 2765.7695 | 2754.5635 | 48.9139 | 1206.0896 | 1245.5237 | 44.8808 | 19.8679 |
| | 1 | MIN | -53.7329 | -2765.7695 | -2754.5635 | -48.9139 | -1206.0896 | -1245.5237 | -44.8808 | -19.8679 |
| 28 | 1 | MAX | 136.1103 | 1864.0796 | 1474.9673 | 84.3440 | 1267.5388 | 1142.3359 | 23.3752 | 17.8055 |
| | 1 | MIN | -136.1103 | -1864.0796 | -1474.9673 | -84.3440 | -1267.5388 | -1142.3359 | -23.3752 | -17.8055 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 167.4233 | 3668.7158 | 3224.8442 |
| | 1 | MIN | -167.4233 | -3668.7158 | -3224.8442 |

| | | | | | |
|---|---|---|---|---|---|
| 2 | 1 | MAX | 53.0356 | 3243.7249 | 3242.0200 |
| | 1 | MIN | -53.0356 | -3243.7249 | -3242.0200 |
| 3 | 1 | MAX | 37.5367 | 3307.8459 | 3412.9529 |
| | 1 | MIN | -37.5367 | -3307.8459 | -3412.9529 |
| 4 | 1 | MAX | 16.4488 | 2046.2998 | 2072.3601 |
| | 1 | MIN | -16.4488 | -2046.2998 | -2072.3601 |
| 5 | 1 | MAX | 18.4794 | 2093.5417 | 2094.6143 |
| | 1 | MIN | -18.4794 | -2093.5417 | -2094.6143 |
| 6 | 1 | MAX | 20.6383 | 2021.9642 | 2218.8364 |
| | 1 | MIN | -20.6383 | -2021.9642 | -2218.8364 |
| 7 | 1 | MAX | 55.1051 | 5162.0044 | 4088.0618 |
| | 1 | MIN | -55.1051 | -5162.0044 | -4088.0618 |
| 8 | 1 | MAX | 39.6391 | 4021.0686 | 3726.1577 |
| | 1 | MIN | -39.6391 | -4021.0686 | -3726.1577 |
| 9 | 1 | MAX | 50.3387 | 3743.3569 | 3755.0471 |
| | 1 | MIN | -50.3387 | -3743.3569 | -3755.0471 |
| 10 | 1 | MAX | 57.1516 | 3197.4094 | 3037.7583 |
| | 1 | MIN | -57.1516 | -3197.4094 | -3037.7583 |
| 11 | 1 | MAX | 53.3982 | 3253.4309 | 2937.0701 |
| | 1 | MIN | -53.3982 | -3253.4309 | -2937.0701 |
| 12 | 1 | MAX | 52.3736 | 3046.1460 | 2748.4697 |
| | 1 | MIN | -52.3736 | -3046.1460 | -2748.4697 |
| 13 | 1 | MAX | 73.3911 | 2995.5129 | 2370.7012 |
| | 1 | MIN | -73.3911 | -2995.5129 | -2370.7012 |
| 14 | 1 | MAX | 50.5004 | 2952.5615 | 2626.6860 |
| | 1 | MIN | -50.5004 | -2952.5615 | -2626.6860 |
| 15 | 1 | MAX | 34.2742 | 2934.5815 | 3101.3643 |
| | 1 | MIN | -34.2742 | -2934.5815 | -3101.3643 |
| 16 | 1 | MAX | 73.1989 | 3106.3857 | 2931.7249 |
| | 1 | MIN | -73.1989 | -3106.3857 | -2931.7249 |
| 17 | 1 | MAX | 44.4551 | 2776.3274 | 2826.9937 |
| | 1 | MIN | -44.4551 | -2776.3274 | -2826.9937 |
| 18 | 1 | MAX | 24.6782 | 2362.6890 | 2366.7822 |
| | 1 | MIN | -24.6782 | -2362.6890 | -2366.7822 |
| 19 | 1 | MAX | 50.1613 | 2731.1460 | 3006.0129 |
| | 1 | MIN | -50.1613 | -2731.1460 | -3006.0129 |
| 20 | 1 | MAX | 57.5449 | 3828.2866 | 3835.7200 |
| | 1 | MIN | -57.5449 | -3828.2866 | -3835.7200 |
| 21 | 1 | MAX | 44.4723 | 4049.9121 | 4045.6294 |
| | 1 | MIN | -44.4723 | -4049.9121 | -4045.6294 |
| 22 | 1 | MAX | 61.8113 | 4113.0620 | 3834.4541 |
| | 1 | MIN | -61.8113 | -4113.0620 | -3834.4541 |
| 23 | 1 | MAX | 30.8520 | 2794.0532 | 2791.6772 |
| | 1 | MIN | -30.8520 | -2794.0532 | -2791.6772 |
| 24 | 1 | MAX | 37.1659 | 3139.3110 | 3157.4993 |
| | 1 | MIN | -37.1659 | -3139.3110 | -3157.4993 |
| 25 | 1 | MAX | 36.1576 | 2867.2007 | 2882.5588 |
| | 1 | MIN | -36.1576 | -2867.2007 | -2882.5588 |
| 26 | 1 | MAX | 49.5911 | 2277.7922 | 2280.0039 |
| | 1 | MIN | -49.5911 | -2277.7922 | -2280.0039 |
| 27 | 1 | MAX | 49.2664 | 2925.9241 | 2620.5686 |
| | 1 | MIN | -49.2664 | -2925.9241 | -2620.5686 |
| 28 | 1 | MAX | 34.9963 | 2724.3162 | 2726.3220 |
| | 1 | MIN | -34.9963 | -2724.3162 | -2726.3220 |
| 29 | 1 | MAX | 20.8379 | 2696.6262 | 2691.4683 |
| | 1 | MIN | -20.8379 | -2696.6262 | -2691.4683 |
| 30 | 1 | MAX | 40.6791 | 2725.0894 | 2723.6702 |
| | 1 | MIN | -40.6791 | -2725.0894 | -2723.6702 |
| 31 | 1 | MAX | 29.8667 | 2721.9751 | 2732.9807 |
| | 1 | MIN | -29.8667 | -2721.9751 | -2732.9807 |
| 32 | 1 | MAX | 53.8537 | 2561.5835 | 2865.3689 |
| | 1 | MIN | -53.8537 | -2561.5835 | -2865.3689 |
| 33 | 1 | MAX | 64.5335 | 4035.2686 | 5105.1167 |
| | 1 | MIN | -64.5335 | -4035.2686 | -5105.1167 |
| 34 | 1 | MAX | 35.8223 | 3705.8040 | 4007.9280 |
| | 1 | MIN | -35.8223 | -3705.8040 | -4007.9280 |

| | | | | | |
|---|---|---|---|---|---|
| 35 | 1 | MAX | 37.3883 | 3265.1714 | 3559.9463 |
| | 1 | MIN | -37.3883 | -3265.1714 | -3559.9463 |
| 36 | 1 | MAX | 36.9058 | 3019.7029 | 3181.2534 |
| | 1 | MIN | -36.9058 | -3019.7029 | -3181.2534 |
| 37 | 1 | MAX | 34.9183 | 2753.1714 | 2960.0344 |
| | 1 | MIN | -34.9183 | -2753.1714 | -2960.0344 |
| 38 | 1 | MAX | 33.6543 | 2595.5034 | 2803.2231 |
| | 1 | MIN | -33.6543 | -2595.5034 | -2803.2231 |
| 39 | 1 | MAX | 63.9696 | 2360.2395 | 2981.2258 |
| | 1 | MIN | -63.9696 | -2360.2395 | -2981.2258 |
| 40 | 1 | MAX | 167.5380 | 3461.0923 | 3048.4741 |
| | 1 | MIN | -167.5380 | -3461.0923 | -3048.4741 |
| 41 | 1 | MAX | 46.0320 | 3003.7786 | 3009.3901 |
| | 1 | MIN | -46.0320 | -3003.7786 | -3009.3901 |
| 42 | 1 | MAX | 45.4346 | 3003.2979 | 3004.3984 |
| | 1 | MIN | -45.4346 | -3003.2979 | -3004.3984 |
| 43 | 1 | MAX | 43.6499 | 3002.2302 | 3001.0981 |
| | 1 | MIN | -43.6499 | -3002.2302 | -3001.0981 |
| 44 | 1 | MAX | 44.0021 | 3018.1321 | 3020.3513 |
| | 1 | MIN | -44.0021 | -3018.1321 | -3020.3513 |
| 45 | 1 | MAX | 64.9799 | 2922.4973 | 3329.2334 |
| | 1 | MIN | -64.9799 | -2922.4973 | -3329.2334 |

MEMBER FORCES ..... FRAME ID F RAME 1 L OCAT FRAME TYPE 1

LEVEL NO 7 ... LEVEL ID

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 | 129.6341 | 2716.2295 | 1740.1348 | 54.5745 | 36[illegible]7734 | 2921.3154 | 36.2306 | 53.7976 |
| | 1 | MIN | -129.6341 | -2716.2295 | -1740.1348 | -54.5745 | -36[illegible]7734 | -2921.3154 | -36.2306 | -53.7976 |
| 2 | 1 | MAX | 51.1763 | 3304.2529 | 2976.2690 | 35.4478 | 2080.0493 | 1947.1106 | 51.0612 | 32.7411 |
| | 1 | MIN | -51.1763 | -3304.2529 | -2976.2690 | -35.4478 | -2080.0493 | -1947.1106 | -51.0612 | -32.7411 |
| 3 | 1 | MAX | 51.1763 | 3268.6956 | 2961.5828 | 40.4407 | 2101.9641 | 1926.7761 | 50.6527 | 32.7540 |
| | 1 | MIN | -51.1763 | -3268.6956 | -2961.5828 | -40.4407 | -2101.9641 | -1926.7761 | -50.6527 | -32.7540 |
| 4 | 1 | MAX | 51.1763 | 2980.6965 | 2559.5681 | 28.8608 | 1722.1018 | 1615.0532 | 45.0429 | 27.1314 |
| | 1 | MIN | -51.1763 | -2980.6965 | -2559.5681 | -28.8608 | -1722.1018 | -1615.0532 | -45.0429 | -27.1314 |
| 5 | 1 | MAX | 29.7790 | 1739.1404 | 1316.4875 | 27.2944 | 1274.0967 | 1064.3397 | 24.8425 | 18.8121 |
| | 1 | MIN | -29.7790 | -1739.1404 | -1316.4875 | -27.2944 | -1274.0967 | -1064.3397 | -24.8425 | -18.8121 |
| 6 | 1 | MAY | 29.7790 | 1709.3755 | 1298.3093 | 20.0317 | 1208.0992 | 994.5546 | 24.4527 | 17.9077 |
| | 1 | MIN | -29.7790 | -1709.3755 | -1298.3093 | -20.0317 | -1208.0992 | -994.5546 | -24.4527 | -17.9077 |
| 7 | 1 | MAX | 129.6341 | 2209.4971 | 1149.7529 | 47.6493 | 2232.7007 | 1793.6924 | 27.3110 | 32.7349 |
| | 1 | MIN | -129.6341 | -2209.4971 | -1149.7529 | -47.6493 | -2232.7007 | -1793.6924 | -27.3110 | -32.7349 |
| 8 | 1 | MAX | 51.1763 | 1681.0847 | 1305.3472 | 22.2234 | 3868.5972 | 3835.6570 | 24.2799 | 62.6362 |
| | 1 | MIN | -51.1763 | -1681.0847 | -1305.3472 | -22.2234 | -3868.5972 | -3835.6570 | -24.2799 | -62.6362 |
| 9 | 1 | MAX | 29.7790 | 1828.1212 | 1538.6331 | 6.9409 | 2704.4495 | 2375.2859 | 27.3720 | 41.2987 |
| | 1 | MIN | -29.7790 | -1828.1212 | -1538.6331 | -6.9409 | -2704.4495 | -2375.2859 | -27.3720 | -41.2987 |
| 10 | 1 | MAX | 94.1180 | 3168.3406 | 2789.9312 | 9.1043 | 4148.6450 | 3993.0801 | 48.4412 | 66.1929 |
| | 1 | MIN | -94.1180 | -3168.3406 | -2789.9312 | -9.1043 | -4148.6450 | -3993.0801 | -48.4412 | -66.1929 |
| 11 | 1 | MAX | 29.7790 | 1828.1395 | 1547.5222 | 6.5596 | 2050.7705 | 1804.6908 | 27.4444 | 31.3452 |
| | 1 | MIN | -29.7790 | -1828.1395 | -1547.5222 | -6.5596 | -2050.7705 | -1804.6908 | -27.4444 | -31.3452 |
| 12 | 1 | MAX | 29.7790 | 1658.2588 | 1398.1636 | 4.4161 | 1958.3862 | 1715.5333 | 24.8490 | 29.8281 |
| | 1 | MIN | -29.7790 | -1658.2588 | -1398.1636 | -4.4161 | -1958.3862 | -1715.5333 | -24.8490 | -29.8281 |
| 13 | 1 | MAX | 29.7790 | 1682.0021 | 1405.1217 | 4.6406 | 1895.3668 | 1664.0703 | 25.0986 | 28.9385 |
| | 1 | MIN | -29.7790 | -1682.0021 | -1405.1217 | -4.6406 | -1895.3668 | -1664.0703 | -25.0986 | -28.9385 |
| 14 | 1 | MAX | 51.1763 | 1706.8052 | 1326.7227 | 15.5406 | 2293.5386 | 2270.6851 | 24.6629 | 37.1075 |
| | 1 | MIN | -51.1763 | -1706.8052 | -1326.7227 | -15.5406 | -2293.5386 | -2270.6851 | -24.6629 | -37.1075 |
| 15 | 1 | MAX | 51.1763 | 1672.5371 | 1309.9844 | 20.5570 | 3850.3818 | 3815.8984 | 24.2482 | 62.3275 |
| | 1 | MIN | -51.1763 | -1672.5371 | -1309.9844 | -20.5570 | -3850.3818 | -3815.8984 | -24.2482 | -62.3275 |
| 16 | 1 | MAX | 29.7790 | 1725.8984 | 1463.8926 | 5.7079 | 2726.9219 | 2391.7537 | 25.9333 | 41.6153 |
| | 1 | MIN | -29.7790 | -1725.8984 | -1463.8926 | -5.7079 | -2726.9219 | -2391.7537 | -25.9333 | -41.6153 |
| 17 | 1 | MAX | 29.7790 | 1678.8038 | 1436.0592 | 2.6143 | 2452.5820 | 2186.4829 | 25.3241 | 37.7160 |
| | 1 | MIN | -29.7790 | -1678.8038 | -1436.0592 | -2.6143 | -2452.5820 | -2186.4829 | -25.3241 | -37.7160 |
| 18 | 1 | MAX | 29.7790 | 1708.6503 | 1458.0801 | 6.3533 | 2072.3992 | 1819.3157 | 25.7458 | 31.6399 |
| | 1 | MIN | -29.7790 | -1708.6503 | -1458.0801 | -6.3533 | -2072.3992 | -1819.3157 | -25.7458 | -31.6399 |
| 19 | 1 | MAX | 29.7790 | 1705.4485 | 1457.9406 | 4.8730 | 1962.9341 | 1705.9808 | 25.7186 | 29.7380 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | MIN | -29.7790 | -1705.4485 | -1457.9406 | -4.8730 | -1962.9341 | -1705.9808 | -25.7186 | -29.7380 |
| 20 | 1 | MAX | 29.7790 | 1701.7664 | 1443.5364 | 4.6024 | 1901.4982 | 1652.1116 | 25.5716 | 28.8911 |
| | 1 | MIN | -29.7790 | -1701.7664 | -1443.5364 | -4.6024 | -1901.4982 | -1652.1116 | -25.5716 | -28.8911 |
| 21 | 1 | MAX | 51.1763 | 1647.7100 | 1284.0342 | 21.6214 | 2289.9810 | 2265.8186 | 23.8354 | 37.0390 |
| | 1 | MIN | -51.1763 | -1647.7100 | -1284.0342 | -21.6214 | -2289.9810 | -2265.8186 | -23.8354 | -37.0390 |
| 22 | 1 | MAX | 129.6341 | 2562.0664 | 1709.7153 | 57.3619 | 3674.5684 | 2896.0068 | 34.6146 | 53.4193 |
| | 1 | MIN | -129.6341 | -2562.0664 | -1709.7153 | -57.3619 | -3674.5684 | -2896.0068 | -34.6146 | -53.4193 |
| 23 | 1 | MAX | 51.1763 | 3106.5381 | 2817.1758 | 31.7244 | 2063.8567 | 1934.4285 | 48.1603 | 32.5064 |
| | 1 | MIN | -51.1763 | -3106.5381 | -2817.1758 | -31.7244 | -2063.8567 | -1934.4285 | -48.1603 | -32.5064 |
| 24 | 1 | MAX | 51.1763 | 3069.7075 | 2784.4001 | 32.8008 | 1906.1597 | 1783.4758 | 47.5944 | 29.9971 |
| | 1 | MIN | -51.1763 | -3069.7075 | -2784.4001 | -32.8008 | -1906.1597 | -1783.4758 | -47.5944 | -29.9971 |
| 25 | 1 | MAX | 51.1763 | 3078.0603 | 2786.1860 | 28.6660 | 1703.4673 | 1605.2686 | 47.6769 | 26.9003 |
| | 1 | MIN | -51.1763 | -3078.0603 | -2786.1860 | -28.6660 | -1703.4673 | -1605.2686 | -47.6769 | -26.9003 |
| 26 | 1 | MAX | 51.1763 | 3079.9417 | 2789.8704 | 24.6652 | 1535.2988 | 1413.9512 | 47.7221 | 23.8459 |
| | 1 | MIN | -51.1763 | -3079.9417 | -2789.8704 | -24.6652 | -1535.2988 | -1413.9512 | -47.7221 | -23.8459 |
| 27 | 1 | MAX | 51.1763 | 3036.7490 | 2761.8169 | 23.7676 | 1442.8929 | 1333.9492 | 47.1429 | 22.5760 |
| | 1 | MIN | -51.1763 | -3036.7490 | -2761.8169 | -23.7676 | -1442.8929 | -1333.9492 | -47.1429 | -22.5760 |
| 28 | 1 | MAX | 129.6341 | 2436.2769 | 1621.6665 | 44.9146 | 2230.6797 | 1799.5352 | 32.9912 | 32.7659 |
| | 1 | MIN | -129.6341 | -2436.2769 | -1621.6665 | -44.9146 | -2230.6797 | -1799.5352 | -32.9912 | -32.7659 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 133.3639 | 2699.8481 | 2386.5623 |
| | 1 | MIN | -133.3639 | -2699.8481 | -2386.5623 |
| 2 | 1 | MAX | 66.8357 | 2572.4229 | 2584.1072 |
| | 1 | MIN | -66.8357 | -2572.4229 | -2584.1072 |
| 3 | 1 | MAX | 27.5547 | 2591.3452 | 2623.2986 |
| | 1 | MIN | -27.5547 | -2591.3452 | -2623.2986 |
| 4 | 1 | MAX | 42.6373 | 1988.9243 | 1729.5084 |
| | 1 | MIN | -42.6373 | -1988.9243 | -1729.5084 |
| 5 | 1 | MAX | 19.6066 | 1458.9984 | 1474.6842 |
| | 1 | MIN | -19.6066 | -1458.9984 | -1474.6842 |
| 6 | 1 | MAX | 47.7399 | 1586.4567 | 2082.5042 |
| | 1 | MIN | -47.7399 | -1586.4567 | -2082.5042 |
| 7 | 1 | MAX | 35.4737 | 4056.2842 | 3303.4558 |
| | 1 | MIN | -35.4737 | -4056.2842 | -3303.4558 |
| 8 | 1 | MAX | 83.7537 | 3093.3101 | 2442.7375 |
| | 1 | MIN | -83.7537 | -3093.3101 | -2442.7375 |
| 9 | 1 | MAX | 46.8796 | 3187.7148 | 3326.7688 |
| | 1 | MIN | -46.8796 | -3187.7148 | -3326.7688 |
| 10 | 1 | MAX | 94.7059 | 2468.8359 | 2029.8429 |
| | 1 | MIN | -94.7059 | -2468.8359 | -2029.8429 |
| 11 | 1 | MAX | 26.1888 | 1985.4076 | 1674.4193 |
| | 1 | MIN | -26.1888 | -1985.4076 | -1674.4193 |
| 12 | 1 | MAX | 22.7621 | 1922.9381 | 1597.7458 |
| | 1 | MIN | -22.7621 | -1922.9381 | -1597.7458 |
| 13 | 1 | MAX | 38.9651 | 2356.6677 | 1911.1116 |
| | 1 | MIN | -38.9651 | -2356.6677 | -1911.1116 |
| 14 | 1 | MAX | 49.0467 | 1816.9645 | 1367.9382 |
| | 1 | MIN | -49.0467 | -1816.9645 | -1367.9382 |
| 15 | 1 | MAX | 93.7209 | 1701.0059 | 2055.8049 |
| | 1 | MIN | -93.7209 | -1701.0059 | -2055.8049 |
| 16 | 1 | MAX | 107.4249 | 2069.8511 | 1718.8448 |
| | 1 | MIN | -107.4249 | -2069.8511 | -1718.8448 |
| 17 | 1 | MAX | 20.8945 | 1399.6082 | 1469.6136 |
| | 1 | MIN | -20.8945 | -1399.6082 | -1469.6136 |
| 18 | 1 | MAX | 13.9466 | 1257.0272 | 1244.9022 |
| | 1 | MIN | -13.9466 | -1257.0272 | -1244.9022 |
| 19 | 1 | MAX | 18.8858 | 1486.1765 | 1872.2904 |
| | 1 | MIN | -18.8858 | -1486.1765 | -1872.2904 |
| 20 | 1 | MAX | 38.3963 | 3340.6702 | 3345.7466 |
| | 1 | MIN | -38.3963 | -3340.6702 | -3345.7466 |
| 21 | 1 | MAX | 34.0985 | 2404.3220 | 2390.7283 |
| | 1 | MIN | -34.0985 | -2404.3220 | -2390.7283 |
| 22 | 1 | MAX | 76.3501 | 2483.0703 | 2052.7751 |
| | 1 | MIN | -76.3501 | -2483.0703 | -2052.7751 |
| 23 | 1 | MAX | 16.7558 | 1609.5995 | 1599.9764 |

| | | | | | |
|---|---|---|---|---|---|
| | 1 | MIN | -16.7558 | -1609.5995 | -1599.9764 |
| 24 | 1 | MAX | 21.0474 | 1681.0651 | 1669.2765 |
| | 1 | MIN | -21.0474 | -1681.0651 | -1669.2765 |
| 25 | 1 | MAX | 22.6210 | 1685.2341 | 1672.5522 |
| | 1 | MIN | -22.6210 | -1685.2341 | -1672.5522 |
| 26 | 1 | MAX | 34.0108 | 1972.6283 | 1973.2485 |
| | 1 | MIN | -34.0108 | -1972.6283 | -1973.2485 |
| 27 | 1 | MAX | 52.3138 | 1840.4578 | 1436.3422 |
| | 1 | MIN | -52.3138 | -1840.4578 | -1436.3422 |
| 28 | 1 | MAX | 10.6584 | 1423.7849 | 1449.0029 |
| | 1 | MIN | -10.6584 | -1423.7849 | -1449.0029 |
| 29 | 1 | MAX | 9.6826 | 1432.8503 | 1418.7445 |
| | 1 | MIN | -9.6826 | -1432.8503 | -1418.7445 |
| 30 | 1 | MAX | 20.8188 | 1445.4209 | 1447.8861 |
| | 1 | MIN | -20.8188 | -1445.4209 | -1447.8861 |
| 31 | 1 | MAX | 15.7170 | 1437.8636 | 1434.5988 |
| | 1 | MIN | -15.7170 | -1437.8636 | -1434.5988 |
| 32 | 1 | MAX | 21.1570 | 1392.3535 | 1789.9015 |
| | 1 | MIN | -21.1570 | -1392.3535 | -1789.9015 |
| 33 | 1 | MAX | 36.4607 | 3252.1411 | 4001.5835 |
| | 1 | MIN | -36.4607 | -3252.1411 | -4001.5835 |
| 34 | 1 | MAX | 62.0149 | 2410.2517 | 3081.4285 |
| | 1 | MIN | -62.0149 | -2410.2517 | -3081.4285 |
| 35 | 1 | MAX | 59.6890 | 2208.0076 | 2772.6177 |
| | 1 | MIN | -59.6890 | -2208.0076 | -2772.6177 |
| 36 | 1 | MAX | 61.5327 | 1988.4473 | 2451.2256 |
| | 1 | MIN | -61.5327 | -1988.4473 | -2451.2256 |
| 37 | 1 | MAX | 59.4712 | 1693.0084 | 2146.2380 |
| | 1 | MIN | -59.4712 | -1693.0084 | -2146.2380 |
| 38 | 1 | MAX | 63.2699 | 1617.3054 | 2084.9272 |
| | 1 | MIN | -63.2699 | -1617.3054 | -2084.9272 |
| 39 | 1 | MAX | 38.1092 | 1900.2225 | 2346.2253 |
| | 1 | MIN | -38.1092 | -1900.2225 | -2346.2253 |
| 40 | 1 | MAX | 131.9219 | 2603.9749 | 2308.4385 |
| | 1 | MIN | -131.9219 | -2603.9749 | -2308.4385 |
| 41 | 1 | MAX | 43.8291 | 2404.9746 | 2413.1892 |
| | 1 | MIN | -43.8291 | -2404.9746 | -2413.1892 |
| 42 | 1 | MAX | 37.4370 | 2409.5886 | 2406.4739 |
| | 1 | MIN | -37.4370 | -2409.5886 | -2406.4739 |
| 43 | 1 | MAX | 37.1202 | 2400.6765 | 2400.7031 |
| | 1 | MIN | -37.1202 | -2400.6765 | -2400.7031 |
| 44 | 1 | MAX | 37.3921 | 2426.7361 | 2438.6687 |
| | 1 | MIN | -37.3921 | -2426.7361 | -2438.6687 |
| 45 | 1 | MAX | 49.5903 | 2215.9927 | 2514.5232 |
| | 1 | MIN | -49.5903 | -2215.9927 | -2514.5232 |

MEMBER FORCES ..... FRAME ID F RAME 1 L OCAT FRAME TYPE 1

LEVEL NO 8 ... LEVEL ID

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 | 89.7368 | 929.7590 | 487.1994 | 17.7283 | 2161.1245 | 1167.8690 | 8.0224 | 22.6683 |
| | 1 | MIN | -89.7368 | -929.7590 | -487.1994 | -17.7283 | -2161.1245 | -1167.8690 | -8.0224 | -22.6683 |
| 2 | 1 | MAX | 35.4258 | 1936.4495 | 1432.0862 | 10.0954 | 1096.3877 | 806.9303 | 26.9541 | 14.5785 |
| | 1 | MIN | -35.4258 | -1936.4495 | -1432.0862 | -10.0954 | -1096.3877 | -806.9303 | -26.9541 | -14.5785 |
| 3 | 1 | MAX | 35.4258 | 2185.8660 | 1536.0432 | 10.3123 | 1113.3932 | 857.3949 | 29.8248 | 15.7673 |
| | 1 | MIN | -35.4258 | -2185.8660 | -1536.0432 | -10.3123 | -1113.3932 | -857.3949 | -29.8248 | -15.7673 |
| 4 | 1 | MAX | 35.4258 | 2085.1770 | 1416.0127 | 7.5063 | 864.2968 | 678.0115 | 27.9716 | 11.6379 |
| | 1 | MIN | -35.4258 | -2085.1770 | -1416.0127 | -7.5063 | -864.2968 | -678.0115 | -27.9716 | -11.6379 |
| 5 | 1 | MAX | 20.6140 | 1471.4948 | 1236.3197 | 8.1160 | 726.0688 | 570.6970 | 22.0147 | 10.5428 |
| | 1 | MIN | -20.6140 | -1471.4948 | -1236.3197 | -8.1160 | -726.0688 | -570.6970 | -22.0147 | -10.5428 |
| 6 | 1 | MAX | 20.6140 | 1381.4955 | 1167.5594 | 4.9681 | 689.9543 | 529.3088 | 20.7240 | 9.9127 |
| | 1 | MIN | -20.6140 | -1381.4955 | -1167.5594 | -4.9681 | -689.9543 | -529.3088 | -20.7240 | -9.9127 |
| 7 | 1 | MAX | 89.7368 | 1149.6194 | 471.2644 | 16.0289 | 1207.3540 | 617.3839 | 9.2191 | 10.7835 |
| | 1 | MIN | -89.7368 | -1149.6194 | -471.2644 | -16.0289 | -1207.3540 | -617.3839 | -9.2191 | -10.7835 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 1 | MAX | 35.4258 | 599.1083 | 322.9354 | 8.1655 | 2921.4209 | 2363.7925 | 5.9041 | 42.9692 |
| | 1 | MIN | -35.4258 | -599.1083 | -322.9354 | -8.1655 | -2921.4209 | -2363.7925 | -5.9041 | -42.9692 |
| 9 | 1 | MAX | 20.6140 | 1082.8497 | 1008.8514 | 2.0843 | 1878.9966 | 1743.9757 | 17.0057 | 29.4551 |
| | 1 | MIN | -20.6140 | -1082.8497 | -1008.8514 | -2.0843 | -1878.9966 | -1743.9757 | -17.0057 | -29.4551 |
| 10 | 1 | MAX | 65.1514 | 1508.5974 | 763.4995 | 1.7259 | 2413.8521 | 1552.2207 | 17.9911 | 30.6727 |
| | 1 | MIN | -65.1514 | -1508.5974 | -763.4995 | -1.7259 | -2413.8521 | -1552.2207 | -17.9911 | -30.6727 |
| 11 | 1 | MAX | 20.6140 | 1121.9293 | 1025.2610 | 2.3532 | 1478.9301 | 1313.4380 | 17.4568 | 22.7022 |
| | 1 | MIN | -20.6140 | -1121.9293 | -1025.2610 | -2.3532 | -1478.9301 | -1313.4380 | -17.4568 | -22.7022 |
| 12 | 1 | MAX | 20.6140 | 1082.6305 | 915.1426 | 1.8089 | 1327.4314 | 1206.8198 | 16.2421 | 20.6037 |
| | 1 | MIN | -20.6140 | -1082.6305 | -915.1426 | -1.8089 | -1327.4314 | -1206.8198 | -16.2421 | -20.6037 |
| 13 | 1 | MAX | 20.6140 | 1039.8743 | 911.8909 | 1.7044 | 1274.8926 | 1170.6517 | 15.8680 | 19.8825 |
| | 1 | MIN | -20.6140 | -1039.8743 | -911.8909 | -1.7044 | -1274.8926 | -1170.6517 | -15.8680 | -19.8825 |
| 14 | 1 | MAX | 35.4258 | 605.6146 | 339.1918 | 4.6402 | 1669.4769 | 1341.6371 | 6.3397 | 24.4806 |
| | 1 | MIN | -35.4258 | -605.6146 | -339.1918 | -4.6402 | -1669.4769 | -1341.6371 | -6.3397 | -24.4806 |
| 15 | 1 | MAX | 35.4258 | 609.0793 | 345.1502 | 7.2839 | 2894.1399 | 2341.4915 | 6.9688 | 42.5661 |
| | 1 | MIN | -35.4258 | -609.0793 | -345.1502 | -7.2839 | -2894.1399 | -2341.4915 | -6.9688 | -42.5661 |
| 16 | 1 | MAX | 20.6140 | 1019.7601 | 928.1563 | 1.9917 | 1892.1064 | 1764.6272 | 15.8367 | 29.7296 |
| | 1 | MIN | -20.6140 | -1019.7601 | -928.1563 | -1.9917 | -1892.1064 | -1764.6272 | -15.8367 | -29.7296 |
| 17 | 1 | MAX | 20.6140 | 1034.8856 | 904.3895 | 2.7644 | 1761.0823 | 1595.8723 | 15.7665 | 27.2923 |
| | 1 | MIN | -20.6140 | -1034.8856 | -904.3895 | -2.7644 | -1761.0823 | -1595.8723 | -15.7665 | -27.2923 |
| 18 | 1 | MAX | 20.6140 | 1046.0375 | 928.3337 | 2.2827 | 1489.6333 | 1332.9352 | 16.0518 | 22.9477 |
| | 1 | MIN | -20.6140 | -1046.0375 | -928.3337 | -2.2827 | -1489.6333 | -1332.9352 | -16.0518 | -22.9477 |
| 19 | 1 | MAX | 20.6140 | 1063.6202 | 934.7557 | 1.8809 | 1322.1233 | 1217.1804 | 16.2469 | 20.6447 |
| | 1 | MIN | -20.6140 | -1063.6202 | -934.7557 | -1.8809 | -1322.1233 | -1217.1804 | -16.2469 | -20.6447 |
| 20 | 1 | MAX | 20.6140 | 999.1075 | 903.8638 | 1.5023 | 1267.2117 | 1179.1057 | 15.4713 | 19.8887 |
| | 1 | MIN | -20.6140 | -999.1075 | -903.8638 | -1.5023 | -1267.2117 | -1179.1057 | -15.4713 | -19.8887 |
| 21 | 1 | MAX | 35.4258 | 586.9789 | 331.1080 | 5.5078 | 1663.9386 | 1337.7148 | 6.5358 | 24.4036 |
| | 1 | MIN | -35.4258 | -586.9789 | -331.1080 | -5.5078 | -1663.9386 | -1337.7148 | -6.5358 | -24.4036 |
| 22 | 1 | MAX | 89.7368 | 909.0540 | 512.5140 | 18.6869 | 2119.7783 | 1137.2155 | 10.4802 | 22.4885 |
| | 1 | MIN | -89.7368 | -909.0540 | -512.5140 | -18.6869 | -2119.7783 | -1137.2155 | -10.4802 | -22.4885 |
| 23 | 1 | MAX | 35.4258 | 1848.9153 | 1396.0402 | 9.8562 | 1086.6282 | 799.4589 | 25.8118 | 14.3804 |
| | 1 | MIN | -35.4258 | -1848.9153 | -1396.0402 | -9.8562 | -1086.6282 | -799.4589 | -25.8118 | -14.3804 |
| 24 | 1 | MAX | 35.4258 | 2088.8113 | 1432.8623 | 9.0125 | 969.7593 | 744.1896 | 28.6315 | 13.0061 |
| | 1 | MIN | -35.4258 | -2088.8113 | -1432.8623 | -9.0125 | -969.7593 | -744.1896 | -28.6315 | -13.0061 |
| 25 | 1 | MAX | 35.4258 | 2044.7202 | 1417.0317 | 7.4082 | 846.0729 | 673.6450 | 28.1443 | 11.3009 |
| | 1 | MIN | -35.4258 | -2044.7202 | -1417.0317 | -7.4082 | -846.0729 | -673.6450 | -28.1443 | -11.3009 |
| 26 | 1 | MAX | 35.4258 | 2074.0220 | 1432.4172 | 6.5237 | 751.0479 | 593.6089 | 28.5076 | 9.9784 |
| | 1 | MIN | -35.4258 | -2074.0220 | -1432.4172 | -6.5237 | -751.0479 | -593.6089 | -28.5076 | -9.9784 |
| 27 | 1 | MAX | 35.4258 | 1939.7800 | 1393.5238 | 6.3102 | 708.7458 | 505.8489 | 26.6099 | 9.1676 |
| | 1 | MIN | -35.4258 | -1939.7800 | -1393.5238 | -6.3102 | -708.7458 | -505.8489 | -26.6099 | -9.1676 |
| 28 | 1 | MAX | 89.7368 | 1125.3469 | 529.6689 | 14.4446 | 1193.3586 | 602.7162 | 12.3962 | 10.8251 |
| | 1 | MIN | -89.7368 | -1125.3469 | -529.6689 | -14.4446 | -1193.3586 | -602.7162 | -12.3962 | -10.8251 |

BEAM FORCES

| BAY | LOAD | | TORS MOMENT | I MOMENT | J MOMENT |
|---|---|---|---|---|---|
| 1 | 1 | MAX | 28.1772 | 902.3298 | 735.5128 |
| | 1 | MIN | -28.1772 | -902.3298 | -735.5128 |
| 2 | 1 | MAX | 20.5866 | 1263.7657 | 1186.6898 |
| | 1 | MIN | -20.5866 | -1263.7657 | -1186.6898 |
| 3 | 1 | MAX | 15.1754 | 1079.9634 | 1092.8671 |
| | 1 | MIN | -15.1754 | -1079.9634 | -1092.8671 |
| 4 | 1 | MAX | 28.0603 | 1054.1366 | 854.0094 |
| | 1 | MIN | -28.0603 | -1054.1366 | -854.0094 |
| 5 | 1 | MAX | 18.4095 | 687.8702 | 736.7662 |
| | 1 | MIN | -18.4095 | -687.8702 | -736.7662 |
| 6 | 1 | MAX | 18.9679 | 704.0169 | 1119.3383 |
| | 1 | MIN | -18.9679 | -704.0169 | -1119.3383 |
| 7 | 1 | MAX | 20.5804 | 2108.4492 | 1416.1329 |
| | 1 | MIN | -20.5804 | -2108.4492 | -1416.1329 |
| 8 | 1 | MAX | 12.0606 | 1159.7278 | 916.1546 |
| | 1 | MIN | -12.0606 | -1159.7278 | -916.1546 |
| 9 | 1 | MAX | 32.5837 | 1176.9991 | 1149.7449 |
| | 1 | MIN | -32.5837 | -1176.9991 | -1149.7449 |
| 10 | 1 | MAX | 7.3451 | 897.7686 | 682.0495 |
| | 1 | MIN | -7.3451 | -897.7686 | -682.0495 |
| 11 | 1 | MAX | 29.4603 | 781.5832 | 623.1533 |
| | 1 | MIN | -29.4603 | -781.5832 | -623.1533 |

[redacted]



| | | | | | |
|---|---|---|---|---|---|
| 12 | 1 | MAX | 27.6806 | 750.9717 | 604.4639 |
| | 1 | MIN | -27.6806 | -750.9717 | -604.4639 |
| 13 | 1 | MAX | 20.3720 | 1170.3627 | 778.5148 |
| | 1 | MIN | -20.3720 | -1170.3627 | -778.5148 |
| 14 | 1 | MAX | 11.5156 | 598.1299 | 474.0742 |
| | 1 | MIN | -11.5156 | -598.1299 | -474.0742 |
| 15 | 1 | MAX | 18.9204 | 677.6002 | 755.7054 |
| | 1 | MIN | -18.9204 | -677.6002 | -755.7054 |
| 16 | 1 | MAX | 28.4834 | 745.8597 | 654.0120 |
| | 1 | MIN | -28.4834 | -745.8597 | -654.0120 |
| 17 | 1 | MAX | 4.0971 | 538.9183 | 529.5817 |
| | 1 | MIN | -4.0971 | -538.9183 | -529.5817 |
| 18 | 1 | MAX | 3.7786 | 591.8357 | 610.5081 |
| | 1 | MIN | -3.7786 | -591.8357 | -610.5081 |
| 19 | 1 | MAX | 8.5003 | 466.8046 | 595.8339 |
| | 1 | MIN | -8.5003 | -466.8046 | -595.8339 |
| 20 | 1 | MAX | 24.7828 | 1575.7643 | 1586.5364 |
| | 1 | MIN | -24.7828 | -1575.7643 | -1586.5364 |
| 21 | 1 | MAX | 14.5046 | 1080.2891 | 1079.1152 |
| | 1 | MIN | -14.5046 | -1080.2891 | -1079.1152 |
| 22 | 1 | MAX | 33.1847 | 1313.1357 | 1095.3445 |
| | 1 | MIN | -33.1847 | -1313.1357 | -1095.3445 |
| 23 | 1 | MAX | 9.2220 | 899.6746 | 899.6032 |
| | 1 | MIN | -9.2220 | -899.6746 | -899.6032 |
| 24 | 1 | MAX | 10.6214 | 784.7834 | 793.5724 |
| | 1 | MIN | -10.6214 | -784.7834 | -793.5724 |
| 25 | 1 | MAX | 9.8098 | 738.7153 | 746.3109 |
| | 1 | MIN | -9.8098 | -738.7153 | -746.3109 |
| 26 | 1 | MAX | 20.7514 | 932.4158 | 934.8359 |
| | 1 | MIN | -20.7514 | -932.4158 | -934.8359 |
| 27 | 1 | MAX | 10.4932 | 610.9067 | 494.5019 |
| | 1 | MIN | -10.4932 | -610.9067 | -494.5019 |
| 28 | 1 | MAX | 8.2721 | 588.4127 | 575.6437 |
| | 1 | MIN | -8.2721 | -588.4127 | -575.6437 |
| 29 | 1 | MAX | 3.4524 | 545.1218 | 545.9642 |
| | 1 | MIN | -3.4524 | -545.1218 | -545.9642 |
| 30 | 1 | MAX | 3.6154 | 562.9102 | 556.4888 |
| | 1 | MIN | -3.6154 | -562.9102 | -556.4888 |
| 31 | 1 | MAX | 3.8797 | 568.3186 | 590.0662 |
| | 1 | MIN | -3.8797 | -568.3186 | -590.0662 |
| 32 | 1 | MAX | 9.8070 | 462.4177 | 577.3806 |
| | 1 | MIN | -9.8070 | -462.4177 | -577.3806 |
| 33 | 1 | MAX | 22.8490 | 1377.7974 | 2065.0649 |
| | 1 | MIN | -22.8490 | -1377.7974 | -2065.0649 |
| 34 | 1 | MAX | 9.2374 | 908.5609 | 1154.1569 |
| | 1 | MIN | -9.2374 | -908.5609 | -1154.1569 |
| 35 | 1 | MAX | 10.0610 | 759.5526 | 1021.8728 |
| | 1 | MIN | -10.0610 | -759.5526 | -1021.8728 |
| 36 | 1 | MAX | 8.2860 | 670.6888 | 889.0862 |
| | 1 | MIN | -8.2860 | -670.6888 | -889.0862 |
| 37 | 1 | MAX | 7.5645 | 610.6864 | 790.2698 |
| | 1 | MIN | -7.5645 | -610.6864 | -790.2698 |
| 38 | 1 | MAX | 8.6069 | 589.3568 | 754.0040 |
| | 1 | MIN | -8.6069 | -589.3568 | -754.0040 |
| 39 | 1 | MAX | 18.0887 | 771.4008 | 1162.4958 |
| | 1 | MIN | -18.0887 | -771.4008 | -1162.4958 |
| 40 | 1 | MAX | 28.8766 | 929.7326 | 779.5750 |
| | 1 | MIN | -28.8766 | -929.7326 | -779.5750 |
| 41 | 1 | MAX | 16.4156 | 1181.4661 | 1108.8330 |
| | 1 | MIN | -16.4156 | -1181.4661 | -1108.8330 |
| 42 | 1 | MAX | 17.7415 | 1037.2198 | 1051.3666 |
| | 1 | MIN | -17.7415 | -1037.2198 | -1051.3666 |
| 43 | 1 | MAX | 20.1869 | 1055.3052 | 1046.9182 |
| | 1 | MIN | -20.1869 | -1055.3052 | -1046.9182 |
| 44 | 1 | MAX | 19.8406 | 1085.0139 | 1117.4492 |
| | 1 | MIN | -19.8406 | -1085.0139 | -1117.4492 |

| | | | | | |
|---|---|---|---|---|---|
| 45 | 1 | MAX | 17.1313 | 918.4484 | 1137.4172 |
| | 1 | MIN | -17.1313 | -918.4484 | -1137.4172 |

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

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