Department of Civil Engineering
University of Alberta
Edmonton

Structural Engineering Report No. 165

NORCO:
A PROGRAM FOR NONLINEAR FINITE ELEMENT ANALYSIS OF REINFORCED CONCRETE STRUCTURES: USER'S MANUAL

by
S. BALAKRISHNAN
A. E. ELWI
D. W. MURRAY

April 1989

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The University of Alberta

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NORCO

A Program for Nonlinear Finite Element Analysis of Reinforced Concrete Structures

- User's Manual -

by

S. Balakrishnan

A.E. Elwi

D.W. Murray

Department of Civil Engineering

University of Alberta

Edmonton, Alberta, Canada, T6G 2G7

April 1989

DISCLAIMER

This program was developed by the authors as a research tool for use in studying the behavior of reinforced concrete structures. It is not intended to be a production program and requires considerable experience and knowledge of both finite element modeling and concrete behavior on the part of the analyst if reliable results are to be obtained.

In using the program the user accepts and understands that no warranty is expressed or implied by the developers or distributors on the accuracy or the reliability of the program.

Users must clearly understand the basic assumptions of the program and must verify their own results.

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CHAPTER ONE

OVERVIEW

1.1 INTRODUCTION

This report is intended as a supplement to Structural Engineering Report No. 138, Department of Civil Engineering, University of Alberta entitled "Finite Element Prediction of Reinforced Concrete Behavior", July 1986, by Balakrishnan and Murray. This report describes the program NORCO (acronym for NOnlinear Analysis of Reinforced COncrete) which was developed as part of the research work on nonlinear analysis of concrete structures undertaken by the authors. This program incorporates the constitutive relationship described in Balakrishnan and Murray (1986). NORCO is a derivative program of FEPARCS (Finite Element Program for the Analysis of Axisymmetric Reinforced Concrete Structures) whose listing and User's Manual are contained in Structural Engineering Report No. 93, Department of Civil Engineering, University of Alberta, 1980.

1.2 ORGANIZATION OF THE REPORT

Chapter Two contains a general description of the program NORCO including the finite element model, constitutive relationships, the numerical solution strategy and IO (input and output). Chapter Three contains a flow diagram of the program operations and a description of the program structure. Chapter Four describes the input data file. Chapter Five contains a sample problem including the input and output files. Appendix A

contains the full listing of the program, while Appendix B contains a listng of the plotting program.

CHAPTER TWO

GENERAL DESCRIPTION OF NORCO

2.1 INTRODUCTION

Program NORCO is intended for linear or nonlinear analysis of plane reinforced concrete structures subjected to static loads. This program is based upon FEPARCS5 developed by Elwi and Murray (1980), which is a finite element FORTRAN code for static analysis of axisymmetric or plane, reinforced and/or prestressed concrete structures. Program NORCO may be used to predict the behavior of two dimensional planar continuum structures which can be discretized into interconnected elements subjected to in-plane forces, and to predict the behavior of individual structural members such as beams, as shown in Fig. 2.1.

2.2 FINITE ELEMENT MODEL

Program NORCO is based on the finite element model described by Balakrishnan and Murray (1986). The finite element formulations used herein are based on the principle of virtual work. The structure such as that shown in Fig. 2.2 is modeled as an assemblage of elements interconnected at nodal points on the element boundaries. The displacement at any point within a typical element is assumed to be a function of the nodal displacements. The program uses isoparametric element formulation (see Zienkiewicz et al., 1977) wherein the element displacements and the element coordinates are expressed by the same interpolation functions, using the natural coordinate system

of the element. The program can handle variable number of nodes on element boundaries. That is, each finite element may have different number of nodes on different sides (see Fig. 2.3). The program can also handle quadratic or cubic Lagrangian elements.

Embedded representation is used for reinforcing elements. That is, reinforcing element is contained inside solid concrete element. The displacement at any point along the reinforcement w_s, is given by

$$w_s = w_c + w_b$$

where w_c is the displacement of concrete at that point and w_b is the bond slip (i.e. the relative displacement between steel and concrete), as illustrated in Fig. 2.4. The bond slip, w_b, is again interpolated from the displacement of the bond-slip "nodes" placed along the reinforcing element. At the present time, the reinforcing elements can be placed only along the local coordinate axes of the element.

A typical finite element model for one-half of a beam structure with quadratic concrete elements, embedded primary reinforcing steel, and embedded stirrups is shown in Fig. 2.5. Bond elements may be included or excluded with each layer of reinforcing steel. Where they are included, nodal points along the reinforcement layer, each with a single slip degree of freedom, must be added. In Fig. 2.5, the x's represent such nodal points for quadratic bond elements on the primary reinforcement in the outer quarter span of the model.

Based on some fundamental studies on cracked reinforced elements (not included herein but related to the convergence studies described in Balakrishnan and Murray (1986)), a modelling technique in which steel layers are located through the concrete element integration points (i.e. Gauss points) is recommended. Thus the stirrups in Fig. 2.5 are lumped on the vertical lines passing through the Gauss points. The primary reinforcement may be located at its actual position.

2.3 CONSTITUTIVE RELATIONS

Constitutive relationships for concrete are described in Balakrishnan and Murray (1986) and is illustrated in Fig. 2.6. The model is intended for use in a "smeared cracking" type of finite element analysis. It has a piecewise linear uniaxial stress-strain relationship with tension softening and tension stiffening for tensile response, and strain hardening and strain softening for compressive response. The points of slope discontinuity of the uniaxial curve divide the idealized stress-strain response curve into regions referred to as "damage regions". These are shown in Fig. 2.6. The peak points of this uniaxial curve are obtained from the biaxial failure envelope shown in Fig. 2.7, wherein the post-cracking compressive strength of concrete is separately defined. The tensile stress in concrete is set equal to zero after reinforcement yield. The incremental shear modulus is assumed to change in proportion to the incremental compressive modulus and to decrease linearly with average tensile strain in the post-cracking region. The peak

values of the stress-strain curve under biaxial stress conditions are adjusted to those associated with the failure envelope described in Balakrishnan and Murray (1986).

Two versions of NORCO are available. In the basic version, the axes of orthotropy are fixed at the onset of cracking to be parallel and perpendicular to the crack. In the rotating crack version, the axes of orthotropy are assumed to coincide with the principal strain axes even after cracking.

For steel, a simple one dimensional elastic plastic constitutive relation has been adopted.

The bond stress vs. slip relationship is given by a trilinear relationship as described in Balakrishnan and Murray (1986).

2.4 LOADS

Program NORCO can handle several types of loads. Normal and tangential surface tractions are input as nodal pressure intensities. Each is integrated to form work equivalent nodal loads and stored in separate arrays. These arrays and an array containing the concentrated loads are combined to form a load increment by applying load factors specified by the user.

2.5 INPUT AND OUTPUT

Program NORCO is executed in several stages. The first stage is called the "problem preparation phase" or the "preprocessing phase". The input to this phase is composed of control parameters, material properties, nodal geometry, boundary

conditions, solid element information, reinforcing layer information, concentrated nodal loads, normal and tangential surface tractions in the form of nodal pressure intensity distributions, and finally surface specification for surface tractions. The output of this phase is composed of an echo check of input data as well as the completely generated data set, if required.

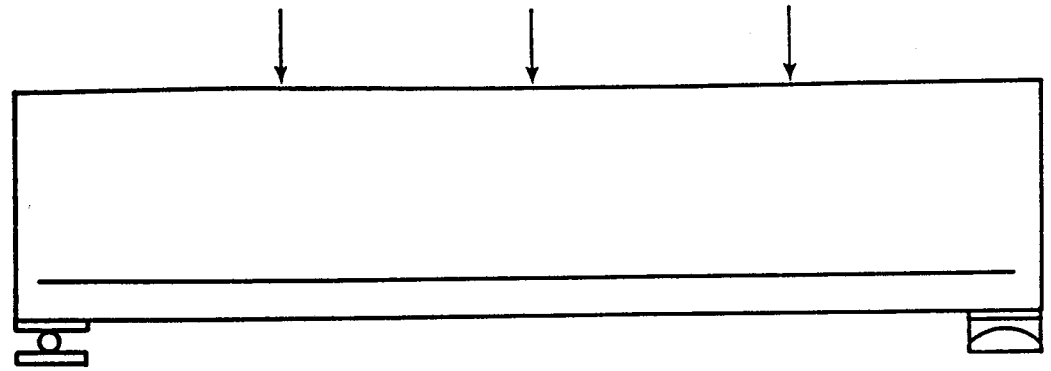
The second stage of execution is the solution or production phase which is run as many times as there are load steps. Each load step is initiated by reading a line describing the load factors, the convergence tolerances, as well as other control parameters. The output of any load step is composed of nodal displacements, stresses for the solid elements at the Gaussian integration points, and stresses and strains for the reinforcing layers at the Gaussian points.

2.6 NUMERICAL SOLUTION STRATEGY

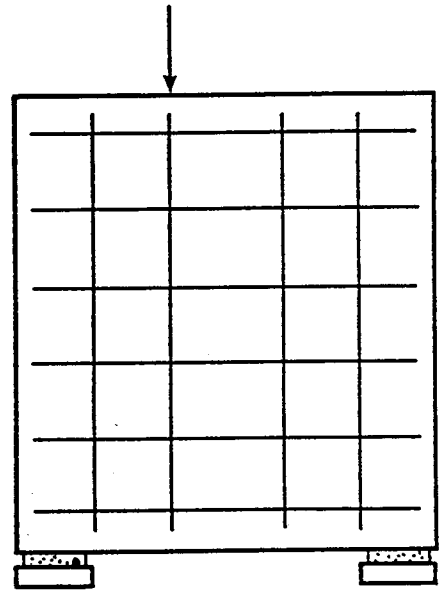
Program NORCO uses a tangent stiffness approach, or alternatively, the initial load method as solution strategies. In the first method a new stiffness matrix is evaluated at the beginning of each load increment based on the current material properties. The stiffness matrix is then re-evaluated every few iterates until convergence is obtained. In the second method, the stiffness matrix is evaluated at any specified point in the analysis, triangularized and stored. It is then used to obtain trial displacements in all subsequent load steps. In any case, assembly and triangularization of the stiffness matrix, reduction

of the load vector and back substitution are governed by an equation solving package of the skyline type (Bathe and Wilson, 1976, and Elwi and Murray, 1977).

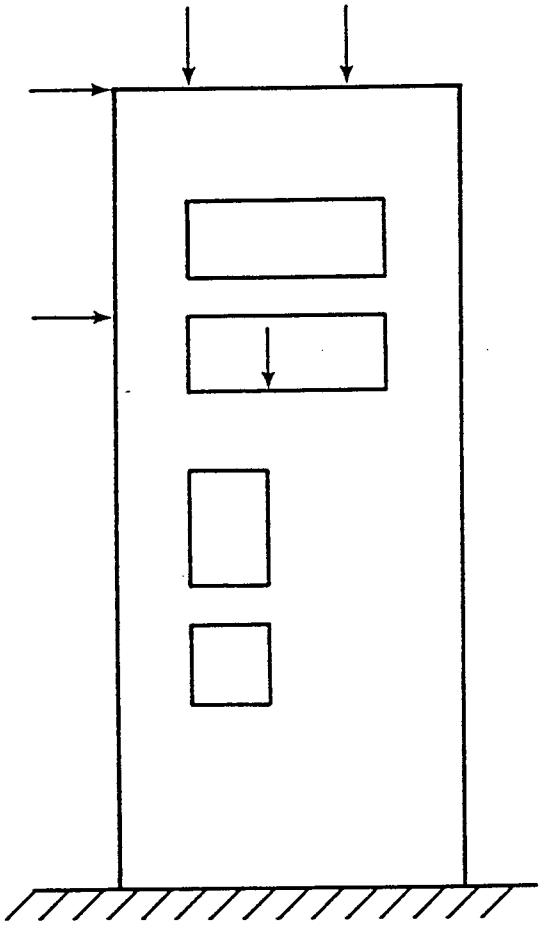
Convergence is based on displacement and load variation. The tolerances are set by the user at the beginning of every load step. In order to aid convergence an optional under (over) relaxation factor is provided.



(a) Shallow Beam



(b) Deep Beam or Large Panel



(c) Shear Wall

Fig. 2.1. Some Structural Types for Which This Study is Applicable

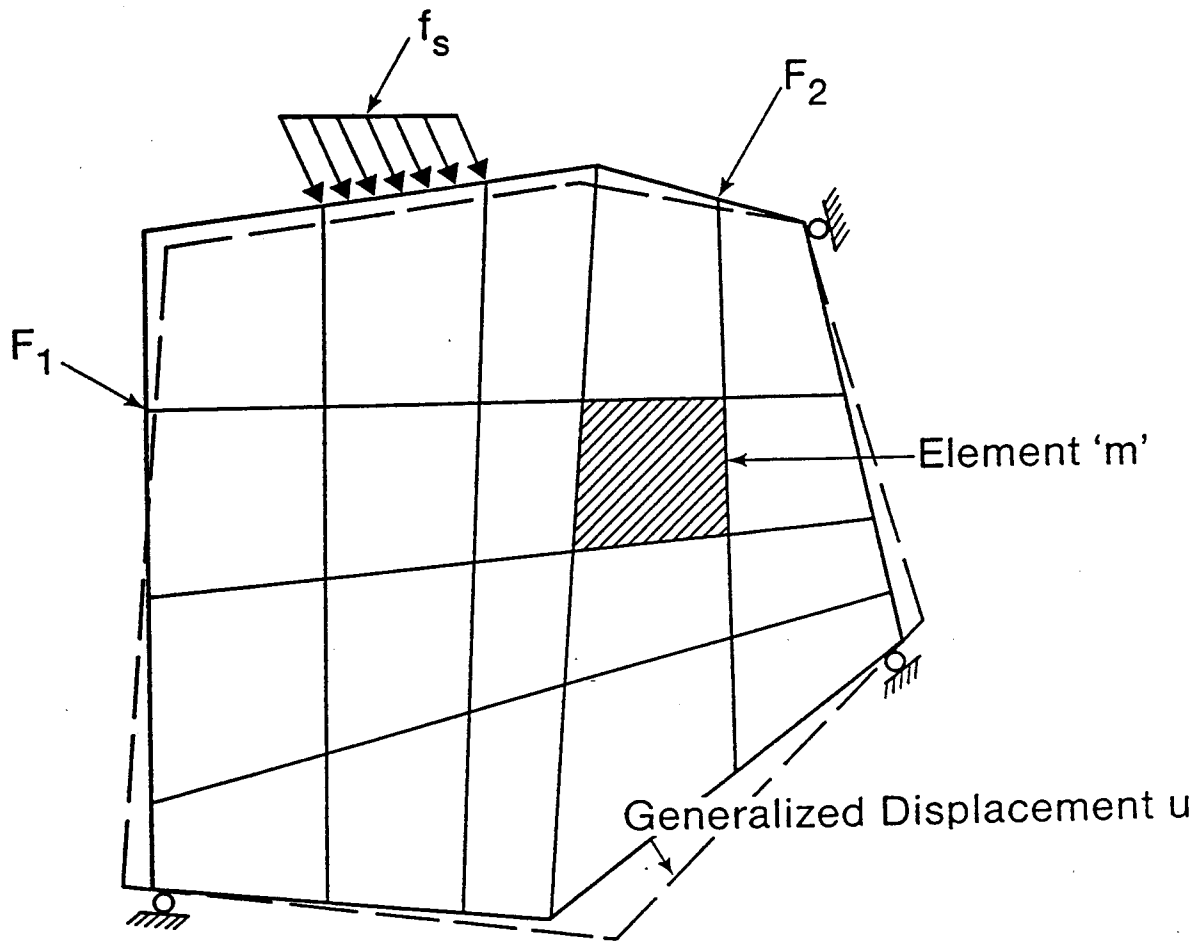


Fig. 2.2. General Structure

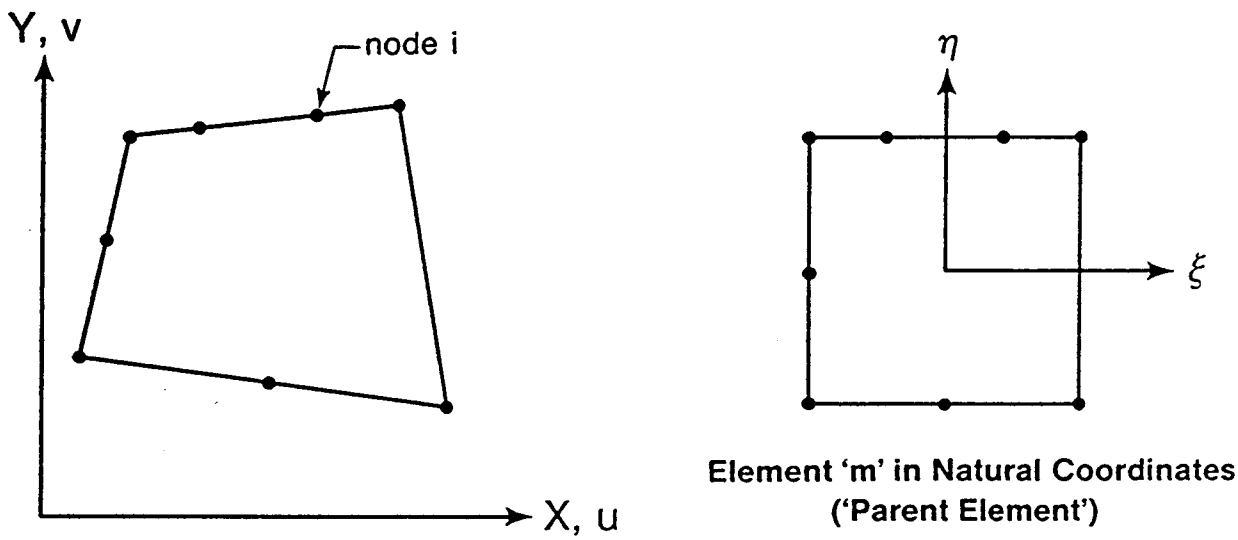


Fig. 2.3. Isoparametric Variable Number Node Elements

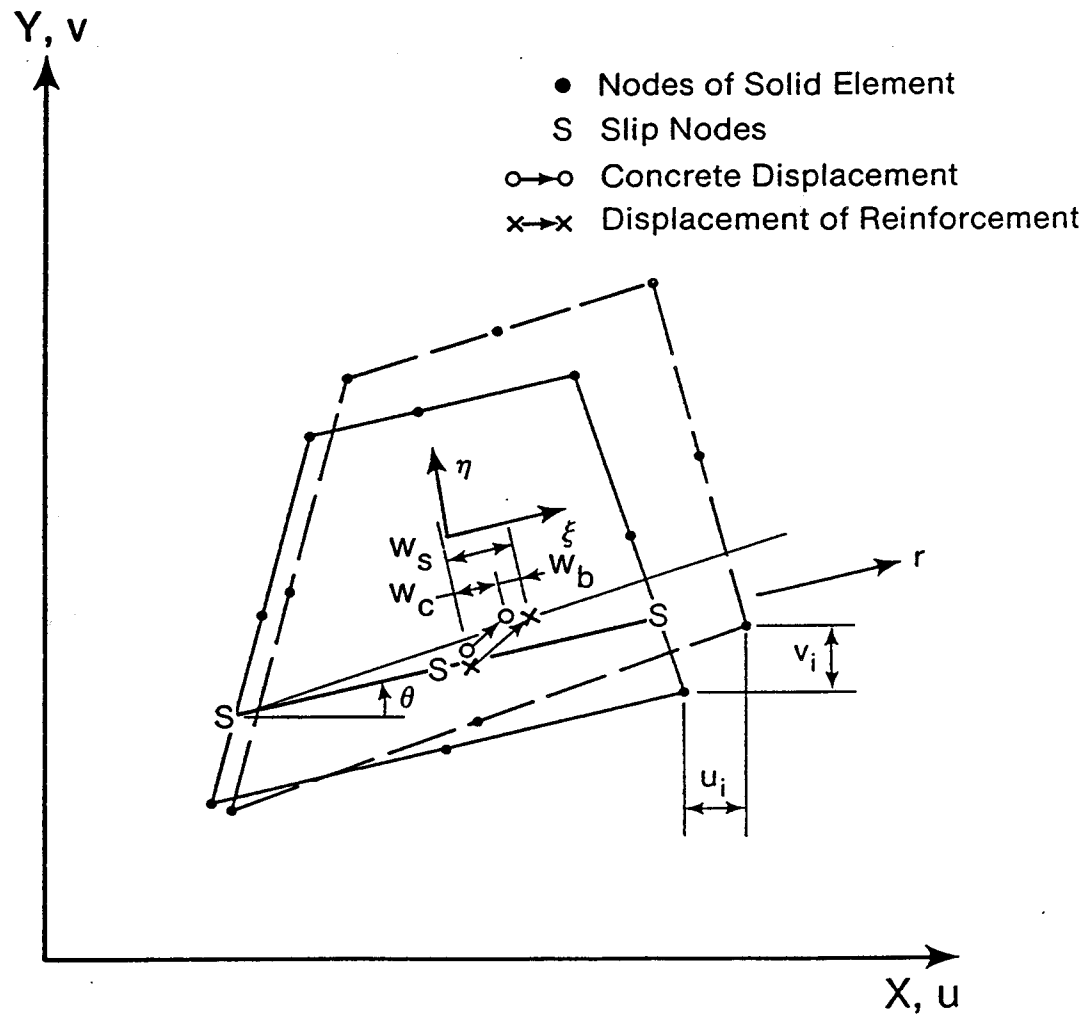


Fig. 2.4. Reinforcing Element and Bond Element

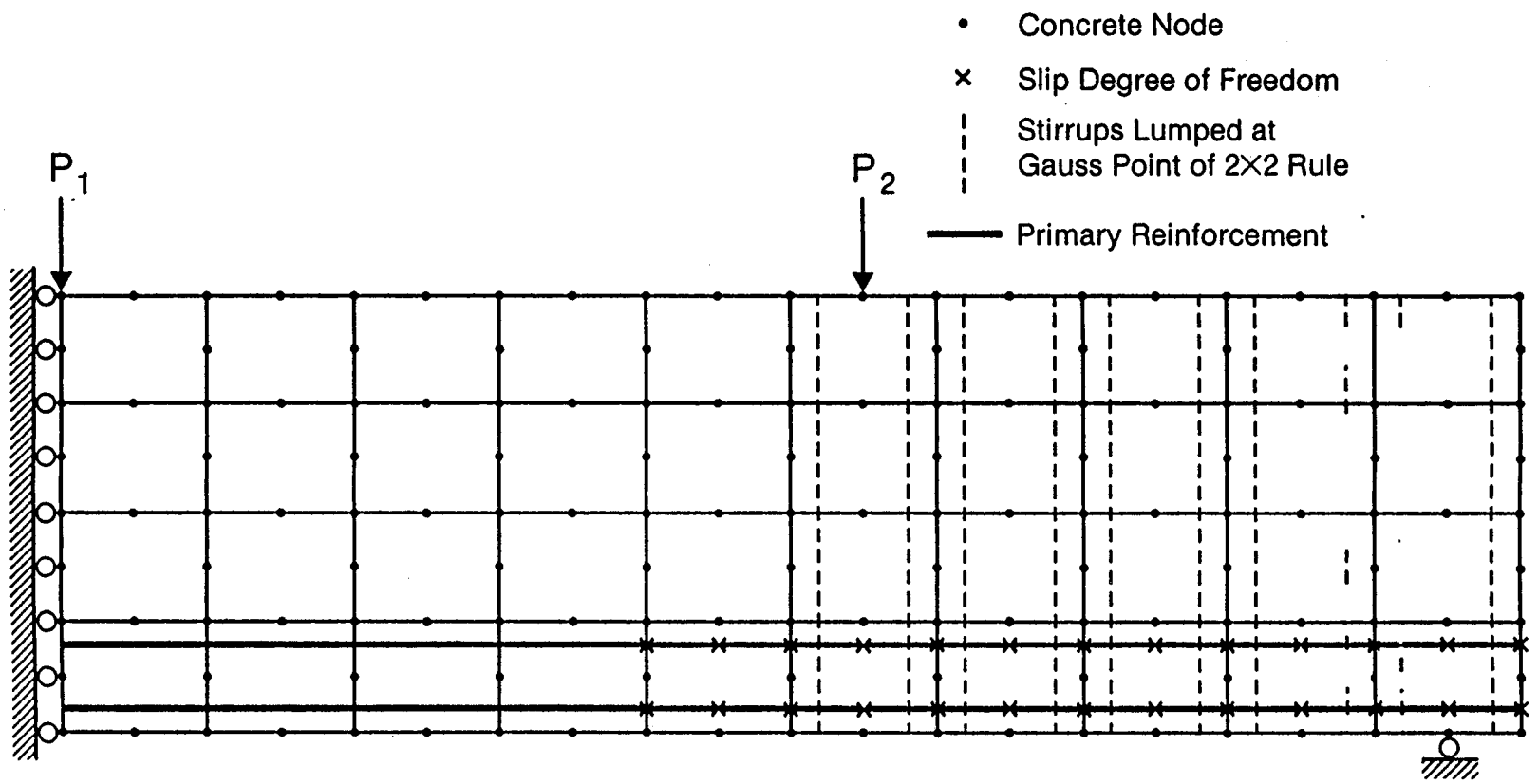


Fig. 2.5. Typical Finite Element Model of a Reinforced Concrete Beam

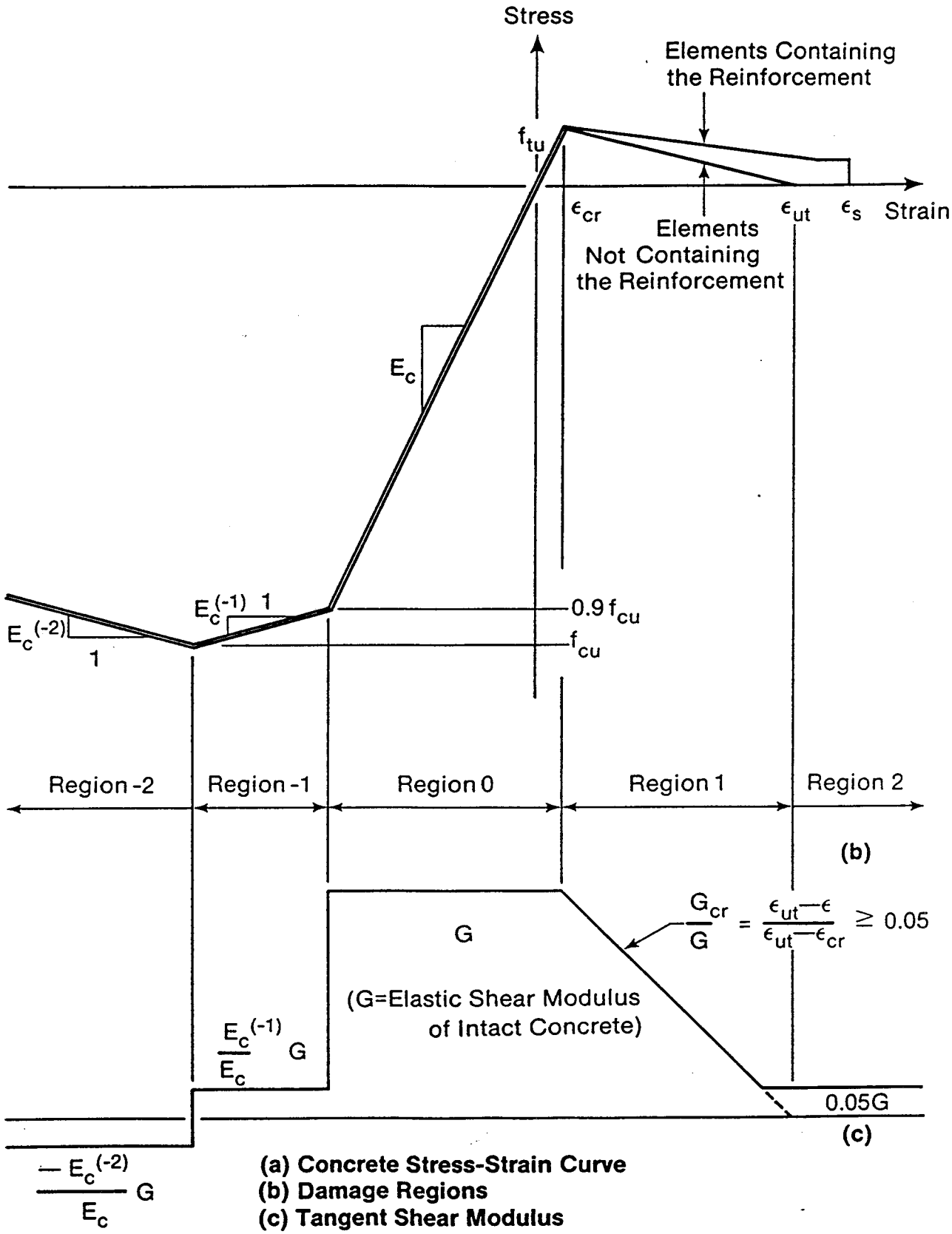


Fig. 2.6. Concrete Moduli used in Stress Computation

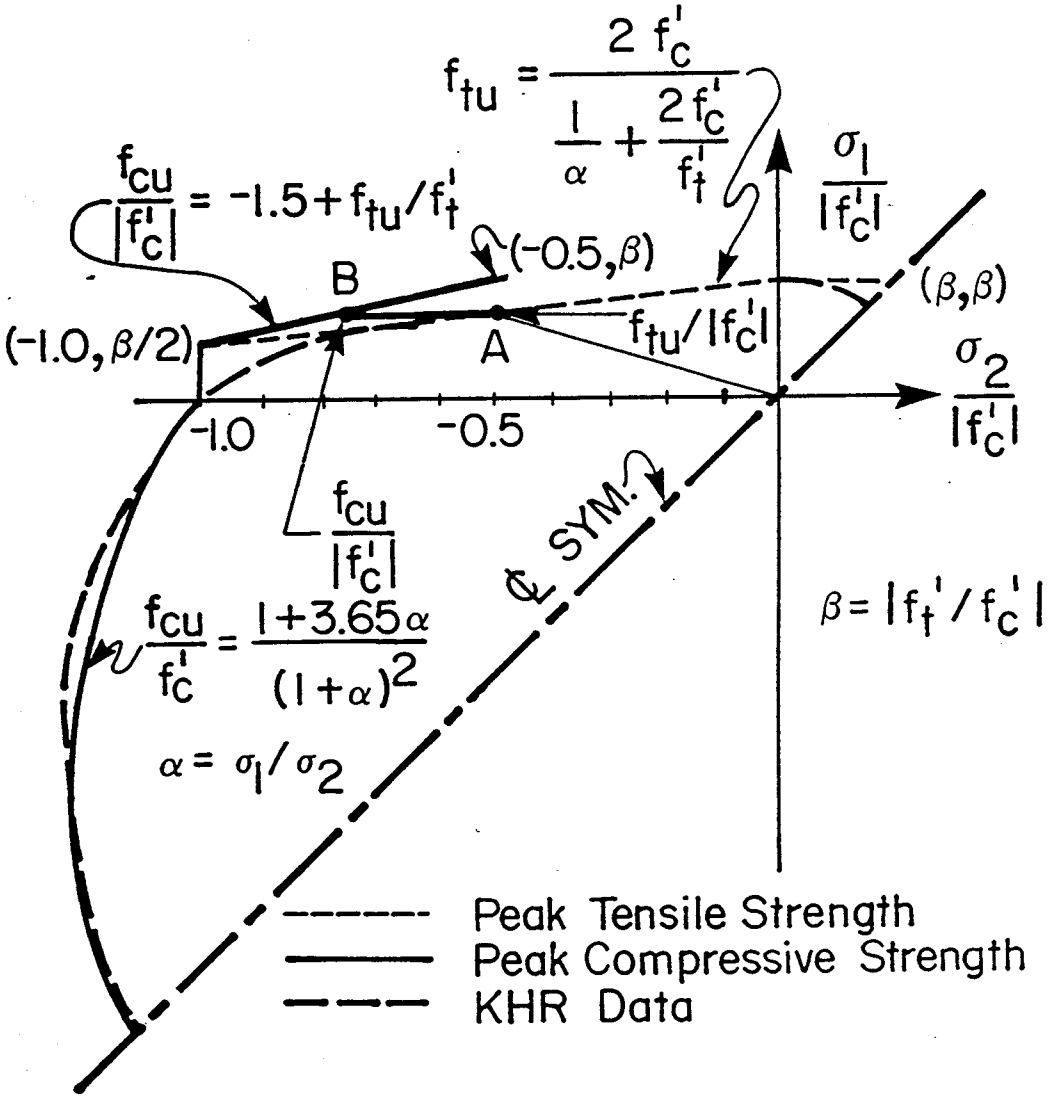


Fig. 2.7. Peak Stress Biaxial Interaction Curves

CHAPTER THREE

STRUCTURE OF NORCO

3.1 FLOW OF OPERATIONS

As mentioned in Chapter 2, program NORCO is executed in two main phases. The first phase is a problem preparation or preprocessing phase. This phase is executed in several stages. In the first stage the program reads the control parameters and calculates the required sizes of the different common blocks. The user can then adjust the size of active storage in the main segment. In the second stage the program reads and generates the structure and load data for checking purposes without carrying out any detailed calculations. The final stage is a complete preprocessing run in which the program generates all data, calculates and stores the element shape functions and derivatives at all integration points, forms the skyline of the structure stiffness matrix, initializes the stresses, strains and material properties at all integration points and finally forms the basic load vectors for all load types.

If requested, an initial stiffness matrix can be formulated, triangularized and stored out of core for use in the production phase. This stage is called "the initial load method preparation phase".

The production phase is the second phase of execution and is repeated for every load step. The size of the load step is controlled by the user who specifies the load factors according to which the basic load vectors are to be mixed in order to form

a load increment vector. Additionally, the user specifies the tolerances on convergence, the relaxation factor and the number of iterates after which the stiffness matrix is to be re-evaluated. If the last parameter is greater than the maximum number of iterates, the program automatically uses the initial load method as a solution strategy. Otherwise, the modified tangent stiffness approach is used.

Having read the load step specifications and formed the load increment vector accordingly, the program formulates and triangularizes the stiffness matrix if the tangent stiffness approach is used, or reads a stored traingularized stiffness matrix if the initial load approach is used. The program then solves for an increment of displacement and updates the total displacement vector. The stresses and material properties are then updated. If the problem is linear, the program prints the results and stops. If the problem is nonlinear, the stresses are integrated to form an equilibrating load vector which is subtracted from the total load vector to obtain the unbalanced load vector. If convergence is obtained, results are printed, and current stresses, material properties, loads and displacements are stored as unformated records on files. The load step is considered ended and the program stops. If convergence has not been obtained, the unbalanced load vector is used to obtain a further displacement increment and the steps are repeated.

When numerical difficulties such as an ill conditioned stiffness matrix occur, execution is automatically halted and the

current stresses, strains and displacements are printed for the user's consideration. Fig. 3.1 shows the flow charts of the preprocessing phase and the production phase. The initial load method preparation phase forms the first six steps of Fig. 3.1.

3.2 STRUCTURE OF PROGRAM

Program NORCO is arranged in four distinct levels. The uppermost level is the MAIN segment. This segment is composed of parts, each of which controls a particular execution phase. Each part of MAIN calls a number of major routines which form the second level of the program. Each major routine controls the execution of one task, such as, reading the data (subroutine DATA), and formulating the stiffness matrix (subroutine STIF), by calling a number of routines which form the third level. Third level routines are designed to handle small and specialized portions of the task of the second level calling routine. The fourth level contains routines of general nature called many times by different higher order routines. This level contains the data managing package, the material routines, and other routines.

In addition to the levels described above, the program calls four MTS system routines which can be replaced. These are READ and WRITE for reading and writing unformatted records to sequential files, and EIGRS, for eigen analysis of a symmetric matrix. In the future these routines will be replaced by routines of general FORTRAN nature. A fifth routine (VCMLT) is written in IBM ASSEMBLER language. Other than these exceptions,

the rest of the Program is written in FORTRAN IV language.

Figs. 3.2 to 3.4 show the structure of the different phases of the program. The functions of the major second level routines shown in Figs. 3.2 to 3.4 are summarized at the heading of each routine in the listing of the program in Chapter Six.

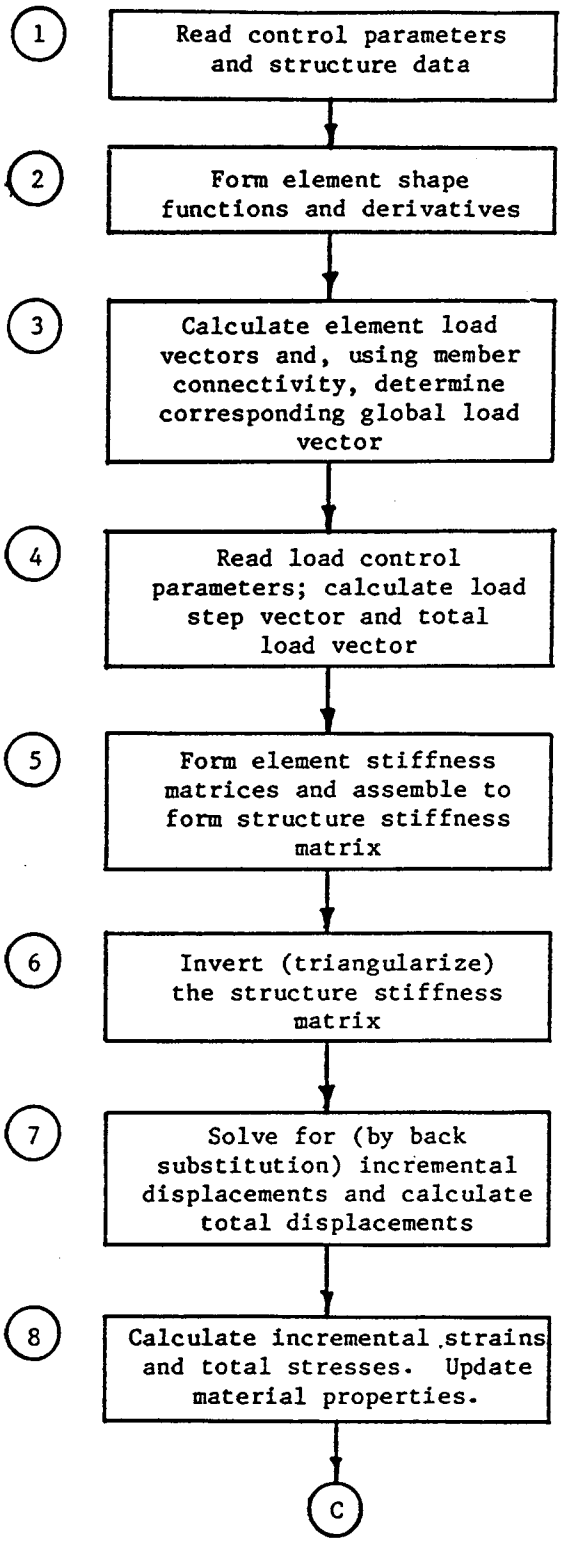


Fig. 3.1 NORCO Program Flow Diagram

(continued on next page ...)

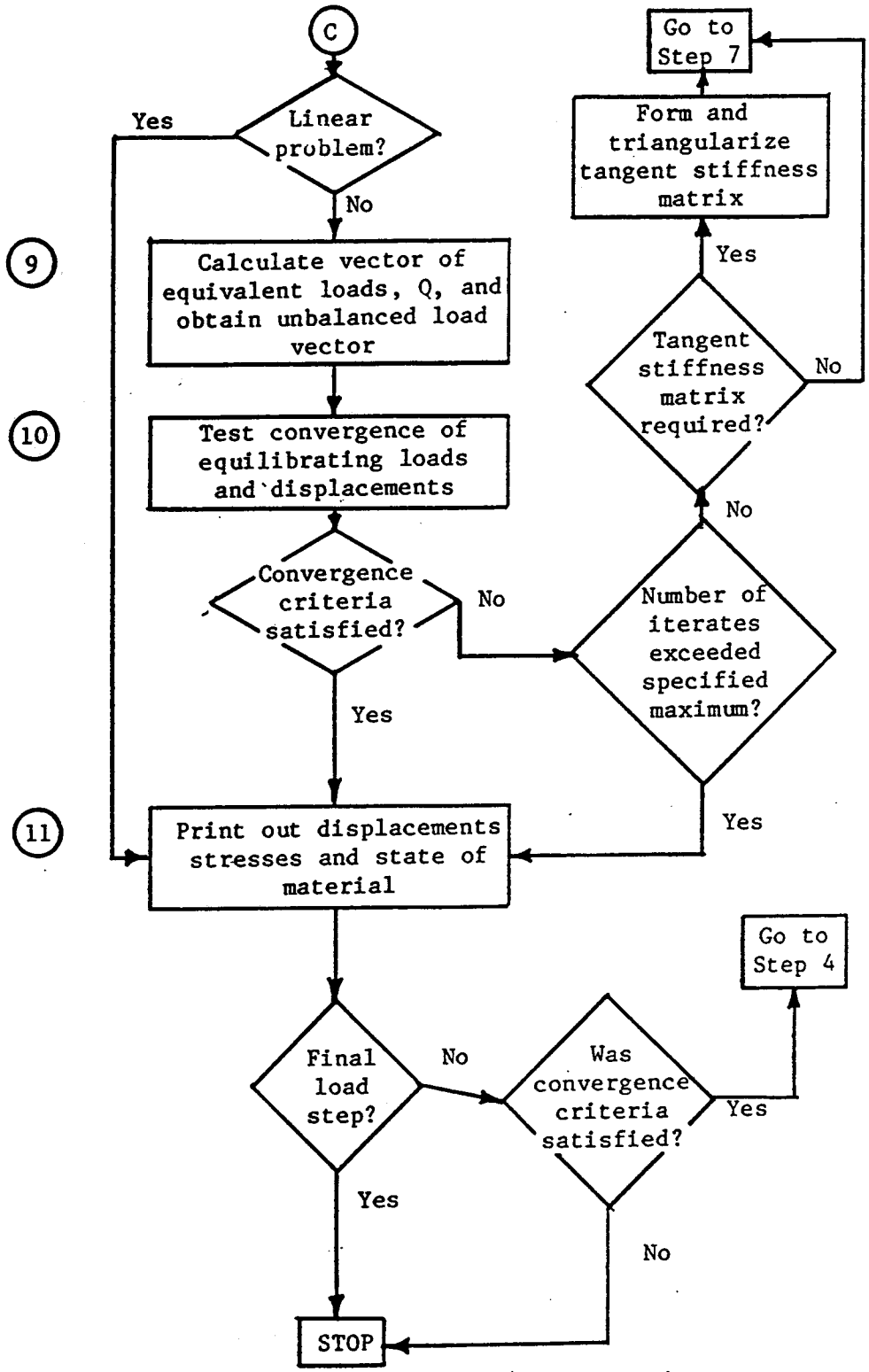


Fig. 3.1. NORCO Program Flow Diagram

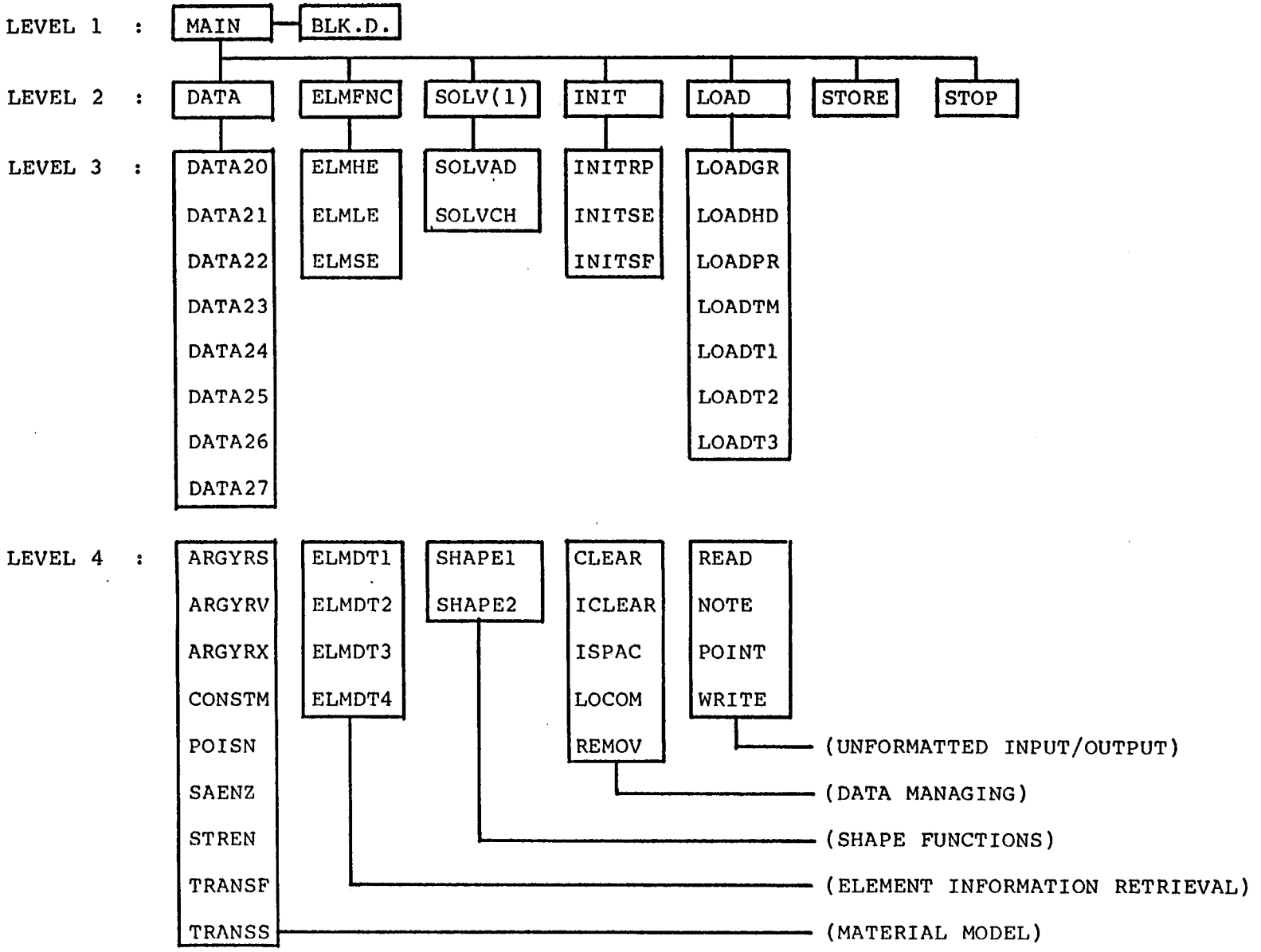


Fig. 3.2 Structure of the Preprocessing Phase

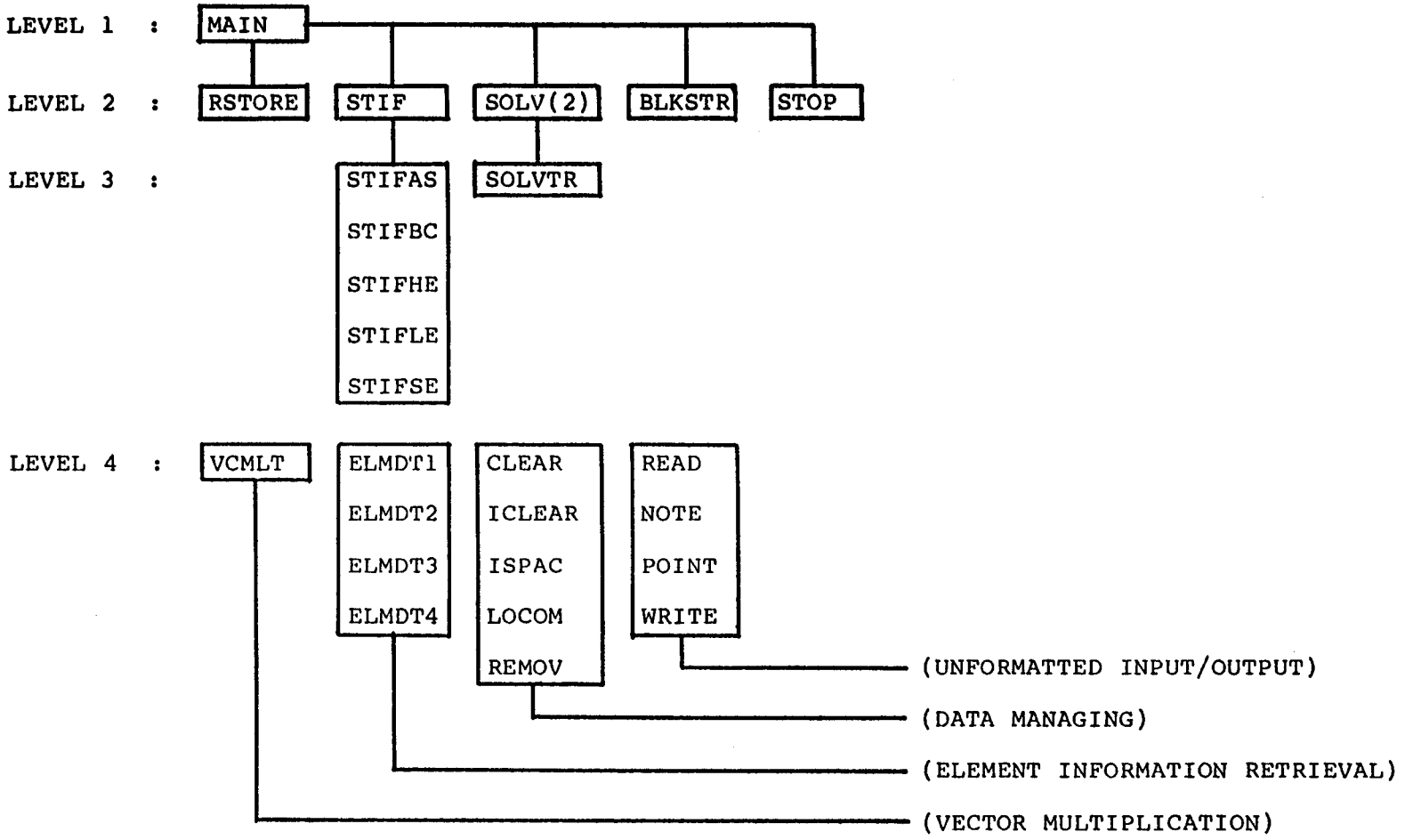


Fig. 3.3 Structure of the Initial Load Method Preparation Phase

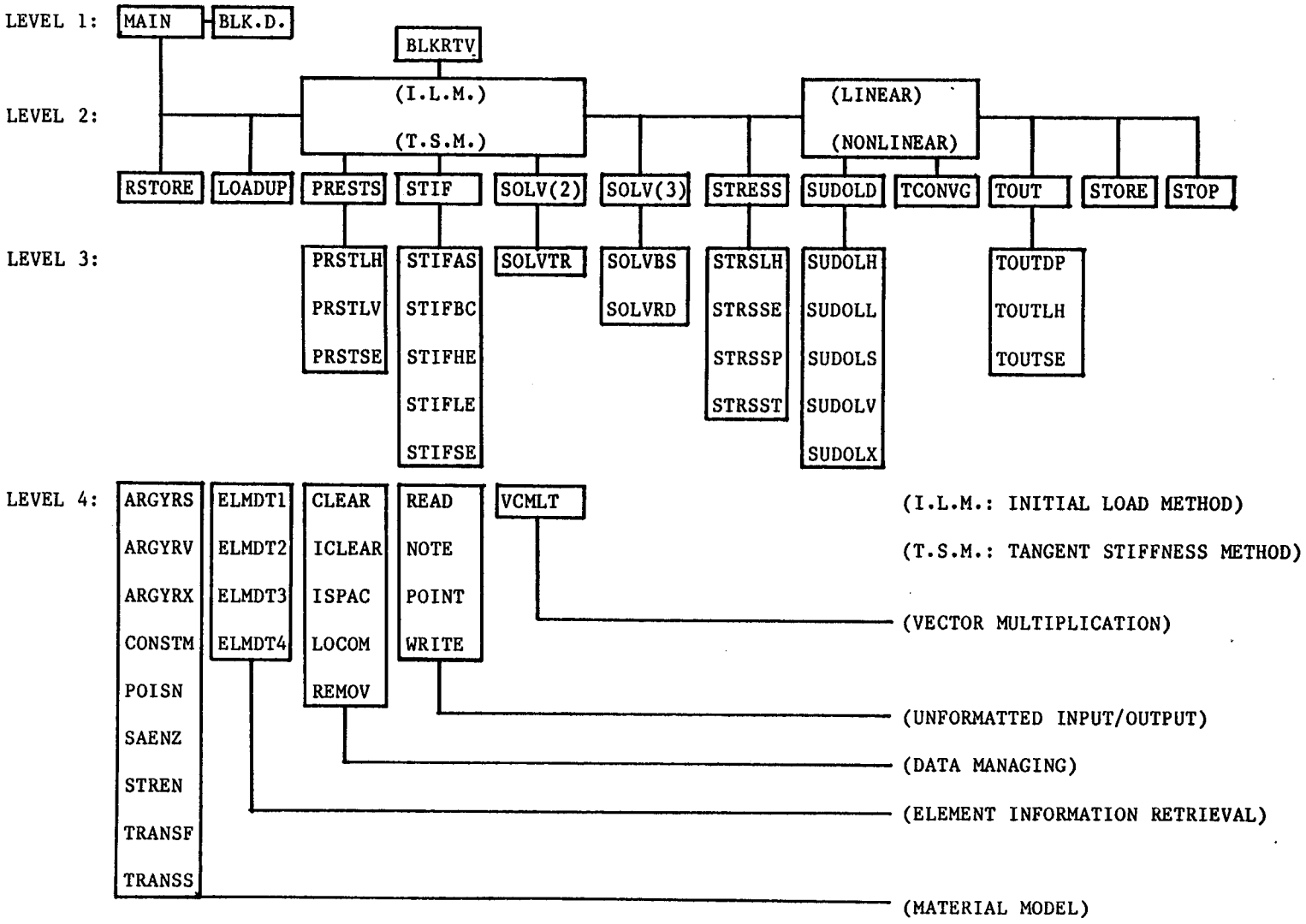


Fig. 3.4 Structure of the Production Phase

CHAPTER FOUR

INPUT DESCRIPTION

4.1 FILE DESCRIPTION

For input and output of printed data and results the program uses a number of line files. Interim and long term storage of unformatted information is done in sequential files. The files used by the program are briefly described in the following. The sizes required for sequential files are stated in bytes. For the U of A MTS virtual memory system, 1 page = 4096 bytes.

File U1

Function : contains shape functions and derivatives evaluated at all integration points of prototype elements

Type : sequential

Size : 336 bytes per integration point

Files U2 and U3

Function : contains stresses, strains and material properties at all integration points. Files U2 and U3 are assigned alternatively to channesl 2 and 3. Channel 2 acts as input channel and the file assigned to it should contain information at the end of the last converged load step. Channel 3 acts as output channel and the file assigned to it receives the information at the end of the current load step. This file can then act as input file for the next

load step.

Type : sequential

Size : 440 bytes per integration point for solid elements and 80 bytes per integration point for reinforcing and prestressing layers.

File U4

Function : contains total loads and total displacements

Type : sequential

Size : 32 bytes per nodal point

File U5

Function : contains input cards described in this chapter

Type : line

File U5'

Function : initiates the stiffness matrix preparation phase in case the initial load method is to be used. The file contains one blank line as described in Section 13 of Section 4.2.

Type : line

File U5''

Function : contains the load step control cards described in Section 14 of Section 4.2. Each line initiates a load step.

Type : line

File U6

Function : receives output for printing

Type : line

File U7

Function : contains structure information and the basic load vectors

Type : sequential

Size : enough to store common blocks AAA, BBB, III, and JJJ.

File U8

Function : contains a triangularized stiffness matrix for use in the initial load method

Type : sequential

Size : enough to store common block CCC.

File U9

Function : temporary file used in the post-tensioning stage only, therefore not used in program NORCO

Type : sequential

Size : identical to files U2 or U3.

File U10

Function : receive printing output for the reinforcing elements and bond elements

Type : line

4.2 INPUT FILE (U5) DESCRIPTION (I4)

4.2.1. PREPROCESSING PHASE INITIATION CARD

One card which contains the following entry

4
IPHASE

IPHASE: -1

4.2.2. HEADING CARD (20A4)

One card which contains a title for the problem.

4.2.3. CONTROL CARDS (20I4)

Two cards which contain the major control parameters entered as follows:

4	8	12	16	20	24	28
IECHO	ISTYP	IMTYP	IDRUN	ILNGR	IHOPR	ILNGP

32	36	40	44	48	52	56
IHOPP	ICNLD	ITEMP	IDSLD	ISTRS	IGRLD	NMNOD

60	64	68	72	76	80
NMELM	NMEBE	NCMAT	NSMAT	NMPAR	NITRT

IECHO : request for complete data output (0=no and 1=yes)

ISTYP : type of structure (0=plane stress, 1=axisymmetric)

IMTYP : type of problem (0=linear, 1=nonlinear)

IDRUN : flag for dry run (0=no, 1=yes, 2=partial dry run iin which only the first three cards are read.)

ILNGR : flag for longitudinal reinforcement)

IHOPR : flat for hoop reinforcement) (0=without,

ILNGP : flag for longitudinal prestressing) 1=with)

IHOPP : flag for hoop prestressing)

ICNLD : flag for concentrated nodal loads (0=none, 1=deadload and live load, 10=prescribed displacement, 11=dead and live loads and

prescribed displacements)

ITEMP : flag for temperature distributions (0=none, 1=a distribution for prestressing purposes, and 2=two distributions, the second is for temperature loading purposes)

IDSLD : flag for surface tractions (0=none, 10=normal and tangential)

ISTRS : flag for initial stresses (0=without, and 1=with)

IGRLD : flag for gravity loads (0=without, and 1=with), use 0

NMNOD : total number of nodes

NMELM : total number of solid elements

NMEBE : total number of external boundary elements

NCMAT : total number of materials for solid elements

NSMAT : total number of materials for reinforcing and prestressing elements

NMPAR : maximum number of parameters for any material

NITRT : maximum number of iterations per load step

4	8	12	16
INCBL	IEIGN	IBOND	ILINK

INCBL : flag for incompatible elements (0=none, 1=present)

IEIGN : flag for eigen analysis of each element (0=no eigen analysis; 1=eigenvalue analysis performed on each element).

Note that for eigenanalysis to be performed, a subroutine called EIGRS should be available in the system. (This is one of the IMSL routines.)

IBOND : flag for bond elements (0=no bond elements, 1=bond elements present)

ILINK : flag for link elements (0=no link elements, 1=link elements present)

Link elements are required if a force is to be applied directly to reinforcement.

4.2.4. MATERIAL CARDS

This group of cards consists of a number of cards for each material type, first the solid element materials, and then the reinforcing and prestressing element materials. For detailed definitions and further details of the constitutive relation, Balakrishnan and Murray (1986) should be consulted.

4.2.4.1 Identification Card (2I4)

4	8
N	NMP(N)

N : material identification number

NMP(N) : number of material parameters to be read

4.2.4.2 Material Parameter Cards (10F8.0)

4.2.4.2a Solid Element (two cards)

It must be noted that in the material model used herein, the principal axes of orthotropy are assumed such that axis 1 coincides with local direction ξ and axis 2 coincides with local direction η, as specified, prior to concrete cracking.

8	16	24	32	40
EMDI(1)	EMDI(2)	EMDI(3)	EMDI(4)	PRTI(1)

48	56	64	72	80
PRTI(2)	PRTI(3)	TECI(1)	TECI(2)	TECI(3)

8	16	24	32
SW	FCU	FT	EUT

EMDI(1) : Young's modulii for material directions ξ and η

EMDI(2) : respectively,

EMDI(3) : 0 for plane stress problems

EMDI(4) : Shear modulus

PRTI(1) : Poisson's ratios for material directions ξ and η

PRTI(2) : respectively,

PRTI(3) : 0 for plane stress problems.

TECI(1) : Thermal expansion coefficients for material

TECI(2) : directions ξ and η respectively,

TECI(3) : 0 for plane problems.

SW : specific weight of the material, γ

(This is the end of input for a linear material.)

FCU : uniaxial compressive strength of material, f'_c

FT : uniaxial tensile strength (splitting tensile), f'_t

EUT : threshhold strain at which tensile stress becomes zero.

In the absence of other information the following values are suggested for normal concrete.

$f_t' = 0.263(f_c')^{2/3}$ in MPa

$f_t' = 2.3(f_c')^{2/3}$ in psi

ε_{ut} = 10 x cracking strain

$= 10 \times \frac{FT}{EMDI(1)}$

4.2.4.2b Reinforcing and Prestressing Element

A minimum of three and a maximum of 17 parameters on one or two cards.

8	16	24	32					
SS(1)	SN(1)			SS(i)	(SN(i)			TC

The first (NMP(N)-1) parameters describe the stress strain curve point by point starting from the first nonzero point. A maximum of eight points other than the origin are allowed. The last parameter is the thermal expansion coefficient for this material.

SS(i) : stress at point i, σ

SN(i) : strain at point i, ε

TC : thermal expansion coefficient, α

4.2.5. NODAL GEOMETRY CARDS

Program NORCO reads and generates nodal coordinates using a Cartesian and/or any number of polar coordinate systems. The Cartesian coordinate system is the global coordinate system of the problem. The polar coordinate system(s) must be assigned center(s) referenced to the global coordinate system. Interpolation of nodal coordinates is linear along a straight line in Cartesian coordinates. In polar coordinates interpolation is linear along an arc.

The nodal geometry cards can be divided into any number of groups. Each group describes a portion of the structure using the global Cartesian system or any one plar coordinate system. Hence, a group must consist of a group control card, a center specification card in case the group uses a polar coordinate system, and any number of nodal coordinate cards.

4.2.5.1 Group Control Card (2I4)

One card which contains the following entries.

4	8
NCARDS	ISPHER

NCARDS : number of nodal coordinate data cards in this group.

ISPHER : if other than 0 the group uses a polar coordinate system.

4.2.5.2 Center Specification Card (2F12.0)

This card is omitted if ISPHER=0 on the group control card.

12	24
XC	YC

XC : r-coordinate of center of polar coordinate system.

YC : z-coordinate of center of polar coordinate system.

4.2.5.3 Nodal Coordinate Cards (3I4, 2F12.0, I4)

One card per node unless automatic nodal generation is initiated to a total number of NCARDS cards.

4	8	12	24	36	40
N	ID(1)	ID(2)	XCORD	YCORD	INC

N : number of node

ID(1), ID(2) : 0 if displacement permitted and 1 if displacement not permitted, in the global X and Y directions, respectively

XCORD : X-coordinate or radius of nodal point

YCORD : Y-coordinate or angle included between the radius and z-global axis in degrees

INC : if non-zero, automatic generation is initiated

between the node on the preceding card and the node on this card. Generated nodes will have numbers (NOLD + INC*K), where NOLD is the node on the preceding card and K is a positive integer which varies from 1 to ((N-NOLD)/INC-1). If automatic generation is used in polar coordinate systems, radii and angles of generated points are interpolated linearly between nodes N and NOLD. In the Cartesian coordinate system, all generated nodes will lie on the straight line joining points N and NOLD at equal distances.

4.2.5.4 Termination Card

One blank card at the end of all nodal geometry cards.

4.2.6 EXTERNAL BOUNDARY ELEMENTS

External boundary elements in program NOARCO are of the spring type. These springs may have any orientation in the X-Y plane. In the case of axisymmetric structures these elements are entered with stiffness per unit width along the circumference.

4.2.6.1 Control Card (I4)

One card which contains the following entry.

4
NCARDS

NCARDS : number of external boundary element cards to follow

4.2.6.2 Element Specification Card (3I4, 4F12.0)

One card per element unless automatic generation is used to a total of NCARDS cards.

4	8	12	24	36	48	60
N	NPEBE	INC	XPEBE	YPEBE	PDEBE	STEBE

N : identfication number of external boundary element

NPEBE : identification number of node to which the element is attached

INC : if nonzero automatic generation is initiated between element on the preceding card and this element. Generated elements will have numbers (NOLD+K*INC), where NOLD is the number of element on the preceding card and K is a positive integer. The elements will be attached to nodes with numbers linearly interpolated between the nodes of element N and NOLD and the generated elements will have the properties of the element on the card initiating the generation.

XPEBE : X-projection of a unit vector along element

YPEBE : Y-projection of a unit vector along element

PDEBE : prescribed displacement of node in the direction of a unit vector along element

STEBE : spring stiffness of element per unit width if other than 10^{20} unit force/unit displacement/unit width

4.2.7. SOLID ELEMENT CARDS

Program NORCO uses variable number of node isoparametric elements up to cubic order together with a variety of Gaussian integration rules.

4.2.7.1 Control Card (I4)

One card which contains the following entry

4
NCARDS

NCARDS : number of solid element specification cards of Section 4.2.7.2 to follow

4.2.7.2 Element Specification Cards (3I4,F6.0, 14I4, F6.0)

One card per element unless automatic generation is used to a total of NCARDS cards.

4	8	12	18	22	26
N	NDELM	NGELM	THKSE	MATSE	INC

74	80
NPELM(I),I=1,12	ORNSE

N : identification number of element

NDELM : maximum order of element (1=2 nodes per side, 2=3 nodes on a side, 3=4 nodes on a side, 4=Lagrangian element with one interior node, 5=Lagrangian element with 4 interior nodes)

NGELM : a two digit number which gives the order of Gaussian integration required. The first digit is the order of integration in the local η direction which may be 1, 2 or 3. The second digit is the order of integration in the ξ local direction which may be 1, 2, 3, 5 or 7.

THKSE : thickness of the element

MATSE : material type identification number

INC : if nonzero, automatic generation is initiated. Generated elements will have numbers (NOLD+K*INC), where NOLD is the element number on the preceding card, and K is a positive integer which varies from (1) to ((N-NOLD)/INC-1). The generated elements will have the properties specified on this card. The nodes will be interpolated linearly between element number NOLD and element number N.

NPELM : array of the identification numbers of nodes of the element starting at a corner and proceeding in a counterclockwise manner around the element, four corner nodes first, four side nodes in each side next and four other side nodes if any. The order of node specification in this array defines the

local nondimensional coordinate system (ξ, η). The initial nodes define the ξ direction, while the η direction will make a counterclockwise angle with the η direction. See Fig. 4.1.

ORNSE : orientation of the E_2 material axis measured in a counter-clockwise direction from the global Y axis.

4.2.8. LONGITUDINAL REINFORCING ELEMENT CARDS

This group of cards is omitted if the flag ILNGR described in Section 4.2.3 equals zero.

4.2.8.1 Control Card (I4)

One card which contains the number of pairs of cards to be read in Section 4.2.8.2.

4.2.8.2 Element Specification Cards (4I4, 8F8.0)

One card per element, unless automatic generation is used.

4	8	12	16	24	32	40	48
N	NMLYR	MATRE	INC	A1	P1	A2	P2

56	64	72	80
A3	P3	A4	P4

N : number of solid element which contains this element

NMLYR : number of last layer in this element (see Section 4.2.8.3)

MATRE : material type identification number

INC : if nonzero, automatic date generation is initiatied. Generated elements will have numbers

(NOLD+K*INC), where NOLD is the element number on the preceding card, and K is a positive integer ranging from (1) to ((N-NOLD)/INC-1). The generated elements will have the properties on this card.

A1 to A4: areas of layers per unit width. A solid element can accept four longitudinal reinforcing layers. The first two lie in the η local direction. The last two lie in the ξ local direction.

P1 to P4: nondimensional position of layer with respect to center of element. P1 and P2 are ξ coordinates indicating the distances from the η axis to layers A1 and A2. P3 and P4 are η coordinates indicating the distances from the ξ axis to layers A3 and A4.

4.2.8.3 Example

For the elements shown in Fig. 4.1, the sequence of cards described in Sections 4.2.8.1 and 4.2.8.2 is written as follows.

```
4
1, 1, 1, 0, 1.0, -0.5, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
2, 1, 1, 0, 1.0, 0.5, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
3, 3, 1, 0, 1.0, -0.5, 0.0, 0.0, 1.0, -0.5, 0.0, 0.0
4, 4, 1, 0, 0.0, 0.0, 0.0, 0.0, 1.0, -0.5, 1.0, 0.5
```

4.2.9. BOND ELEMENT CARDS

This group of cards is omitted if the flag IBOND is zero.

4.2.9.1 Control card (I4)

One card which contains the number of cards to be read in Section 4.2.9.2.

4.2.9.2 Element Specification Cards (2I4, F8.0, 16I4)

One card per element, unless automatic generation is used.

4	8	16	80
N	INC	CB	NBELM(I,N), I=1,16

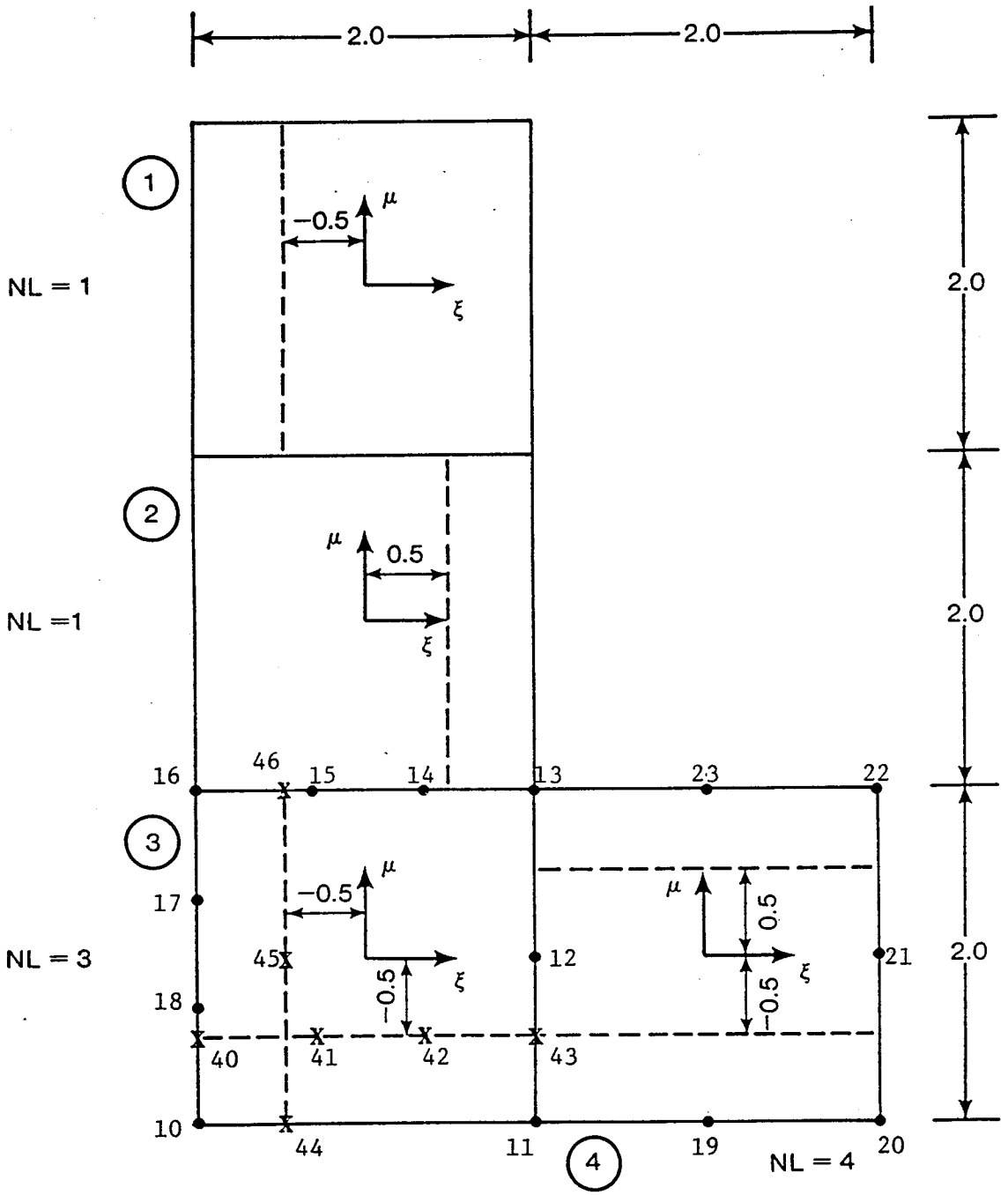
N : number of the solid element which contains this bond element

INC : If nonzero, automatic data generation is initiated. Generated elements will have numbers (NOLD+K*INC), where NOLD is the element number on the preceding card, and K is a positive integer which varies from (1) to ((N-NOLD)/INC-1). The generated elements will have the properties specified on this card. The nodes will be interpolated linearly between element number NOLD and element number N.

CB : bond modulus, i.e. bond stress required for unit

slip

NBELM(I,N),I=1,16 : bond nodes. The specification is dependent on the orientation of the corresponding reinforcing layer. For example, in Fig. 4.1, bond element in solid element 3 will be specified as follows: 3, 0, 1.21D6, 44, 45, 46, 0, 0, 0, 0, 0, 40, 41, 42, 43, 0, 0, 0, 0.



Solid element nodes specified in the following order:

Element 3: 10, 11, 13, 16, 0, 12, 14, 17, 0, 0, 15, 18

Element 4: 11, 20, 22, 13, 19, 21, 23, 12, 0, 0, 0, 0

Fig. 4.1. Example of Reinforcing Layer and Solid Element Nodal Specifications

4.2.10. LOAD DATA

Program NORCO can accept a variety of load types; concentrated loads (dead and/or live), normal and/or tangential surface pressure (live).

4.2.10.1 Concentrated Load Cards

This group of cards describes the live and dead concentrated nodal loads. The entire group of cards must be omitted if flag ICNLD described in Section 4.2.3 equals zero.

4.2.10.1.1 Control Card (I4)

One card which contains the following entry.

4
NCARDS

NCARDS : the number of concentrated load specification cards to follow.

4.2.10.1.2 Concentrated Load Specification Cards (I4, F12.0)

One card per node at which a dead and/or live nonzero load is applied.

4	16	28	40	52
N	FDX	FDY	FLX	FLY

N : node identification number

FDX : X-component of dead load

FDY : Y-component of dead load

FLX : X-component of live load

FLY : Y-component of live load

4.2.10.2 Nodal Pressure Intensity Cards

This group describes the nodal normal and tangential pressure intensities which make up surface traction. The group is omitted if the flag IDSLD described in Section 4.2.3 equals zero or 1.

4.2.10.2.1 Control Card (I4)

One card which contains the number of cards of type 12.2.2 to be read.

4.2.10.2.2 Pressure Specification Card (2I4, 2F12.0)

One card per node of surfaces where pressure is applied, unless automatic data generation is used.

4	8	20	32
N	INC	PNORM	PTANG

N : node number

INC : if nonzero, automatic data generation is

initiated. Pressure intensities are generated at nodes with numbers (NOLD+K*INC), where NOLD is the node number on the preceding card, and K is a positive integer. The pressure intensities are interpolated linearly.

PNORM : pressure intensity at node N normal to surface (see Section 4.2.10.3)

PTANG : pressure intensity at node N tangential to surface (see Section 4.2.10.3).

4.2.10.3 Surface Definition Cards (7I4)

One card per element surface exposed to surface traction, as described in Section 4.2.10.2 unless automatic generation is used. This group is terminated with a blank card. The group is omitted, if the flag IDSLD in Section 4.2.3 is 0 or 1.

4	8	12	16	20	24	28
NR	NI	NG	N1	N2	N3	N4

NR : number of nodes on surface (two, three, or four for linear, quadratic or cubic elements respectively). A surface is a group of nodes which form one side of a solid element.

NI : number of surfaces to be generated between the surface defined on the previous card and this card

NG : order of Gaussian integration

N1 to N4: node identification numbers which define the surface. The order of specification of the nodes defines the positive normal to the surface. The positive normal to an element surface is the normal which points to the righthand side, when the nodes which define the surface are traversed in the order they are specified. The positive direction of a tangent to the surface makes a 90° counterclockwise angle with the positive normal described above, (i.e., the positive tangent points in the direction in which this curve is being traversed).

4.2.11 INITIAL LOAD METHOD PREPARATION CARD

One blank card.

4.2.12 LOAD STEP SPECIFICATION CARDS (4I4, 9F6.0)

One card per load step which contains the following entries.

4	8	12	16	22	28	34	40	46
ISTEP	IPRST	NI	KI	RX	TU	TP	CD	CL

52	58	64	70
CT	CPN	CPT	CPD

ISTEP : load increment number

IPRST : if (1), this increment is a pretensioning step. Otherwise it should be zero. Use 0.

NI : number of strain subincrements

KI : number of iterates allowed before re-evaluation of structure stiffness matrix

RX : a relaxation factor

TU : tolerance for convergence of displacements, λ_r

TP : tolerance for convergence of loads, λ_p

CD : load factor for increment of dead loads

CL : load factor for increment of live concentrated nodal loads

CT : load factor for temperature gradient loads

CPN : load factor for normal surface pressure

CPT : load factor for tangential surface pressure

CPD : load factor for prescribed displacements

4.3 EXECUTION OF NORCO

Execution of program NORCO is carried out in several stages designed to carry out specific tasks. The results of each stage are used as input for the next stage. Those results can be stored on tape for future reference and to allow for restarting the analysis at any given point. This considerable flexibility calls for judiciousness on the part of the user. In the following, the different stages of execution are briefly described. The files required for the run commands have already been described in the beginning of this chapter.

The Partial Dry Run (IDRUN=2)

In this initial stage the control parameters described in Sections 1, 2 and 3 are read and the required sizes of common blocks AAA, BBB, III and JJJ are calculated. The user must then make sure that the sizes of those common blocks defined in MAIN are adequate. The run command may be written as

```
$run OBJNORCO 5=U5 6=U6
```

This run is distinguished by IDRUN=2 on the control card. OBJNORCO is the object file resulting from the FORTRAN compilation of NORCO.

The Dry Run (Date Check Run) (IDRUN=1)

In this run the program reads, generates and prints the structure and load data described in Sections 1 to 12. The Jaccobian determinants at all integration points are calculated to assist in debugging the data. In this run, the program also calculates the size of the array required to store the skyline structure stiffness matrix. The user must then check the data, and must make sure that the size of common block CCC which is used to store the stiffness matrix is adequate. The run command may be stated as

```
$run OBJNORCO 1=U1 5=U5 6=U6
```

This run is distinguished by IDRUN=1 on the control card.

The Data Preprocessing Run (IDRUN=0)

In this stage the program reads, generates and prints the corrected data. The shape functions and derivatives are calculated at the integration points of the prototype elements. The skyline of the structure stiffness matrix is formed. The stresses, strains and material properties are initialized at all integration points. All basic load vectors are formed. Finally, the program stores all processed information on sequential files. The run command may be described as

```
$run OBJNORCO 1=U1 2=U3 3=U2 4=U4 5=U5 6=U6 7=U7
```

It must be noted that if there is a state of initial stresses the user wishes to assign to the structure it should be contained in file U2 and must be assigned to channel 3 as shown above.

The Initial Load Method Preparation Run

In this run the program formulates, triangularizes and stores a structure stiffness matrix for use as a constant mapping in the initial load method. The program obtains the necessary information from previously stored files. The execution command may be written as follows.

```
$run OBJNORCO  1=U1 2=U2 4=U4 5=U5' 6=U6(last+1) 7=U7 8=U8
```

The Production Run

Each load step is carried out separately in one run. If the run is successful the user should store the output files assigned to channels 3 and 4 on tape for future reference in case a rerun is required or more information other than those printed out is needed. The file assigned to channel 2 is an input file and should contain the stresses, strains and material properties at all integration points at the end of the preceding load step. The file assigned to channel 3 is an output file for this information at the end of the current load step, and therefore, serves as an input file in the next load step where it should be assigned to channel 2. An example of two successive load steps is as follows,

```
$run OBJNORCO 1=U1 2=U2 3=U3 4=U4 5=U5''(i) 6=U6 7=U7
              [8=U8] 10=U10
$print U6, U10
$empty U6, U10
$store U3 and U4 on tape
$run OBJNORCO 1=U1 2=U3 3=U2 4=U4 5=U5''(i+1) 6=U6 7=U7
              [8=U8] 10=U10
```

In this sequence i denotes an odd numbered load step. For the MTS file handling system the statement 5=U5''(i) sets the read pointer for logical unit 5 to line i of file U5''. Channel 8 is optional and is to be used only when the initial load approach is used as a solution strategy. In this case the initial load preparation run must have been carried out beforehand.

CHAPTER FIVE

EXAMPLE PROBLEM

5.1 Introduction

As described in the Structural Engineering Report No. 138, Department of Civil Engineering, University of Alberta entitled "Finite Element Prediction of Reinforced Concrete Behavior" by Balakrishnan and Murray, a number of shear critical beams were analyzed using the program NORCO. One such beam was Beam 0A1 tested by Bresler and Scordelis (1961). This beam which contained no web reinforcement, failed in a brittle manner after the formation of a predominant diagonal crack and was therfore expected to be a severe test of the smeared crack modeling incorporated in NORCO. The dimensions and other details of this beam are shown in Fig. 5.1.

5.2 Finite Element Modeling

The finite element mesh layout is shown in Fig. 5.2. The quadratic serendipity element has been selected instead of four node quadrilateral elements because such elements are more flexible and produce reliable crack pattern even for coarse mesh layout. The aspect ratio of the elements has been selected to be between 1 and 2 in order to minimize the directional bias with respect to crack formation. The size of the element has been chosen so that it is smaller than the compression "stress block" at the ultimate stage. Full integration using 3x3 Gaussian quadrature has been selected because reduced integration has been

found to produce spurious zero energy modes.

Some fundamental studies on cracked reinforced concrete elements indicated that the embedded formulation of reinforcement in quadratic elements may not, in general, be able to reproduce a constant strain condition unless the reinforcement is lumped at the Gauss points corresponding to 2x2 integration. Specific studies on beams showed, however, that the main (i.e. the longitudinal) reinforcement may be located at their actual location whereas the stirrups, if any, must be lumped at the natural coordinates of ±0.5774 (i.e., Gauss points corresponding to 2x2 integration).

Bond elements have been used (quadratic), since for shear critical beams without web reinforcement, bond considerations are important.

5.3 Illustrative Input and Output Files

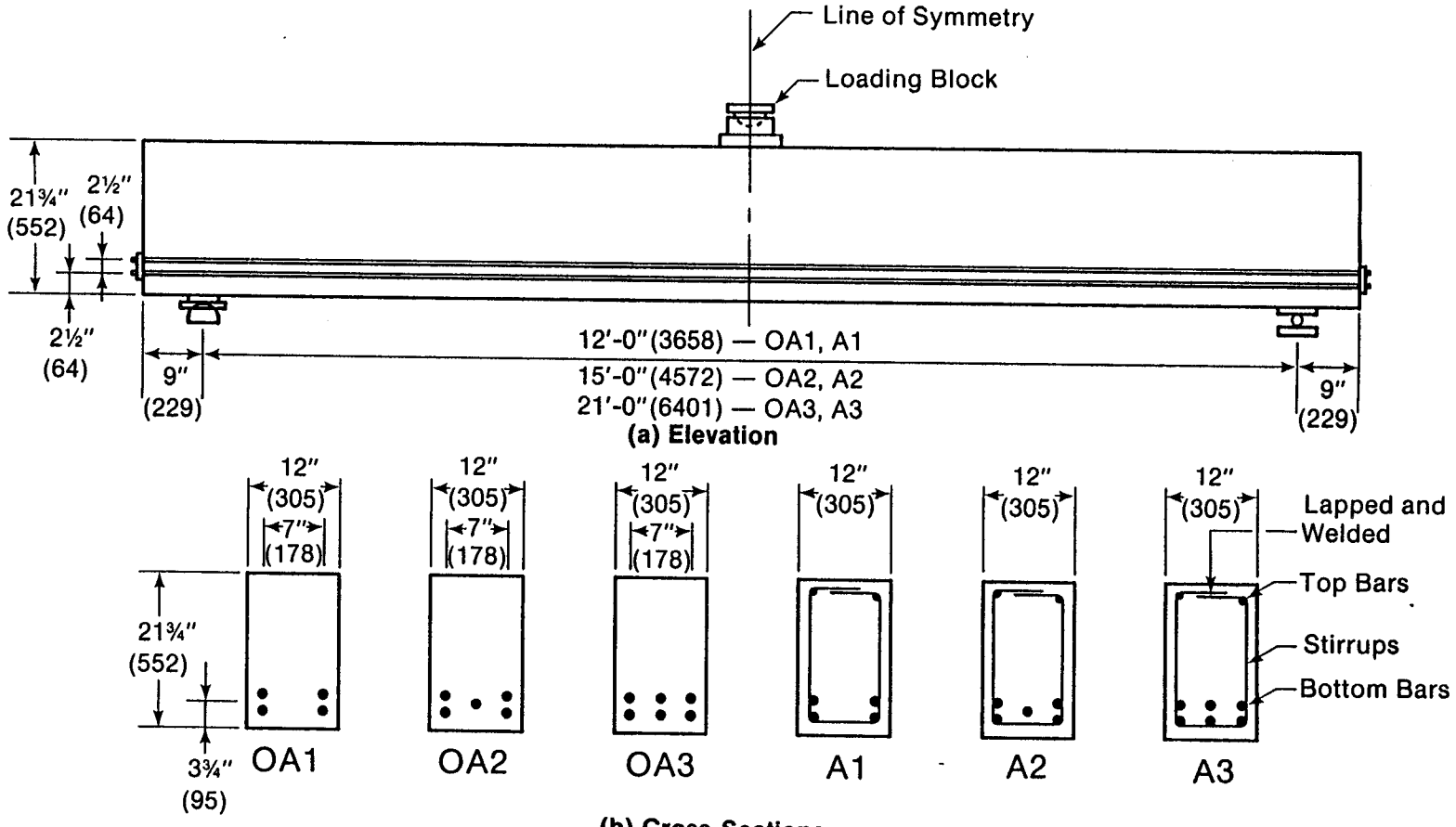
A listing of the input file for Beam 0A1, modeled as shown in Fig. 5.2, is given in Sect. 5.3.1 (following Fig. 5.4). The input file consists of 72 lines of input prepared according to the instructions given in Chapter 4. The program echo check of this input file is shown in Sect. 5.3.2. The echo check first reproduces the input as it is read, and then the file used for program execution which includes the data generated internally by the program.

Sect. 5.3.3 contains the stress output for Load Step 4, an intermediate load step. XG and YG are the global coordinates of the Gauss points. SIGR, SIGZ and SIGRZ are the normal stresses

and shear stress in the global coordinate system, whereas SIGXI, SIGETA and SIGXIET are the normal stresses and shear stress in the "local coordinate system". The orientation of the major algebraic principal strain axis at the onset of cracking is given by ZETA (fixed crack model) measured counterclockwise from the global x axis, and this defines the direction of the "local coordinate system" axes XI and ETA. The orientation of the major principal stress direction is given by GAMMA, and SIG1 and SIG2 are the major and minor principal stresses, respectively. IXI and IXETA denote the damage regions in the XI and ETA directions, respectively.

The interpretation of failure load and the numerical solution strategy are fully described in Balakrishnan and Murray (1986). Figure 5.3 shows the load deflection relationship of a node at midspan drawn using the program output. Figure 5.4 shows the cracking pattern. The crack pattern was plotted using the program NORCOMESH developed by the authors. This plotting routine uses *PLOTLIB available at the University of Alberta Computer Library.

A listing of NORCO is contained in Appendix A. A listing of NORCOMESH is given in Appendix B.



1. All Dimensions Are Nominal; See Table 5.1 for Measured Dimensions
2. All Bottom Bars Are 1.125"(30) Dia., Stirrups Are 0.25"(6) Dia. Spaced at 8.25"(210), Top Bars Are 0.5"(12) Dia.

Figure 5.1. Bresler Scordelis Beams - Example Problem

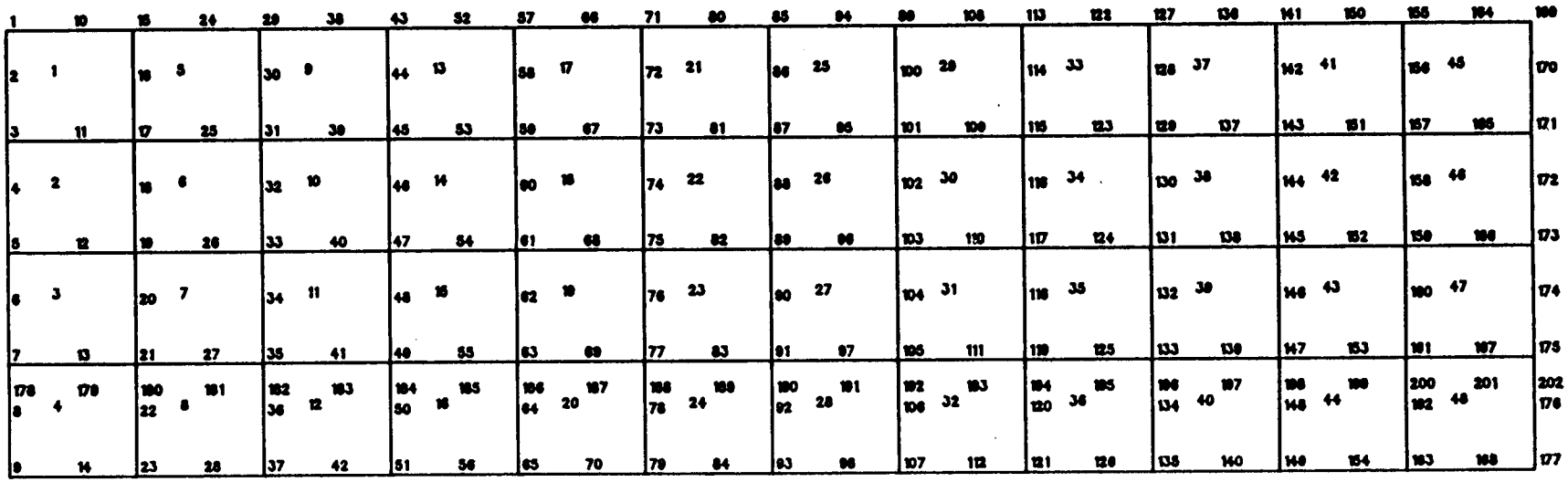


Figure 5.2. Mesh Layout for Beam OA1

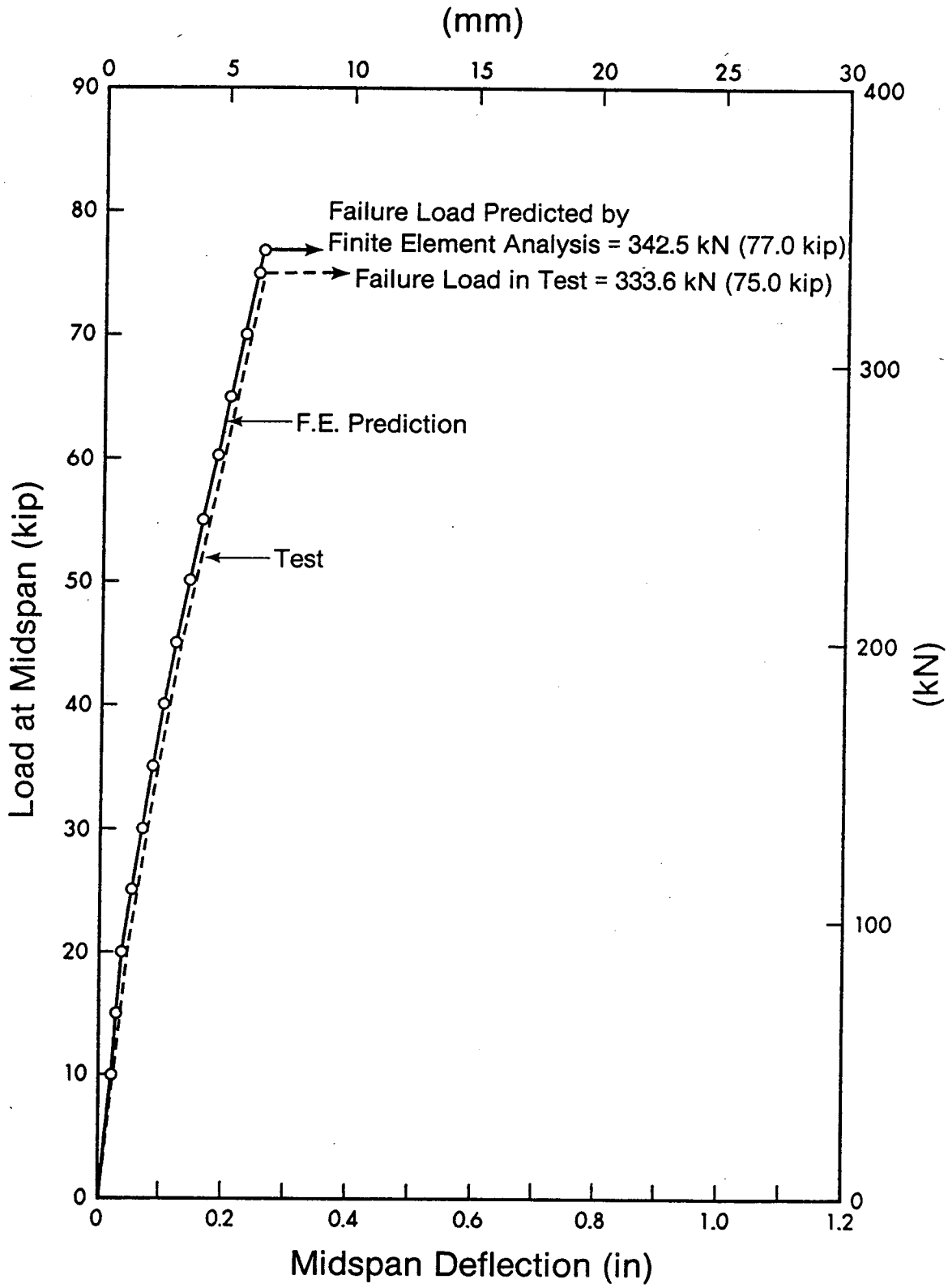


Figure 5.3. Load Displacement Relationship for Beam OA1

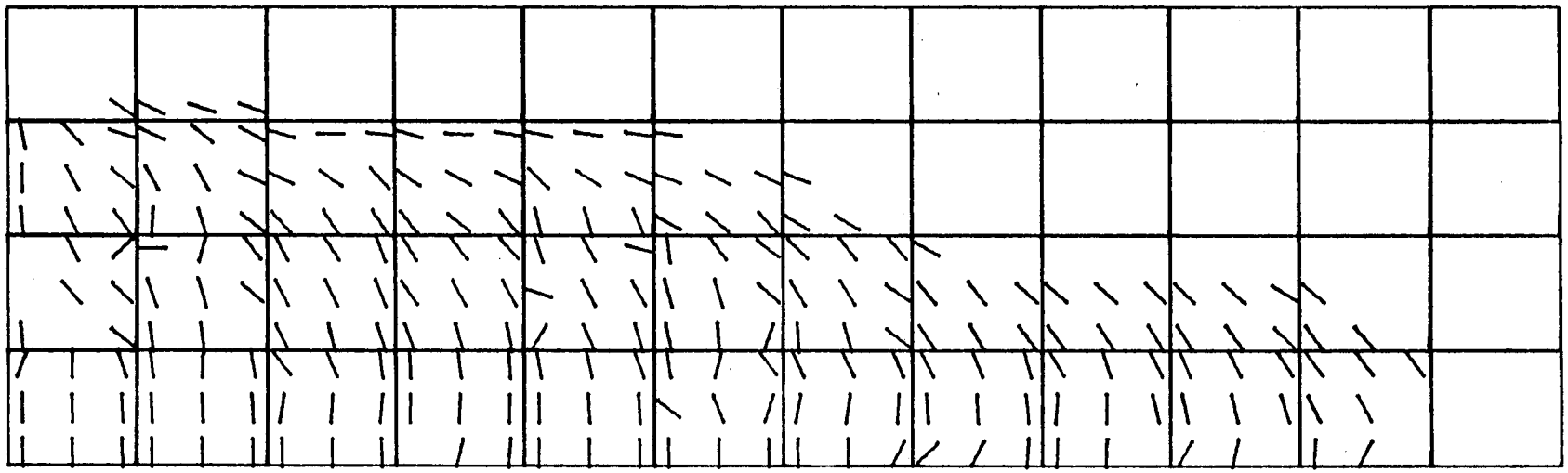


Figure 5.4. Crack Pattern for Beam 0A1 for Reaction of 37.5 kips

5.3.1 Input File for Beam 0A1

```
ing of -BOA1 at 20:42:40 on APR  4, 1989 for CCid=DWM. on UALTAMTS

      -1,
      BRESLER-SCORDELIS BEAM OA1 FBEAM.BOA1 BOND SLIP CONSIDERED
      1,0,1,0,1,0,0,0,1,0,0,0,0,202,48,1,1,1,14,25,
      0,0,1,0,
      1,14,
      3.1D6,3.1D6,0.0,1.3D6,0.2,0.2,0.0,0.,0.,0.,
      0.0,-3270.,300.,.0012,
      2,9,
      8.0D4,0.0025,1.2D5,0.035,1.30D5,0.06,1.39D5,0.1,0.0,
      40,0,
      1,1,0,0.0,21.9,
      9,1,0,0.0,0.0,1,
      10,0,0,3.13,21.9,
      164,0,0,71.99,21.9,14,
      11,0,0,3.13,16.425,
      165,0,0,71.99,16.425,14,
      12,0,0,3.13,10.95,
      166,0,0,71.99,10.95,14,
      13,0,0,3.13,5.475,
      167,0,0,71.99,5.475,14,
      14,0,0,3.13,0.0,
      154,0,0,65.73,0.0,14,
      15,0,0,6.26,21.9,
      23,0,0,6.26,0.0,1,
      29,0,0,12.52,21.9,
      37,0,0,12.52,0.0,1,
      43,0,0,18.78,21.9,
      51,0,0,18.78,0.0,1,
      57,0,0,25.04,21.9,
      65,0,0,25.04,0.0,1,
      71,0,0,31.30,21.9,
      79,0,0,31.30,0.0,1,
      85,0,0,37.56,21.9,
      93,0,0,37.56,0.0,1,
      99,0,0,43.82,21.9,
      107,0,0,43.82,0.0,1,
      113,0,0,50.08,21.9,
      121,0,0,50.08,0.0,1,
      127,0,0,56.34,21.9,
      135,0,0,56.34,0.0,1,
      141,0,0,62.60,21.9,
      149,0,0,62.60,0.0,1,
      155,0,0,68.86,21.9,
      163,0,0,68.86,0.0,1,
      168,0,1,71.99,0.0,
      169,0,0,75.12,21.9,
      177,0,0,75.12,0.0,1,
      178,1,1,0.0,3.75,
      179,0,1,3.13,3.75,
      202,0,1,75.12,3.75,1,

      1,
      1,164,0,0.0,1.0,0.0,1.D0,
      8,
      1,2,33,12.2,1,0,3,17,15,1,11,16,10,2,0,0,0,0,
      45,2,33,12.2,1,4,157,171,169,155,165,170,164,156,0,0,0,0,
      2,2,33,12.2,1,0,5,19,17,3,12,18,11,4,
      46,2,33,12.2,1,4,159,173,171,157,166,172,165,158,
```

```
   59      3,2,33,12.2,1,0,7,21,19,5,13,20,12,6,
   60      47,2,33,12.2,1,4,161,175,173,159,167,174,166,160,
   61      4,2,33,12.2,1,0,9,23,21,7,14,22,13,8,
   62      48,2,33,12.2,1,4,163,177,175,161,168,176,167,162,
   63      2,
   64      4,4,2,0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.328,.3699,
   65      48,4,2,4,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.328,.3699,
   66      2,
   67      4,0,1.21D6,0,0,0,0,0,0,0,0,0,0,0,0,178,179,180,0,
   68      48,4,1.21D6,0,0,0,0,0,0,0,0,0,0,0,0,200,201,202,0,
   69      2,
   70      1,0.0,0.0,0.0,-250.0,
   71      10,0.0,0.0,0.0,-750.0,
   72
```

5.3.2 Program Echo Check of Input File for Beam 0A1

BRESLER-SCORDELIS BEAM 0A1 FBEAM.B0A1 BOND SLIP CONSIDERED

PROBLEM CONTROL VARIABLES
****

ECHO CHECK FLAG	=	1	WHERE 1 = PRINT COMPLETE DATA , 0 = SUPRESS
AXISYMMETRY FLAG	=	0	WHERE 1 = AXISYMMETRIC, 0 = 2 DIMENSIONAL
NONLINEAR LOADING FLAG	=	1	WHERE 1 = NONLINEAR PROBLEM, 0 = LINEAR
DRY RUN FLAG	=	0	WHERE 2 = READ CONTROL PARAMETERS ONLY, 1 = READ AND GENERATE DATA ONLY, 0 = RUN PROBLEM PREPARATION PHASE,

(IN THE NEXT 5 FLAGS 1 = PRESENT , 0 = NOT PRESENT)

LONGITUDINAL REINFORCEMENT FLAG	=	1	
HOOP REINFORCEMENT FLAG	=	0	
LONGITUDINAL PRESTRESSING FLAG	=	0	
HOOP PRESTRESSING FLAG	=	0	
CONCENTRATED LOADS FLAG	=	1	
TEMPRATURE LOADS FLAG	=	0	WHERE 0 = NO THERMAL DISTRIBUTION PRESENT, 1 = THERMAL DISTRIBUTION FOR PRESTRESSING, 2 = THERMAL DISTRIBUTION AS A LOAD CASE,
DISTRIBUTED SURFACE LOADS FLAG	=	0	WHERE 0 = NO DISTRIBUTED SURFACE LOADS, 1 = HYDROSTATIC LOADS ONLY, 10 = SURFACE TRACTIONS ONLY, 11 = SURFACE TRACTIONS AND HYDROSTATIC LOADS,
GRAVITY LOAD FLAG	=	0	WHERE 0 = NO GRAVITY LOADS, 1 = GRAVITY LOADS PRESENT,
INITIAL STRESSES FLAG	=	0	WHERE 0 = NO INITIAL STRESSES, 1 = INITIAL STRESSES PRESENT,
NUMBER OF NODAL POINTS	=	202	
NUMBER OF ELEMENTS	=	48	
NUMBER OF EXTERNAL BOUNDARY ELEMENTS	=	1	
NUMBER OF SOLID ELEMENT MATERIAL TYPES	=	1	
NUMBER OF REINFORCING ELEMENT MATERIAL TYPES	=	1	
MAXIMUM NUMBER OF MATERIAL PARAMETERS	=	14	
NUMBER OF ITERATIONS PER LOAD STEP	=	25	

FLAG FOR INCOMPATIBLE ELEMENTS (O=NO 1=YES) = 0

FLAG FOR EIGENVALUE ANALYSIS (O=NO 1=YES) = 0

FLAG FOR BOND ELEMENTS (O=NO 1=YES) = 1

FLAG FOR LINK ELEMENTS (O=NO 1=YES) = 0

MASTER ARRAY SIZES
****

AAA = 972
III = 2800
BBB = 3664

CONTROL PARAMETERS READ AND STORAGE REQUIREMENTS COMPUTED

MATERIAL PARAMETERS
****

SOLID ELEMENT MATERIAL TYPE 1

E1 = 0.3100E+07 E2 = 0.3100E+07 E3 = 0.0 G12 = 0.1300E+07
NU1 = 0.2000E+00 NU2 = 0.2000E+00 NU3 = 0.0 TEC1 = 0.0 TEC2 = 0.0 TEC3 = 0.0
GAMA = 0.0

NONLINEAR STRENGTH PARAMETERS

FCU = -.3270E+04 AC = 0.3000E+03 AT = 0.1200E-02
SI1 =
REINFORCING OR PRESTRESSING MATERIAL TYPE 2

STRESS	0.8000E+05	0.1200E+06	0.1300E+06	0.1390E+06	0.0
STRAIN	0.2500E-02	0.3500E-01	0.6000E-01	0.1000E+00	0.0

TEC = 0.0

NODAL GEOMETRY AS INPUT
****

N	FIXED 1 OR FREE 0		XCORD	YCORD	INC
1	1	0	0.0	0.219000E+02	0
9	1	0	0.0	0.0	1
10	0	0	0.313000E+01	0.219000E+02	0
164	0	0	0.719900E+02	0.219000E+02	14
11	0	0	0.313000E+01	0.164250E+02	0
165	0	0	0.719900E+02	0.164250E+02	14
12	0	0	0.313000E+01	0.109500E+02	0
166	0	0	0.719900E+02	0.109500E+02	14
13	0	0	0.313000E+01	0.547500E+01	0
167	0	0	0.719900E+02	0.547500E+01	14
14	0	0	0.313000E+01	0.0	0
154	0	0	0.657300E+02	0.0	14
15	0	0	0.626000E+01	0.219000E+02	0
23	0	0	0.626000E+01	0.0	1
29	0	0	0.125200E+02	0.219000E+02	0
37	0	0	0.125200E+02	0.0	1
43	0	0	0.187800E+02	0.219000E+02	0
51	0	0	0.187800E+02	0.0	1
57	0	0	0.250400E+02	0.219000E+02	0
65	0	0	0.250400E+02	0.0	1
71	0	0	0.313000E+02	0.219000E+02	0
79	0	0	0.313000E+02	0.0	1
85	0	0	0.375600E+02	0.219000E+02	0
93	0	0	0.375600E+02	0.0	1
99	0	0	0.438200E+02	0.219000E+02	0
107	0	0	0.438200E+02	0.0	1
113	0	0	0.500800E+02	0.219000E+02	0
121	0	0	0.500800E+02	0.0	1
127	0	0	0.563400E+02	0.219000E+02	0
135	0	0	0.563400E+02	0.0	1
141	0	0	0.626000E+02	0.219000E+02	0
149	0	0	0.626000E+02	0.0	1
155	0	0	0.688600E+02	0.219000E+02	0
163	0	0	0.688600E+02	0.0	1
168	0	1	0.719900E+02	0.0	0
169	0	0	0.751200E+02	0.219000E+02	0
177	0	0	0.751200E+02	0.0	1
178	1	1	0.0	0.375000E+01	0
179	0	1	0.313000E+01	0.375000E+01	0
202	0	1	0.751200E+02	0.375000E+01	1

BOUDARY ELEMENTS AS INPUT
****

NO.BE	NODE	INC	X.PROJ.	Y.PROJ.	PRS.DSP.	STIFF.
1	164	0	0.0	0.100000E+01	0.0	0.100000E+01

SOLID ELEMENT DATA AS INPUT
****

NO.SE.	DEG	GAUSS	ELM.THICK.	NO.MAT	INC	NP1	NP2	NP3	NP4	NP5	NP6	NP7	NP8	NP9	NP10	NP11	NP12	M.AXES ORN.
1	2	33	12.2000	1	0	3	17	15	1	11	16	10	2	0	0	0	0	0.0
45	2	33	12.2000	1	4	157	171	169	155	165	170	164	156	0	0	0	0	0.0
2	2	33	12.2000	1	0	5	19	17	3	12	18	11	4	0	0	0	0	0.0
46	2	33	12.2000	1	4	159	173	171	157	166	172	165	158	0	0	0	0	0.0
3	2	33	12.2000	1	0	7	21	19	5	13	20	12	6	0	0	0	0	0.0
47	2	33	12.2000	1	4	161	175	173	159	167	174	166	160	0	0	0	0	0.0
4	2	33	12.2000	1	0	9	23	21	7	14	22	13	8	0	0	0	0	0.0
48	2	33	12.2000	1	4	163	177	175	161	168	176	167	162	0	0	0	0	0.0

LONGITUDINAL REINFORCEMENT AS INPUT

N	NML	NMT	INC	A1	POS.	A2	POS.	A3	POS.	A4	POS.
4	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
48	4	2	4	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00

BOND NODES AS INPUT
****

NO.SE	INC	BOND STIFF	NB1	NB2	NB3	NB4	NB5	NB6	NB7	NB8	NB9	NB10	NB11	NB12	NB13	NB14	NB15	NB16
4	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	178	179	180	0
48	4	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	200	201	202	0

LOADS
****

CONCENTRATED NODAL LOADS
****

N	X-DEAD L.	Y-DEAD L.	X-LIVE L.	Y-LIVE L.
1	0.0	0.0	0.0	-0.250000E+03
10	0.0	0.0	0.0	-0.750000E+03

COMPLETE NODAL GEOMETRY
****

N	D O F		XCORD	YCORD	INC
1	0	1	0.0	0.219000E+02	0
2	0	2	0.0	0.191625E+02	0
3	0	3	0.0	0.164250E+02	0
4	0	4	0.0	0.136875E+02	0
5	0	5	0.0	0.109500E+02	0
6	0	6	0.0	0.821250E+01	0
7	0	7	0.0	0.547500E+01	0
8	0	8	0.0	0.273750E+01	0
9	0	9	0.0	0.0	0
10	10	11	0.313000E+01	0.219000E+02	0
11	12	13	0.313000E+01	0.164250E+02	0
12	14	15	0.313000E+01	0.109500E+02	0
13	16	17	0.313000E+01	0.547500E+01	0
14	18	19	0.313000E+01	0.0	0
15	20	21	0.626000E+01	0.219000E+02	0
16	22	23	0.626000E+01	0.191625E+02	0
17	24	25	0.626000E+01	0.164250E+02	0
18	26	27	0.626000E+01	0.136875E+02	0
19	28	29	0.626000E+01	0.109500E+02	0
20	30	31	0.626000E+01	0.821250E+01	0
21	32	33	0.626000E+01	0.547500E+01	0
22	34	35	0.626000E+01	0.273750E+01	0
23	36	37	0.626000E+01	0.0	0
24	38	39	0.939000E+01	0.219000E+02	0
25	40	41	0.939000E+01	0.164250E+02	0
26	42	43	0.939000E+01	0.109500E+02	0
27	44	45	0.939000E+01	0.547500E+01	0
28	46	47	0.939000E+01	0.0	0
29	48	49	0.125200E+02	0.219000E+02	0
30	50	51	0.125200E+02	0.191625E+02	0
31	52	53	0.125200E+02	0.164250E+02	0
32	54	55	0.125200E+02	0.136875E+02	0
33	56	57	0.125200E+02	0.109500E+02	0
34	58	59	0.125200E+02	0.821250E+01	0
35	60	61	0.125200E+02	0.547500E+01	0
36	62	63	0.125200E+02	0.273750E+01	0
37	64	65	0.125200E+02	0.0	0
38	66	67	0.156500E+02	0.219000E+02	0
39	68	69	0.156500E+02	0.164250E+02	0
40	70	71	0.156500E+02	0.109500E+02	0
41	72	73	0.156500E+02	0.547500E+01	0
42	74	75	0.156500E+02	0.0	0
43	76	77	0.187800E+02	0.219000E+02	0
44	78	79	0.187800E+02	0.191625E+02	0
45	80	81	0.187800E+02	0.164250E+02	0
46	82	83	0.187800E+02	0.136875E+02	0
47	84	85	0.187800E+02	0.109500E+02	0
48	86	87	0.187800E+02	0.821250E+01	0
49	88	89	0.187800E+02	0.547500E+01	0
50	90	91	0.187800E+02	0.273750E+01	0
51	92	93	0.187800E+02	0.0	0
52	94	95	0.219100E+02	0.219000E+02	0
53	96	97	0.219100E+02	0.164250E+02	0

54	98	99	0.219100E+02	0.109500E+02	0
55	100	101	0.219100E+02	0.547500E+01	0
56	102	103	0.219100E+02	0.0	0
57	104	105	0.250400E+02	0.219000E+02	0
58	106	107	0.250400E+02	0.191625E+02	0
59	108	109	0.250400E+02	0.164250E+02	0
60	110	111	0.250400E+02	0.136875E+02	0
61	112	113	0.250400E+02	0.109500E+02	0
62	114	115	0.250400E+02	0.821250E+01	0
63	116	117	0.250400E+02	0.547500E+01	0
64	118	119	0.250400E+02	0.273750E+01	0
65	120	121	0.250400E+02	0.0	0
66	122	123	0.281700E+02	0.219000E+02	0
67	124	125	0.281700E+02	0.164250E+02	0
68	126	127	0.281700E+02	0.109500E+02	0
69	128	129	0.281700E+02	0.547500E+01	0
70	130	131	0.281700E+02	0.0	0
71	132	133	0.313000E+02	0.219000E+02	0
72	134	135	0.313000E+02	0.191625E+02	0
73	136	137	0.313000E+02	0.164250E+02	0
74	138	139	0.313000E+02	0.136875E+02	0
75	140	141	0.313000E+02	0.109500E+02	0
76	142	143	0.313000E+02	0.821250E+01	0
77	144	145	0.313000E+02	0.547500E+01	0
78	146	147	0.313000E+02	0.273750E+01	0
79	148	149	0.313000E+02	0.0	0
80	150	151	0.344300E+02	0.219000E+02	0
81	152	153	0.344300E+02	0.164250E+02	0
82	154	155	0.344300E+02	0.109500E+02	0
83	156	157	0.344300E+02	0.547500E+01	0
84	158	159	0.344300E+02	0.0	0
85	160	161	0.375600E+02	0.219000E+02	0
86	162	163	0.375600E+02	0.191625E+02	0
87	164	165	0.375600E+02	0.164250E+02	0
88	166	167	0.375600E+02	0.136875E+02	0
89	168	169	0.375600E+02	0.109500E+02	0
90	170	171	0.375600E+02	0.821250E+01	0
91	172	173	0.375600E+02	0.547500E+01	0
92	174	175	0.375600E+02	0.273750E+01	0
93	176	177	0.375600E+02	0.0	0
94	178	179	0.406900E+02	0.219000E+02	0
95	180	181	0.406900E+02	0.164250E+02	0
96	182	183	0.406900E+02	0.109500E+02	0
97	184	185	0.406900E+02	0.547500E+01	0
98	186	187	0.406900E+02	0.0	0
99	188	189	0.438200E+02	0.219000E+02	0
100	190	191	0.438200E+02	0.191625E+02	0
101	192	193	0.438200E+02	0.164250E+02	0
102	194	195	0.438200E+02	0.136875E+02	0
103	196	197	0.438200E+02	0.109500E+02	0
104	198	199	0.438200E+02	0.821250E+01	0
105	200	201	0.438200E+02	0.547500E+01	0
106	202	203	0.438200E+02	0.273750E+01	0
107	204	205	0.438200E+02	0.0	0
108	206	207	0.469500E+02	0.219000E+02	0
109	208	209	0.469500E+02	0.164250E+02	0
110	210	211	0.469500E+02	0.109500E+02	0
111	212	213	0.469500E+02	0.547500E+01	0
112	214	215	0.469500E+02	0.0	0
113	216	217	0.500800E+02	0.219000E+02	0

114	218	219	0.500800E+02	0.191625E+02	0
115	220	221	0.500800E+02	0.164250E+02	0
116	222	223	0.500800E+02	0.136875E+02	0
117	224	225	0.500800E+02	0.109500E+02	0
118	226	227	0.500800E+02	0.821250E+01	0
119	228	229	0.500800E+02	0.547500E+01	0
120	230	231	0.500800E+02	0.273750E+01	0
121	232	233	0.500800E+02	0.0	0
122	234	235	0.532100E+02	0.219000E+02	0
123	236	237	0.532100E+02	0.164250E+02	0
124	238	239	0.532100E+02	0.109500E+02	0
125	240	241	0.532100E+02	0.547500E+01	0
126	242	243	0.532100E+02	0.0	0
127	244	245	0.563400E+02	0.219000E+02	0
128	246	247	0.563400E+02	0.191625E+02	0
129	248	249	0.563400E+02	0.164250E+02	0
130	250	251	0.563400E+02	0.136875E+02	0
131	252	253	0.563400E+02	0.109500E+02	0
132	254	255	0.563400E+02	0.821250E+01	0
133	256	257	0.563400E+02	0.547500E+01	0
134	258	259	0.563400E+02	0.273750E+01	0
135	260	261	0.563400E+02	0.0	0
136	262	263	0.594700E+02	0.219000E+02	0
137	264	265	0.594700E+02	0.164250E+02	0
138	266	267	0.594700E+02	0.109500E+02	0
139	268	269	0.594700E+02	0.547500E+01	0
140	270	271	0.594700E+02	0.0	0
141	272	273	0.626000E+02	0.219000E+02	0
142	274	275	0.626000E+02	0.191625E+02	0
143	276	277	0.626000E+02	0.164250E+02	0
144	278	279	0.626000E+02	0.136875E+02	0
145	280	281	0.626000E+02	0.109500E+02	0
146	282	283	0.626000E+02	0.821250E+01	0
147	284	285	0.626000E+02	0.547500E+01	0
148	286	287	0.626000E+02	0.273750E+01	0
149	288	289	0.626000E+02	0.0	0
150	290	291	0.657300E+02	0.219000E+02	0
151	292	293	0.657300E+02	0.164250E+02	0
152	294	295	0.657300E+02	0.109500E+02	0
153	296	297	0.657300E+02	0.547500E+01	0
154	298	299	0.657300E+02	0.0	0
155	300	301	0.688600E+02	0.219000E+02	0
156	302	303	0.688600E+02	0.191625E+02	0
157	304	305	0.688600E+02	0.164250E+02	0
158	306	307	0.688600E+02	0.136875E+02	0
159	308	309	0.688600E+02	0.109500E+02	0
160	310	311	0.688600E+02	0.821250E+01	0
161	312	313	0.688600E+02	0.547500E+01	0
162	314	315	0.688600E+02	0.273750E+01	0
163	316	317	0.688600E+02	0.0	0
164	318	319	0.719900E+02	0.219000E+02	0
165	320	321	0.719900E+02	0.164250E+02	0
166	322	323	0.719900E+02	0.109500E+02	0
167	324	325	0.719900E+02	0.547500E+01	0
168	326	0	0.719900E+02	0.0	0
169	327	328	0.751200E+02	0.219000E+02	0
170	329	330	0.751200E+02	0.191625E+02	0
171	331	332	0.751200E+02	0.164250E+02	0
172	333	334	0.751200E+02	0.136875E+02	0
173	335	336	0.751200E+02	0.109500E+02	0

174	337	338	0.751200E+02	0.821250E+01	0
175	339	340	0.751200E+02	0.547500E+01	0
176	341	342	0.751200E+02	0.273750E+01	0
177	343	344	0.751200E+02	0.0	0
178	0	0	0.0	0.375000E+01	0
179	345	0	0.313000E+01	0.375000E+01	0
180	346	0	0.626000E+01	0.375000E+01	0
181	347	0	0.939000E+01	0.375000E+01	0
182	348	0	0.125200E+02	0.375000E+01	0
183	349	0	0.156500E+02	0.375000E+01	0
184	350	0	0.187800E+02	0.375000E+01	0
185	351	0	0.219100E+02	0.375000E+01	0
186	352	0	0.250400E+02	0.375000E+01	0
187	353	0	0.281700E+02	0.375000E+01	0
188	354	0	0.313000E+02	0.375000E+01	0
189	355	0	0.344300E+02	0.375000E+01	0
190	356	0	0.375600E+02	0.375000E+01	0
191	357	0	0.406900E+02	0.375000E+01	0
192	358	0	0.438200E+02	0.375000E+01	0
193	359	0	0.469500E+02	0.375000E+01	0
194	360	0	0.500800E+02	0.375000E+01	0
195	361	0	0.532100E+02	0.375000E+01	0
196	362	0	0.563400E+02	0.375000E+01	0
197	363	0	0.594700E+02	0.375000E+01	0
198	364	0	0.626000E+02	0.375000E+01	0
199	365	0	0.657300E+02	0.375000E+01	0
200	366	0	0.688600E+02	0.375000E+01	0
201	367	0	0.719900E+02	0.375000E+01	0
202	368	0	0.751200E+02	0.375000E+01	0

COMPLETE BOUNDARY ELEMENTS
****

NO.BE	NODE	INC	X.PROJ.	Y.PROJ.	PRS.DSP.	STIFF.
1	164	0	0.0	0.100000E+01	0.0	0.100000E+01

COMPLETE SOLID ELEMENT DATA
****

NO.SE.	DEG	GAUSS	ELM.THICK.	NO.MAT	INC	NP1	NP2	NP3	NP4	NP5	NP6	NP7	NP8	NP9	NP10	NP11	NP12	M.AXES ORN.
1	2	33	12.2000	1	0	3	17	15	1	11	16	10	2	0	0	0	0	0.0
2	2	33	12.2000	1	0	5	19	17	3	12	18	11	4	0	0	0	0	0.0
3	2	33	12.2000	1	0	7	21	19	5	13	20	12	6	0	0	0	0	0.0
4	2	33	12.2000	1	0	9	23	21	7	14	22	13	8	0	0	0	0	0.0
5	2	33	12.2000	1	0	17	31	29	15	25	30	24	16	0	0	0	0	0.0
6	2	33	12.2000	1	0	19	33	31	17	26	32	25	18	0	0	0	0	0.0
7	2	33	12.2000	1	0	21	35	33	19	27	34	26	20	0	0	0	0	0.0
8	2	33	12.2000	1	0	23	37	35	21	28	36	27	22	0	0	0	0	0.0
9	2	33	12.2000	1	0	31	45	43	29	39	44	38	30	0	0	0	0	0.0
10	2	33	12.2000	1	0	33	47	45	31	40	46	39	32	0	0	0	0	0.0
11	2	33	12.2000	1	0	35	49	47	33	41	48	40	34	0	0	0	0	0.0
12	2	33	12.2000	1	0	37	51	49	35	42	50	41	36	0	0	0	0	0.0
13	2	33	12.2000	1	0	45	59	57	43	53	58	52	44	0	0	0	0	0.0
14	2	33	12.2000	1	0	47	61	59	45	54	60	53	46	0	0	0	0	0.0
15	2	33	12.2000	1	0	49	63	61	47	55	62	54	48	0	0	0	0	0.0
16	2	33	12.2000	1	0	51	65	63	49	56	64	55	50	0	0	0	0	0.0
17	2	33	12.2000	1	0	59	73	71	57	67	72	66	58	0	0	0	0	0.0
18	2	33	12.2000	1	0	61	75	73	59	68	74	67	60	0	0	0	0	0.0
19	2	33	12.2000	1	0	63	77	75	61	69	76	68	62	0	0	0	0	0.0
20	2	33	12.2000	1	0	65	79	77	63	70	78	69	64	0	0	0	0	0.0
21	2	33	12.2000	1	0	73	87	85	71	81	86	80	72	0	0	0	0	0.0
22	2	33	12.2000	1	0	75	89	87	73	82	88	81	74	0	0	0	0	0.0
23	2	33	12.2000	1	0	77	91	89	75	83	90	82	76	0	0	0	0	0.0
24	2	33	12.2000	1	0	79	93	91	77	84	92	83	78	0	0	0	0	0.0
25	2	33	12.2000	1	0	87	101	99	85	95	100	94	86	0	0	0	0	0.0
26	2	33	12.2000	1	0	89	103	101	87	96	102	95	88	0	0	0	0	0.0
27	2	33	12.2000	1	0	91	105	103	89	97	104	96	90	0	0	0	0	0.0
28	2	33	12.2000	1	0	93	107	105	91	98	106	97	92	0	0	0	0	0.0
29	2	33	12.2000	1	0	101	115	113	99	109	114	108	100	0	0	0	0	0.0
30	2	33	12.2000	1	0	103	117	115	101	110	116	109	102	0	0	0	0	0.0
31	2	33	12.2000	1	0	105	119	117	103	111	118	110	104	0	0	0	0	0.0
32	2	33	12.2000	1	0	107	121	119	105	112	120	111	106	0	0	0	0	0.0
33	2	33	12.2000	1	0	115	129	127	113	123	128	122	114	0	0	0	0	0.0
34	2	33	12.2000	1	0	117	131	129	115	124	130	123	116	0	0	0	0	0.0
35	2	33	12.2000	1	0	119	133	131	117	125	132	124	118	0	0	0	0	0.0
36	2	33	12.2000	1	0	121	135	133	119	126	134	125	120	0	0	0	0	0.0
37	2	33	12.2000	1	0	129	143	141	127	137	142	136	128	0	0	0	0	0.0
38	2	33	12.2000	1	0	131	145	143	129	138	144	137	130	0	0	0	0	0.0
39	2	33	12.2000	1	0	133	147	145	131	139	146	138	132	0	0	0	0	0.0
40	2	33	12.2000	1	0	135	149	147	133	140	148	139	134	0	0	0	0	0.0
41	2	33	12.2000	1	0	143	157	155	141	151	156	150	142	0	0	0	0	0.0
42	2	33	12.2000	1	0	145	159	157	143	152	158	151	144	0	0	0	0	0.0
43	2	33	12.2000	1	0	147	161	159	145	153	160	152	146	0	0	0	0	0.0
44	2	33	12.2000	1	0	149	163	161	147	154	162	153	148	0	0	0	0	0.0
45	2	33	12.2000	1	0	157	171	169	155	165	170	164	156	0	0	0	0	0.0
46	2	33	12.2000	1	0	159	173	171	157	166	172	165	158	0	0	0	0	0.0
47	2	33	12.2000	1	0	161	175	173	159	167	174	166	160	0	0	0	0	0.0
48	2	33	12.2000	1	0	163	177	175	161	168	176	167	162	0	0	0	0	0.0

COMPLETE LONG. REINF. DATA

N	NML	NMT	INC		A1	POS.	A2	POS.	A3	POS.	A4	POS.
1	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
5	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
9	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
13	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
17	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
21	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
25	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
29	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
33	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
37	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
41	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00
45	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
47	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	4	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3280E+00	0.3699E+00

COMPLETE BOND ELEMENT DATA
****

NO.SE	INC	BOND STIFF	NB1	NB2	NB3	NB4	NB5	NB6	NB7	NB8	NB9	NB10	NB11	NB12	NB13	NB14	NB15	NB16
1	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	178	179	180	0
5	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	180	181	182	0
9	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	182	183	184	0
13	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	184	185	186	0
17	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	186	187	188	0
21	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	188	189	190	0
25	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	190	191	192	0
29	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	192	193	194	0
33	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	194	195	196	0
37	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	196	197	198	0
41	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	198	199	200	0
45	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	1210000.0000	0	0	0	0	0	0	0	0	0	0	0	0	200	201	202	0

PROBLEM DATA READ AND GENERATED

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ELEMENT SHAPE FUNCTIONS AND DERIVATIVES FORMULATED AND STORED ON FILE 1

****************************************
SIZE OF STIFNESS MATRIX =     13781
****************************************

DYNAMIC STORAGE SIZE IN BYTES =        158540

COLUMN HEIGHTS AND ADDRESSING ARRAY CALCULATED

STRESSES AND MATERIAL PARAMETERS INITIALIZED

BASIC LOAD VECTORS FORMED

VARIABLES AND ARRAYS STORED ON FILES IST , ILD

VARIABLES AND ARRAYS RETRIEVED FROM FILES IST AND ILD
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5.3.3 Output for Load Step 4 for Beam 0A1

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OUTPUT OF LOAD STEP NO. 4

****

IP	NI	KI	RX	TU	TP	CD	CL	CT	CPN	CPT
0	1	10.	100000E+01	0.100000E-02	0.100000E-01	0.0	0.250000E+01	0.0	0.0	0.0

LOAD VECTOR UPDATED AND PSUEDO-LOAD VECTOR INTIALIZED

ITRATE NO.	FNU	FNP	PT/UT
1	0.207125E+00	0.367917E+00	0.205047E+05
2	0.217131E-01	0.433281E-01	0.200640E+05
3	0.226846E-02	0.244333E-01	0.200189E+05
4	0.218609E-03	0.342674E-01	0.200147E+05
5	0.138787E-03	0.168328E-01	0.200122E+05
6	0.597939E-04	0.164193E-01	0.200117E+05
7	0.621541E-04	0.169665E-01	0.200113E+05
8	0.694038E-04	0.182150E-01	0.200110E+05
9	0.783480E-04	0.200166E-01	0.200106E+05
10	0.887758E-04	0.223005E-01	0.200102E+05
11	0.100782E-03	0.250489E-01	0.200097E+05
12	0.114557E-03	0.316116E-01	0.200091E+05
13	0.185781E-03	0.292869E-01	0.200065E+05
14	0.151778E-03	0.334890E-01	0.200054E+05
15	0.171019E-03	0.134498E+00	0.200042E+05
16	0.433976E-03	0.217396E-01	0.199961E+05
17	0.102731E-03	0.207442E-01	0.199960E+05
18	0.112736E-03	0.201225E-01	0.199948E+05
19	0.113603E-03	0.195700E-01	0.199936E+05
20	0.111369E-03	0.110639E+00	0.199923E+05
21	0.156652E-03	0.499887E-01	0.199896E+05
22	0.187984E-03	0.328952E-01	0.199860E+05
23	0.138035E-03	0.220235E-02	0.199832E+05

NODAL DISPLACEMENTS
****

N	U	V	DU	DV	PX	PY
1	0.0	-0.659703E-01	0.0	-0.150773E-01	0.0	-0.375000E+04
2	0.0	-0.659350E-01	0.0	-0.150788E-01	0.0	0.0
3	0.0	-0.658863E-01	0.0	-0.150746E-01	0.0	0.0
4	0.0	-0.658103E-01	0.0	-0.150593E-01	0.0	0.0
5	0.0	-0.657341E-01	0.0	-0.150391E-01	0.0	0.0
6	0.0	-0.656329E-01	0.0	-0.150097E-01	0.0	0.0
7	0.0	-0.655479E-01	0.0	-0.149911E-01	0.0	0.0
8	0.0	-0.654761E-01	0.0	-0.149855E-01	0.0	0.0
9	0.0	-0.654409E-01	0.0	-0.149834E-01	0.0	0.0
10	-0.130784E-02	-0.656236E-01	-0.268302E-03	-0.150029E-01	0.0	-0.112500E+05
11	-0.482566E-03	-0.655992E-01	-0.768810E-04	-0.150075E-01	0.0	0.0
12	0.143175E-03	-0.655020E-01	0.902841E-04	-0.149873E-01	0.0	0.0
13	0.721541E-03	-0.653675E-01	0.193701E-03	-0.149773E-01	0.0	0.0
14	0.129983E-02	-0.652722E-01	0.249190E-03	-0.149804E-01	0.0	0.0
15	-0.254610E-02	-0.646262E-01	-0.523004E-03	-0.147865E-01	0.0	0.0
16	-0.167546E-02	-0.647666E-01	-0.323473E-03	-0.148163E-01	0.0	0.0
17	-0.991886E-03	-0.648364E-01	-0.157385E-03	-0.148300E-01	0.0	0.0
18	-0.360851E-03	-0.648442E-01	0.118238E-05	-0.148268E-01	0.0	0.0
19	0.262477E-03	-0.648059E-01	0.168579E-03	-0.148103E-01	0.0	0.0
20	0.956853E-03	-0.647219E-01	0.387499E-03	-0.147818E-01	0.0	0.0
21	0.158446E-02	-0.646428E-01	0.543300E-03	-0.147687E-01	0.0	0.0
22	0.237065E-02	-0.645903E-01	0.828001E-03	-0.147728E-01	0.0	0.0
23	0.326846E-02	-0.645687E-01	0.116563E-02	-0.147717E-01	0.0	0.0
24	-0.361190E-02	-0.634142E-01	-0.743460E-03	-0.145063E-01	0.0	0.0
25	-0.150718E-02	-0.636857E-01	-0.240926E-03	-0.145577E-01	0.0	0.0
26	0.354709E-03	-0.637254E-01	0.236487E-03	-0.145547E-01	0.0	0.0
27	0.210324E-02	-0.636509E-01	0.600790E-03	-0.145541E-01	0.0	0.0
28	0.389535E-02	-0.635503E-01	0.865797E-03	-0.145350E-01	0.0	0.0
29	-0.460712E-02	-0.619680E-01	-0.948763E-03	-0.141623E-01	0.0	0.0
30	-0.327139E-02	-0.621189E-01	-0.628473E-03	-0.141923E-01	0.0	0.0
31	-0.200156E-02	-0.622274E-01	-0.320796E-03	-0.142116E-01	0.0	0.0
32	-0.794804E-03	-0.622855E-01	-0.230173E-04	-0.142180E-01	0.0	0.0
33	0.399387E-03	-0.622941E-01	0.280519E-03	-0.142133E-01	0.0	0.0
34	0.164877E-02	-0.622560E-01	0.617387E-03	-0.141989E-01	0.0	0.0
35	0.283086E-02	-0.622143E-01	0.889284E-03	-0.142008E-01	0.0	0.0
36	0.423507E-02	-0.621622E-01	0.130117E-02	-0.142131E-01	0.0	0.0
37	0.576883E-02	-0.621404E-01	0.174889E-02	-0.142105E-01	0.0	0.0
38	-0.556740E-02	-0.602449E-01	-0.114383E-02	-0.137515E-01	0.0	0.0
39	-0.247746E-02	-0.604869E-01	-0.401251E-03	-0.137976E-01	0.0	0.0
40	0.435411E-03	-0.605611E-01	0.321481E-03	-0.138051E-01	0.0	0.0
41	0.333141E-02	-0.604982E-01	0.994116E-03	-0.138034E-01	0.0	0.0
42	0.626675E-02	-0.604141E-01	0.160504E-02	-0.138006E-01	0.0	0.0
43	-0.646999E-02	-0.582507E-01	-0.132723E-02	-0.132768E-01	0.0	0.0
44	-0.465829E-02	-0.583837E-01	-0.894503E-03	-0.133031E-01	0.0	0.0
45	-0.292156E-02	-0.584780E-01	-0.475880E-03	-0.133207E-01	0.0	0.0
46	-0.123157E-02	-0.585345E-01	-0.665707E-04	-0.133306E-01	0.0	0.0
47	0.444001E-03	-0.585528E-01	0.342639E-03	-0.133329E-01	0.0	0.0
48	0.215451E-02	-0.585294E-01	0.780503E-03	-0.133196E-01	0.0	0.0
49	0.387038E-02	-0.584785E-01	0.118673E-02	-0.133092E-01	0.0	0.0
50	0.571856E-02	-0.584348E-01	0.169848E-02	-0.133085E-01	0.0	0.0
51	0.769831E-02	-0.583932E-01	0.226710E-02	-0.133083E-01	0.0	0.0
52	-0.730701E-02	-0.560063E-01	-0.149609E-02	-0.127437E-01	0.0	0.0
53	-0.334100E-02	-0.562186E-01	-0.549804E-03	-0.127850E-01	0.0	0.0
54	0.454416E-03	-0.562875E-01	0.374058E-03	-0.127938E-01	0.0	0.0

55	0.426620E-02	-0.562335E-01	0.128881E-02	-0.127885E-01	0.0	0.0
56	0.816209E-02	-0.561289E-01	0.209277E-02	-0.127894E-01	0.0	0.0
57	-0.808520E-02	-0.535324E-01	-0.165341E-02	-0.121573E-01	0.0	0.0
58	-0.587176E-02	-0.536465E-01	-0.112775E-02	-0.121796E-01	0.0	0.0
59	-0.373061E-02	-0.537281E-01	-0.616585E-03	-0.121945E-01	0.0	0.0
60	-0.163608E-02	-0.537782E-01	-0.114759E-03	-0.122040E-01	0.0	0.0
61	0.442957E-03	-0.537963E-01	0.387933E-03	-0.122066E-01	0.0	0.0
62	0.254849E-02	-0.537791E-01	0.911222E-03	-0.121985E-01	0.0	0.0
63	0.467475E-02	-0.537390E-01	0.143044E-02	-0.121899E-01	0.0	0.0
64	0.694510E-02	-0.536856E-01	0.203709E-02	-0.121919E-01	0.0	0.0
65	0.930097E-02	-0.536380E-01	0.268178E-02	-0.121933E-01	0.0	0.0
66	-0.880098E-02	-0.508479E-01	-0.179605E-02	-0.115220E-01	0.0	0.0
67	-0.409639E-02	-0.510291E-01	-0.681678E-03	-0.115571E-01	0.0	0.0
68	0.432373E-03	-0.510902E-01	0.404265E-03	-0.115670E-01	0.0	0.0
69	0.500040E-02	-0.510399E-01	0.151552E-02	-0.115574E-01	0.0	0.0
70	0.969829E-02	-0.509371E-01	0.254333E-02	-0.115519E-01	0.0	0.0
71	-0.945875E-02	-0.479737E-01	-0.192603E-02	-0.108444E-01	0.0	0.0
72	-0.691105E-02	-0.480699E-01	-0.132593E-02	-0.108629E-01	0.0	0.0
73	-0.443423E-02	-0.481390E-01	-0.741145E-03	-0.108756E-01	0.0	0.0
74	-0.200201E-02	-0.481804E-01	-0.164396E-03	-0.108830E-01	0.0	0.0
75	0.413262E-03	-0.481945E-01	0.412831E-03	-0.108852E-01	0.0	0.0
76	0.283533E-02	-0.481854E-01	0.995853E-03	-0.108856E-01	0.0	0.0
77	0.529571E-02	-0.481512E-01	0.159605E-02	-0.108814E-01	0.0	0.0
78	0.785192E-02	-0.481076E-01	0.222742E-02	-0.108863E-01	0.0	0.0
79	0.104900E-01	-0.480602E-01	0.288103E-02	-0.108914E-01	0.0	0.0
80	-0.100567E-01	-0.449280E-01	-0.204167E-02	-0.101290E-01	0.0	0.0
81	-0.474558E-02	-0.450786E-01	-0.796055E-03	-0.101571E-01	0.0	0.0
82	0.389092E-03	-0.451283E-01	0.417026E-03	-0.101648E-01	0.0	0.0
83	0.554544E-02	-0.450809E-01	0.165384E-02	-0.101550E-01	0.0	0.0
84	0.109440E-01	-0.449760E-01	0.294169E-02	-0.101442E-01	0.0	0.0
85	-0.105994E-01	-0.417296E-01	-0.214437E-02	-0.938185E-02	0.0	0.0
86	-0.778132E-02	-0.418089E-01	-0.148782E-02	-0.939647E-02	0.0	0.0
87	-0.503031E-02	-0.418658E-01	-0.845970E-03	-0.940649E-02	0.0	0.0
88	-0.232307E-02	-0.418994E-01	-0.212241E-03	-0.941149E-02	0.0	0.0
89	0.363218E-03	-0.419098E-01	0.419289E-03	-0.941169E-02	0.0	0.0
90	0.305238E-02	-0.418977E-01	0.105573E-02	-0.940759E-02	0.0	0.0
91	0.576504E-02	-0.418654E-01	0.170221E-02	-0.940044E-02	0.0	0.0
92	0.855719E-02	-0.418161E-01	0.237762E-02	-0.939147E-02	0.0	0.0
93	0.114168E-01	-0.417683E-01	0.304800E-02	-0.939267E-02	0.0	0.0
94	-0.110872E-01	-0.383951E-01	-0.223404E-02	-0.860774E-02	0.0	0.0
95	-0.528882E-02	-0.385176E-01	-0.890630E-03	-0.862918E-02	0.0	0.0
96	0.336924E-03	-0.385576E-01	0.420534E-03	-0.863293E-02	0.0	0.0
97	0.595921E-02	-0.385175E-01	0.174141E-02	-0.862059E-02	0.0	0.0
98	0.118083E-01	-0.384226E-01	0.312641E-02	-0.860925E-02	0.0	0.0
99	-0.115239E-01	-0.349396E-01	-0.231223E-02	-0.781112E-02	0.0	0.0
100	-0.849124E-02	-0.350031E-01	-0.161484E-02	-0.782219E-02	0.0	0.0
101	-0.552148E-02	-0.350491E-01	-0.930268E-03	-0.782966E-02	0.0	0.0
102	-0.259465E-02	-0.350769E-01	-0.253692E-03	-0.783325E-02	0.0	0.0
103	0.309823E-03	-0.350864E-01	0.419835E-03	-0.783283E-02	0.0	0.0
104	0.321220E-02	-0.350778E-01	0.109524E-02	-0.782838E-02	0.0	0.0
105	0.613080E-02	-0.350519E-01	0.177656E-02	-0.782028E-02	0.0	0.0
106	0.910538E-02	-0.350125E-01	0.247302E-02	-0.781128E-02	0.0	0.0
107	0.121642E-01	-0.349631E-01	0.319071E-02	-0.780536E-02	0.0	0.0
108	-0.119105E-01	-0.313771E-01	-0.237962E-02	-0.699568E-02	0.0	0.0
109	-0.572930E-02	-0.314741E-01	-0.965359E-03	-0.701187E-02	0.0	0.0
110	0.283251E-03	-0.315094E-01	0.418298E-03	-0.701482E-02	0.0	0.0
111	0.628076E-02	-0.314831E-01	0.180497E-02	-0.700516E-02	0.0	0.0
112	0.124690E-01	-0.314028E-01	0.322915E-02	-0.698906E-02	0.0	0.0
113	-0.122490E-01	-0.277203E-01	-0.243741E-02	-0.616447E-02	0.0	0.0
114	-0.905009E-02	-0.277690E-01	-0.171113E-02	-0.617267E-02	0.0	0.0

115	-0.591227E-02	-0.278052E-01	-0.996013E-03	-0.617845E-02	0.0	0.0
116	-0.281640E-02	-0.278286E-01	-0.288313E-03	-0.618154E-02	0.0	0.0
117	0.257011E-03	-0.278390E-01	0.415851E-03	-0.618188E-02	0.0	0.0
118	0.332689E-02	-0.278361E-01	0.112015E-02	-0.617960E-02	0.0	0.0
119	0.640941E-02	-0.278206E-01	0.182709E-02	-0.617539E-02	0.0	0.0
120	0.954082E-02	-0.277924E-01	0.254340E-02	-0.616970E-02	0.0	0.0
121	0.127467E-01	-0.277520E-01	0.326921E-02	-0.616248E-02	0.0	0.0
122	-0.125390E-01	-0.239816E-01	-0.248628E-02	-0.531992E-02	0.0	0.0
123	-0.607113E-02	-0.240543E-01	-0.102255E-02	-0.533186E-02	0.0	0.0
124	0.231730E-03	-0.240863E-01	0.412676E-03	-0.533585E-02	0.0	0.0
125	0.652056E-02	-0.240748E-01	0.184624E-02	-0.533208E-02	0.0	0.0
126	0.129942E-01	-0.240175E-01	0.330981E-02	-0.532225E-02	0.0	0.0
127	-0.127809E-01	-0.201739E-01	-0.252661E-02	-0.446426E-02	0.0	0.0
128	-0.946237E-02	-0.202078E-01	-0.178052E-02	-0.446989E-02	0.0	0.0
129	-0.620564E-02	-0.202341E-01	-0.104497E-02	-0.447417E-02	0.0	0.0
130	-0.298930E-02	-0.202525E-01	-0.316328E-03	-0.447694E-02	0.0	0.0
131	0.206524E-03	-0.202629E-01	0.408854E-03	-0.447827E-02	0.0	0.0
132	0.340205E-02	-0.202650E-01	0.113409E-02	-0.447818E-02	0.0	0.0
133	0.661307E-02	-0.202566E-01	0.186192E-02	-0.447639E-02	0.0	0.0
134	0.987231E-02	-0.202384E-01	0.259750E-02	-0.447321E-02	0.0	0.0
135	0.132094E-01	-0.202085E-01	0.334603E-02	-0.446824E-02	0.0	0.0
136	-0.129719E-01	-0.163112E-01	-0.255835E-02	-0.359977E-02	0.0	0.0
137	-0.631614E-02	-0.163578E-01	-0.106340E-02	-0.360748E-02	0.0	0.0
138	0.182563E-03	-0.163806E-01	0.405012E-03	-0.361095E-02	0.0	0.0
139	0.668596E-02	-0.163774E-01	0.187407E-02	-0.361009E-02	0.0	0.0
140	0.133887E-01	-0.163371E-01	0.337594E-02	-0.360325E-02	0.0	0.0
141	-0.131127E-01	-0.124101E-01	-0.258168E-02	-0.272912E-02	0.0	0.0
142	-0.972711E-02	-0.124279E-01	-0.182466E-02	-0.273207E-02	0.0	0.0
143	-0.640262E-02	-0.124418E-01	-0.107783E-02	-0.273436E-02	0.0	0.0
144	-0.311343E-02	-0.124493E-01	-0.336947E-03	-0.273558E-02	0.0	0.0
145	0.160275E-03	-0.124521E-01	0.401300E-03	-0.273597E-02	0.0	0.0
146	0.343676E-02	-0.124471E-01	0.113997E-02	-0.273507E-02	0.0	0.0
147	0.673854E-02	-0.124413E-01	0.188279E-02	-0.273406E-02	0.0	0.0
148	0.101067E-01	-0.124290E-01	0.263663E-02	-0.273199E-02	0.0	0.0
149	0.135396E-01	-0.124113E-01	0.340119E-02	-0.272901E-02	0.0	0.0
150	-0.131990E-01	-0.849012E-02	-0.259598E-02	-0.185545E-02	0.0	0.0
151	-0.646290E-02	-0.850556E-02	-0.108789E-02	-0.185801E-02	0.0	0.0
152	0.140316E-03	-0.848836E-02	0.397953E-03	-0.185512E-02	0.0	0.0
153	0.677754E-02	-0.844408E-02	0.188928E-02	-0.184773E-02	0.0	0.0
154	0.136938E-01	-0.841575E-02	0.342700E-02	-0.184300E-02	0.0	0.0
155	-0.132420E-01	-0.457425E-02	-0.260308E-02	-0.982535E-03	0.0	0.0
156	-0.985031E-02	-0.457729E-02	-0.184514E-02	-0.983039E-03	0.0	0.0
157	-0.649989E-02	-0.457245E-02	-0.109406E-02	-0.982235E-03	0.0	0.0
158	-0.317759E-02	-0.455502E-02	-0.347686E-03	-0.979337E-03	0.0	0.0
159	0.134012E-03	-0.452348E-02	0.396875E-03	-0.974089E-03	0.0	0.0
160	0.345376E-02	-0.446690E-02	0.114275E-02	-0.964670E-03	0.0	0.0
161	0.680283E-02	-0.439492E-02	0.189349E-02	-0.952681E-03	0.0	0.0
162	0.102115E-01	-0.434490E-02	0.265413E-02	-0.944347E-03	0.0	0.0
163	0.138070E-01	-0.428922E-02	0.344594E-02	-0.935068E-03	0.0	0.0
164	-0.132508E-01	-0.681393E-03	-0.260453E-02	-0.113473E-03	0.0	0.0
165	-0.651362E-02	-0.667527E-03	-0.109636E-02	-0.111171E-03	0.0	0.0
166	0.138899E-03	-0.581888E-03	0.397671E-03	-0.969346E-04	0.0	0.0
167	0.684172E-02	-0.402475E-03	0.189996E-02	-0.670705E-04	0.0	0.0
168	0.137407E-01	0.0	0.343491E-02	0.0	0.0	0.0
169	-0.132467E-01	0.318829E-02	-0.260384E-02	0.751736E-03	0.0	0.0
170	-0.987218E-02	0.318494E-02	-0.184877E-02	0.751176E-03	0.0	0.0
171	-0.651259E-02	0.319079E-02	-0.109619E-02	0.752140E-03	0.0	0.0
172	-0.317428E-02	0.321766E-02	-0.347158E-03	0.756587E-03	0.0	0.0
173	0.153141E-03	0.327843E-02	0.400035E-03	0.766675E-03	0.0	0.0
174	0.349511E-02	0.340041E-02	0.114962E-02	0.786965E-03	0.0	0.0

175	0.688781E-02	0.356667E-02	0.190764E-02	0.814642E-03	0.0	0.0
176	0.103229E-01	0.364031E-02	0.267271E-02	0.826904E-03	0.0	0.0
177	0.136519E-01	0.371777E-02	0.342012E-02	0.839813E-03	0.0	0.0
178	0.0	0.0	0.0	0.0	0.0	0.0
179	0.376974E-04	0.0	0.533026E-04	0.0	0.0	0.0
180	-0.223302E-03	0.0	-0.182889E-03	0.0	0.0	0.0
181	0.496149E-04	0.0	0.809685E-04	0.0	0.0	0.0
182	-0.218287E-03	0.0	-0.150586E-03	0.0	0.0	0.0
183	-0.543345E-05	0.0	0.285740E-04	0.0	0.0	0.0
184	-0.160760E-03	0.0	-0.109893E-03	0.0	0.0	0.0
185	-0.120884E-04	0.0	0.296077E-04	0.0	0.0	0.0
186	-0.128412E-03	0.0	-0.948441E-04	0.0	0.0	0.0
187	-0.255497E-04	0.0	0.870042E-05	0.0	0.0	0.0
188	-0.718734E-04	0.0	-0.422653E-04	0.0	0.0	0.0
189	-0.388405E-04	0.0	-0.156316E-04	0.0	0.0	0.0
190	-0.387030E-04	0.0	-0.178363E-04	0.0	0.0	0.0
191	-0.283796E-04	0.0	-0.975612E-05	0.0	0.0	0.0
192	-0.241268E-04	0.0	-0.596020E-05	0.0	0.0	0.0
193	-0.218875E-04	0.0	-0.443187E-05	0.0	0.0	0.0
194	-0.213859E-04	0.0	-0.426909E-05	0.0	0.0	0.0
195	-0.205716E-04	0.0	-0.359221E-05	0.0	0.0	0.0
196	-0.200291E-04	0.0	-0.326250E-05	0.0	0.0	0.0
197	-0.211772E-04	0.0	-0.350444E-05	0.0	0.0	0.0
198	-0.234887E-04	0.0	-0.391038E-05	0.0	0.0	0.0
199	-0.129107E-04	0.0	-0.215140E-05	0.0	0.0	0.0
200	0.635754E-05	0.0	0.106119E-05	0.0	0.0	0.0
201	-0.169083E-04	0.0	-0.281947E-05	0.0	0.0	0.0
202	-0.592901E-04	0.0	-0.988324E-05	0.0	0.0	0.0

STRESS STATE AT THE GAUSS POINTS FOR SOLID ELEMENTS
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ELEMENT	GAUSS	COORDINATES	GLOBAL STRESSES	LOCAL STRESSES	PRINCIPAL STRESSES	CRACKING FLAGS
1	IG = 1	XG = 0.705512E+00	SIGR = -0.583760E+03	SIGXI = -0.181241E+03	SIG1 = -0.181240E+03	IXI = 0
	JG = 1	YG = 0.170420E+02	SIGZ = -0.182762E+03	SIGETA = -0.585281E+03	SIG2 = -0.585281E+03	IETA = 0
		ZETA = 0.865047E+02	SIGRZ = 0.247470E+02	SIGXIET= -0.161077E+00	SIGTH = 0.0	ITHETA = 2
			SSTRN = 0.190362E-04		GAMA = 0.864819E+02	IXIETA = 0
1	IG = 2	XG = 0.313000E+01	SIGR = -0.593263E+03	SIGXI = -0.160698E+03	SIG1 = -0.160698E+03	IXI = 0
	JG = 1	YG = 0.170420E+02	SIGZ = -0.169296E+03	SIGETA = -0.601861E+03	SIG2 = -0.601861E+03	IETA = 0
		ZETA = 0.820234E+02	SIGRZ = 0.609842E+02	SIGXIET= -0.371418E+00	SIGTH = 0.0	ITHETA = 2
			SSTRN = 0.469109E-04		GAMA = 0.819752E+02	IXIETA = 0
1	IG = 3	XG = 0.555449E+01	SIGR = -0.590385E+03	SIGXI = -0.702549E+02	SIG1 = -0.702542E+02	IXI = 0
	JG = 1	YG = 0.170420E+02	SIGZ = -0.939184E+02	SIGETA = -0.614048E+03	SIG2 = -0.614049E+03	IETA = 0
		ZETA = 0.780261E+02	SIGRZ = 0.110944E+03	SIGXIET= -0.634708E+00	SIGTH = 0.0	ITHETA = 2
			SSTRN = 0.853413E-04		GAMA = 0.779593E+02	IXIETA = 0
1	IG = 1	XG = 0.705512E+00	SIGR = -0.891509E+03	SIGXI = -0.226574E+03	SIG1 = -0.226574E+03	IXI = 0
	JG = 2	YG = 0.191625E+02	SIGZ = -0.226926E+03	SIGETA = -0.891861E+03	SIG2 = -0.891861E+03	IETA = 0
		ZETA = 0.886906E+02	SIGRZ = 0.152962E+02	SIGXIET= -0.980210E-01	SIGTH = 0.0	ITHETA = 2
			SSTRN = 0.117663E-04		GAMA = 0.886822E+02	IXIETA = 0
1	IG = 2	XG = 0.313000E+01	SIGR = -0.867148E+03	SIGXI = -0.184043E+03	SIG1 = -0.184043E+03	IXI = 0
	JG = 2	YG = 0.191625E+02	SIGZ = -0.187233E+03	SIGETA = -0.870338E+03	SIG2 = -0.870339E+03	IETA = 0
		ZETA = 0.861150E+02	SIGRZ = 0.466817E+02	SIGXIET= -0.291721E+00	SIGTH = 0.0	ITHETA = 2
			SSTRN = 0.359090E-04		GAMA = 0.860906E+02	IXIETA = 0
1	IG = 3	XG = 0.555449E+01	SIGR = -0.830405E+03	SIGXI = -0.744834E+02	SIG1 = -0.744830E+02	IXI = 0
	JG = 2	YG = 0.191625E+02	SIGZ = -0.856287E+02	SIGETA = -0.841551E+03	SIG2 = -0.841551E+03	IETA = 0
		ZETA = 0.831183E+02	SIGRZ = 0.917895E+02	SIGXIET= -0.557565E+00	SIGTH = 0.0	ITHETA = 2
			SSTRN = 0.706073E-04		GAMA = 0.830766E+02	IXIETA = 0
1	IG = 1	XG = 0.705512E+00	SIGR = -0.125716E+04	SIGXI = -0.282496E+03	SIG1 = -0.282496E+03	IXI = 0
	JG = 3	YG = 0.212830E+02	SIGZ = -0.282669E+03	SIGETA = -0.125733E+04	SIG2 = -0.125733E+04	IETA = 0
		ZETA = 0.892417E+02	SIGRZ = 0.129804E+02	SIGXIET= -0.807880E-01	SIGTH = 0.0	ITHETA = 2
			SSTRN = 0.998491E-05		GAMA = 0.892370E+02	IXIETA = 0
1	IG = 2	XG = 0.313000E+01	SIGR = -0.119893E+04	SIGXI = -0.215162E+03	SIG1 = -0.215162E+03	IXI = 0
	JG = 3	YG = 0.212830E+02	SIGZ = -0.216749E+03	SIGETA = -0.120052E+04	SIG2 = -0.120052E+04	IETA = 0
		ZETA = 0.877144E+02	SIGRZ = 0.395142E+02	SIGXIET= -0.250198E+00	SIGTH = 0.0	ITHETA = 2
			SSTRN = 0.303956E-04		GAMA = 0.876999E+02	IXIETA = 0
1	IG = 3	XG = 0.555449E+01	SIGR = -0.112832E+04	SIGXI = -0.828324E+02	SIG1 = -0.828321E+02	IXI = 0
	JG = 3	YG = 0.212830E+02	SIGZ = -0.889186E+02	SIGETA = -0.113441E+04	SIG2 = -0.113441E+04	IETA = 0
		ZETA = 0.856640E+02	SIGRZ = 0.797704E+02	SIGXIET= -0.498264E+00	SIGTH = 0.0	ITHETA = 2
			SSTRN = 0.613618E-04		GAMA = 0.856368E+02	IXIETA = 0
2	IG = 1	XG = 0.705512E+00	SIGR = 0.650001E+02	SIGXI = 0.658649E+02	SIG1 = 0.658649E+02	IXI = 0
	JG = 1	YG = 0.115670E+02	SIGZ = -0.715021E+02	SIGETA = -0.723668E+02	SIG2 = -0.723668E+02	IETA = 0
		ZETA = 0.452498E+01	SIGRZ = 0.108990E+02	SIGXIET= 0.277093E-01	SIGTH = 0.0	ITHETA = 2
			SSTRN = 0.838384E-05		GAMA = 0.453647E+01	IXIETA = 0
2	IG = 2	XG = 0.313000E+01	SIGR = 0.475646E+02	SIGXI = 0.642155E+02	SIG1 = 0.642159E+02	IXI = 0
	JG = 1	YG = 0.115670E+02	SIGZ = -0.658615E+02	SIGETA = -0.825124E+02	SIG2 = -0.825127E+02	IETA = 0
		ZETA = 0.196015E+02	SIGRZ = 0.465397E+02	SIGXIET= 0.217500E+00	SIGTH = 0.0	ITHETA = 2

						SSTRN =	0.357998E-04					GAMA =	0.196865E+02	IXIETA =	0
2	IG = 3	XG =	0.555449E+01	SIGR =	0.309578E+02	SIGXI =	0.800688E+02	SIG1 =	0.800692E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	-0.560772E+02	SIGETA =	-0.105188E+03	SIG2 =	-0.105189E+03	IETA =	0
		ZETA =	0.309076E+02	SIGRZ =	0.817700E+02	SIGXIET=	0.263681E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.629000E-04			GAMA =	0.309892E+02	IXIETA =	0
2	IG = 1	XG =	0.705512E+00	SIGR =	-0.182523E+03	SIGXI =	-0.112549E+03	SIG1 =	-0.112549E+03	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.116231E+03	SIGETA =	-0.186205E+03	SIG2 =	-0.186205E+03	IETA =	0
		ZETA =	0.771504E+02	SIGRZ =	0.160523E+02	SIGXIET=	-0.909217E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.123480E-04			GAMA =	0.770797E+02	IXIETA =	0
2	IG = 2	XG =	0.313000E+01	SIGR =	-0.197607E+03	SIGXI =	-0.728374E+02	SIG1 =	-0.728370E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.945539E+02	SIGETA =	-0.219323E+03	SIG2 =	-0.219324E+03	IETA =	0
		ZETA =	0.674473E+02	SIGRZ =	0.520539E+02	SIGXIET=	-0.238259E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.400415E-04			GAMA =	0.673541E+02	IXIETA =	0
2	IG = 3	XG =	0.555449E+01	SIGR =	-0.211862E+03	SIGXI =	-0.271473E+02	SIG1 =	-0.271467E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.687332E+02	SIGETA =	-0.253448E+03	SIG2 =	-0.253449E+03	IETA =	0
		ZETA =	0.647099E+02	SIGRZ =	0.876451E+02	SIGXIET=	-0.369674E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.674193E-04			GAMA =	0.646163E+02	IXIETA =	0
2	IG = 1	XG =	0.705512E+00	SIGR =	-0.432431E+03	SIGXI =	-0.158790E+03	SIG1 =	-0.158790E+03	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.161437E+03	SIGETA =	-0.435078E+03	SIG2 =	-0.435078E+03	IETA =	0
		ZETA =	0.844176E+02	SIGRZ =	0.269149E+02	SIGXIET=	-0.168932E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.207038E-04			GAMA =	0.843825E+02	IXIETA =	0
2	IG = 2	XG =	0.313000E+01	SIGR =	-0.445164E+03	SIGXI =	-0.111716E+03	SIG1 =	-0.111716E+03	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.123723E+03	SIGETA =	-0.457171E+03	SIG2 =	-0.457172E+03	IETA =	0
		ZETA =	0.793157E+02	SIGRZ =	0.632773E+02	SIGXIET=	-0.366071E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.486749E-04			GAMA =	0.792549E+02	IXIETA =	0
2	IG = 3	XG =	0.555449E+01	SIGR =	-0.457068E+03	SIGXI =	-0.572403E+02	SIG1 =	-0.572395E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.818662E+02	SIGETA =	-0.481694E+03	SIG2 =	-0.481695E+03	IETA =	0
		ZETA =	0.761368E+02	SIGRZ =	0.992293E+02	SIGXIET=	-0.554506E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.763303E-04			GAMA =	0.760620E+02	IXIETA =	0
3	IG = 1	XG =	0.705512E+00	SIGR =	0.270623E+03	SIGXI =	0.270698E+03	SIG1 =	0.270828E+03	IXI =	1
	JG = 1	YG =	0.609204E+01	SIGZ =	-0.314211E+02	SIGETA =	-0.314954E+02	SIG2 =	-0.316257E+02	IETA =	0
		ZETA =	-0.300764E+00	SIGRZ =	-0.786354E+01	SIGXIET=	-0.627760E+01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.686513E-05			GAMA =	-0.149031E+01	IXIETA =	0
3	IG = 2	XG =	0.313000E+01	SIGR =	0.260443E+03	SIGXI =	0.262833E+03	SIG1 =	0.263506E+03	IXI =	1
	JG = 1	YG =	0.609204E+01	SIGZ =	-0.689220E+01	SIGETA =	-0.928271E+01	SIG2 =	-0.995568E+01	IETA =	0
		ZETA =	0.323223E+01	SIGRZ =	0.287812E+02	SIGXIET=	0.135490E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.484425E-04			GAMA =	0.607569E+01	IXIETA =	0
3	IG = 3	XG =	0.555449E+01	SIGR =	0.245440E+03	SIGXI =	0.252939E+03	SIG1 =	0.253749E+03	IXI =	1
	JG = 1	YG =	0.609204E+01	SIGZ =	-0.376508E+02	SIGETA =	-0.451492E+02	SIG2 =	-0.459599E+02	IETA =	0
		ZETA =	0.660352E+01	SIGRZ =	0.492063E+02	SIGXIET=	0.155659E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.856409E-04			GAMA =	0.958464E+01	IXIETA =	0
3	IG = 1	XG =	0.705512E+00	SIGR =	0.288437E+03	SIGXI =	0.288220E+03	SIG1 =	0.288464E+03	IXI =	1
	JG = 2	YG =	0.821250E+01	SIGZ =	-0.339247E+02	SIGETA =	-0.337074E+02	SIG2 =	-0.339518E+02	IETA =	0
		ZETA =	0.105274E+01	SIGRZ =	-0.295512E+01	SIGXIET=	-0.887478E+01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.404276E-06			GAMA =	-0.525176E+00	IXIETA =	0
3	IG = 2	XG =	0.313000E+01	SIGR =	0.280235E+03	SIGXI =	0.283703E+03	SIG1 =	0.283733E+03	IXI =	1
	JG = 2	YG =	0.821250E+01	SIGZ =	-0.191908E+02	SIGETA =	-0.226590E+02	SIG2 =	-0.226891E+02	IETA =	0

			ZETA =	0.556568E+01	SIGRZ =	0.325533E+02	SIGXIET=	0.303743E+01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.398896E-04			GAMA =	0.613367E+01	IXIETA =	0
3	IG	= 3	XG =	0.555449E+01	SIGR =	0.274683E+03	SIGXI =	0.278802E+03	SIG1 =	0.279681E+03	IXI =	1
	JG	= 2	YG =	0.821250E+01	SIGZ =	-0.367799E+02	SIGETA =	-0.408992E+02	SIG2 =	-0.417781E+02	IETA =	0
			ZETA =	0.101604E+02	SIGRZ =	0.397709E+02	SIGXIET=	-0.167861E+02	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.620741E-04			GAMA =	0.716304E+01	IXIETA =	0
3	IG	= 1	XG =	0.705512E+00	SIGR =	0.200831E+03	SIGXI =	0.201151E+03	SIG1 =	0.201151E+03	IXI =	0
	JG	= 3	YG =	0.103330E+02	SIGZ =	-0.678504E+02	SIGETA =	-0.681701E+02	SIG2 =	-0.681701E+02	IETA =	0
			ZETA =	0.196459E+01	SIGRZ =	0.927259E+01	SIGXIET=	0.453024E-01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.713276E-05			GAMA =	0.197423E+01	IXIETA =	0
3	IG	= 2	XG =	0.313000E+01	SIGR =	0.201330E+03	SIGXI =	0.208332E+03	SIG1 =	0.208333E+03	IXI =	0
	JG	= 3	YG =	0.103330E+02	SIGZ =	-0.452202E+02	SIGETA =	-0.522222E+02	SIG2 =	-0.522227E+02	IETA =	0
			ZETA =	0.936264E+01	SIGRZ =	0.421367E+02	SIGXIET=	0.331156E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.324128E-04			GAMA =	0.943546E+01	IXIETA =	0
3	IG	= 3	XG =	0.555449E+01	SIGR =	0.196146E+03	SIGXI =	0.206432E+03	SIG1 =	0.206432E+03	IXI =	0
	JG	= 3	YG =	0.103330E+02	SIGZ =	-0.510051E+02	SIGETA =	-0.612905E+02	SIG2 =	-0.612910E+02	IETA =	0
			ZETA =	0.112253E+02	SIGRZ =	0.514587E+02	SIGXIET=	0.366596E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.395836E-04			GAMA =	0.113038E+02	IXIETA =	0
4	IG	= 1	XG =	0.705512E+00	SIGR =	0.267279E+03	SIGXI =	0.267279E+03	SIG1 =	0.267719E+03	IXI =	1
	JG	= 1	YG =	0.617042E+00	SIGZ =	-0.267453E+02	SIGETA =	-0.267453E+02	SIG2 =	-0.271859E+02	IETA =	0
			ZETA =	-0.609969E-14	SIGRZ =	-0.113910E+02	SIGXIET=	-0.113910E+02	SIGTH =	0.0	ITHETA =	2
					SSTRN =	-0.118581E-04			GAMA =	-0.221531E+01	IXIETA =	0
4	IG	= 2	XG =	0.313000E+01	SIGR =	0.246775E+03	SIGXI =	0.246775E+03	SIG1 =	0.248021E+03	IXI =	1
	JG	= 1	YG =	0.617042E+00	SIGZ =	-0.234751E+02	SIGETA =	-0.234751E+02	SIG2 =	-0.247208E+02	IETA =	0
			ZETA =	-0.464739E-14	SIGRZ =	0.183903E+02	SIGXIET=	0.183903E+02	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.183235E-04			GAMA =	0.387513E+01	IXIETA =	0
4	IG	= 3	XG =	0.555449E+01	SIGR =	0.226272E+03	SIGXI =	0.226272E+03	SIG1 =	0.226400E+03	IXI =	1
	JG	= 1	YG =	0.617042E+00	SIGZ =	-0.163732E+02	SIGETA =	-0.163732E+02	SIG2 =	-0.165013E+02	IETA =	0
			ZETA =	-0.153945E-13	SIGRZ =	-0.557661E+01	SIGXIET=	-0.557661E+01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	-0.929409E-05			GAMA =	-0.131588E+01	IXIETA =	0
4	IG	= 1	XG =	0.705512E+00	SIGR =	0.275459E+03	SIGXI =	0.275306E+03	SIG1 =	0.275975E+03	IXI =	1
	JG	= 2	YG =	0.273750E+01	SIGZ =	0.254277E+02	SIGETA =	0.255807E+02	SIG2 =	0.249122E+02	IETA =	0
			ZETA =	0.360626E+00	SIGRZ =	-0.113647E+02	SIGXIET=	-0.129375E+02	SIGTH =	0.0	ITHETA =	2
					SSTRN =	-0.743590E-05			GAMA =	-0.259714E+01	IXIETA =	0
4	IG	= 2	XG =	0.313000E+01	SIGR =	0.260759E+03	SIGXI =	0.261586E+03	SIG1 =	0.262668E+03	IXI =	1
	JG	= 2	YG =	0.273750E+01	SIGZ =	0.288196E+02	SIGETA =	0.279921E+02	SIG2 =	0.269101E+02	IETA =	0
			ZETA =	0.127880E+01	SIGRZ =	0.211310E+02	SIGXIET=	0.159350E+02	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.358731E-04			GAMA =	0.516333E+01	IXIETA =	0
4	IG	= 3	XG =	0.555449E+01	SIGR =	0.249579E+03	SIGXI =	0.248031E+03	SIG1 =	0.250575E+03	IXI =	1
	JG	= 2	YG =	0.273750E+01	SIGZ =	0.356107E+02	SIGETA =	0.371585E+02	SIG2 =	0.346143E+02	IETA =	0
			ZETA =	0.233636E+01	SIGRZ =	-0.146350E+02	SIGXIET=	-0.233018E+02	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.213829E-04			GAMA =	-0.389475E+01	IXIETA =	0
4	IG	= 1	XG =	0.705512E+00	SIGR =	0.281340E+03	SIGXI =	0.281117E+03	SIG1 =	0.281574E+03	IXI =	1
	JG	= 3	YG =	0.485796E+01	SIGZ =	-0.368719E+02	SIGETA =	-0.366490E+02	SIG2 =	-0.371059E+02	IETA =	0
			ZETA =	0.617289E+00	SIGRZ =	-0.863248E+01	SIGXIET=	-0.120585E+02	SIGTH =	0.0	ITHETA =	2
					SSTRN =	-0.246752E-05			GAMA =	-0.155280E+01	IXIETA =	0
4	IG	= 2	XG =	0.313000E+01	SIGR =	0.271159E+03	SIGXI =	0.274356E+03	SIG1 =	0.278665E+03	IXI =	1

	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.263915E+02	SIGETA	=	-0.295886E+02	SIG2	=	-0.338977E+02	IETA	= 0
			ZETA	=	0.217194E+01	SIGRZ	=	0.478521E+02	SIGXIET	=	0.364461E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.539689E-04				GAMA	=	0.891495E+01	IXIETA	= 0
4	IG	= 3	XG	=	0.555449E+01	SIGR	=	0.270185E+03	SIGXI	=	0.267598E+03	SIG1	=	0.270288E+03	IXI	= 1
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.223206E+02	SIGETA	=	-0.197338E+02	SIG2	=	-0.224229E+02	IETA	= 0
			ZETA	=	0.442893E+01	SIGRZ	=	-0.547132E+01	SIGXIET	=	-0.279266E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.526061E-04				GAMA	=	-0.107122E+01	IXIETA	= 0
5	IG	= 1	XG	=	0.696551E+01	SIGR	=	-0.600779E+03	SIGXI	=	-0.269392E+02	SIG1	=	-0.269385E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.488430E+02	SIGETA	=	-0.622682E+03	SIG2	=	-0.622683E+03	IETA	= 0
			ZETA	=	0.790077E+02	SIGRZ	=	0.112115E+03	SIGXIET	=	-0.651031E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.862420E-04				GAMA	=	0.789450E+02	IXIETA	= 0
5	IG	= 2	XG	=	0.939000E+01	SIGR	=	-0.572755E+03	SIGXI	=	0.392321E+01	SIG1	=	0.392369E+01	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.104073E+02	SIGETA	=	-0.587086E+03	SIG2	=	-0.587086E+03	IETA	= 0
			ZETA	=	0.810931E+02	SIGRZ	=	0.909085E+02	SIGXIET	=	-0.531604E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.699296E-04				GAMA	=	0.810415E+02	IXIETA	= 0
5	IG	= 3	XG	=	0.118145E+02	SIGR	=	-0.549911E+03	SIGXI	=	0.126103E+02	SIG1	=	0.126107E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	0.213190E+01	SIGETA	=	-0.560390E+03	SIG2	=	-0.560390E+03	IETA	= 0
			ZETA	=	0.822716E+02	SIGRZ	=	0.767759E+02	SIGXIET	=	-0.435986E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.590584E-04				GAMA	=	0.822280E+02	IXIETA	= 0
5	IG	= 1	XG	=	0.696551E+01	SIGR	=	-0.832614E+03	SIGXI	=	-0.310776E+02	SIG1	=	-0.310774E+02	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.360547E+02	SIGETA	=	-0.837591E+03	SIG2	=	-0.837591E+03	IETA	= 0
			ZETA	=	0.855217E+02	SIGRZ	=	0.631627E+02	SIGXIET	=	-0.385415E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.485867E-04				GAMA	=	0.854943E+02	IXIETA	= 0
5	IG	= 2	XG	=	0.939000E+01	SIGR	=	-0.791228E+03	SIGXI	=	-0.138905E+01	SIG1	=	-0.138893E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.456677E+01	SIGETA	=	-0.794405E+03	SIG2	=	-0.794406E+03	IETA	= 0
			ZETA	=	0.863924E+02	SIGRZ	=	0.500996E+02	SIGXIET	=	-0.301689E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.385382E-04				GAMA	=	0.863706E+02	IXIETA	= 0
5	IG	= 3	XG	=	0.118145E+02	SIGR	=	-0.755021E+03	SIGXI	=	0.358935E+01	SIG1	=	0.358943E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	0.102460E+01	SIGETA	=	-0.757585E+03	SIG2	=	-0.757585E+03	IETA	= 0
			ZETA	=	0.866914E+02	SIGRZ	=	0.441101E+02	SIGXIET	=	-0.254499E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.339309E-04				GAMA	=	0.866722E+02	IXIETA	= 0
5	IG	= 1	XG	=	0.696551E+01	SIGR	=	-0.102695E+04	SIGXI	=	-0.156537E+02	SIG1	=	-0.156537E+02	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	-0.157665E+02	SIGETA	=	-0.102706E+04	SIG2	=	-0.102706E+04	IETA	= 0
			ZETA	=	0.893982E+02	SIGRZ	=	0.106824E+02	SIGXIET	=	-0.592466E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.821722E-05				GAMA	=	0.893948E+02	IXIETA	= 0
5	IG	= 2	XG	=	0.939000E+01	SIGR	=	-0.972200E+03	SIGXI	=	0.880750E+01	SIG1	=	0.880750E+01	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.877365E+01	SIGETA	=	-0.972234E+03	SIG2	=	-0.972234E+03	IETA	= 0
			ZETA	=	0.896653E+02	SIGRZ	=	0.576237E+01	SIGXIET	=	-0.315608E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.443259E-05				GAMA	=	0.896635E+02	IXIETA	= 0
5	IG	= 3	XG	=	0.118145E+02	SIGR	=	-0.922630E+03	SIGXI	=	0.748460E+01	SIG1	=	0.748460E+01	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.741723E+01	SIGETA	=	-0.922698E+03	SIG2	=	-0.922698E+03	IETA	= 0
			ZETA	=	0.895150E+02	SIGRZ	=	0.791591E+01	SIGXIET	=	-0.421317E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.608916E-05				GAMA	=	0.895124E+02	IXIETA	= 0
6	IG	= 1	XG	=	0.696551E+01	SIGR	=	0.265272E+02	SIGXI	=	0.828405E+02	SIG1	=	0.828407E+02	IXI	= 0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.416210E+02	SIGETA	=	-0.979344E+02	SIG2	=	-0.979346E+02	IETA	= 0
			ZETA	=	0.338774E+02	SIGRZ	=	0.837190E+02	SIGXIET	=	0.155700E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.643993E-04				GAMA	=	0.339267E+02	IXIETA	= 0

6	IG	= 2	XG	=	0.939000E+01	SIGR	=	0.429396E+00	SIGXI	=	0.765282E+02	SIG1	=	0.765282E+02	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.192948E+02	SIGETA	=	-0.953936E+02	SIG2	=	-0.953936E+02	IETA	=	0
			ZETA	=	0.417066E+02	SIGRZ	=	0.853933E+02	SIGXIET	=	-0.172366E-02	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.656871E-04				GAMA	=	0.417060E+02	IXIETA	=	0
6	IG	= 3	XG	=	0.118145E+02	SIGR	=	-0.287360E+02	SIGXI	=	0.766482E+02	SIG1	=	0.766483E+02	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.123067E+02	SIGETA	=	-0.117691E+03	SIG2	=	-0.117691E+03	IETA	=	0
			ZETA	=	0.474651E+02	SIGRZ	=	0.968218E+02	SIGXIET	=	-0.136719E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.744783E-04				GAMA	=	0.474248E+02	IXIETA	=	0
6	IG	= 1	XG	=	0.696551E+01	SIGR	=	-0.214489E+03	SIGXI	=	-0.679252E+01	SIG1	=	-0.679182E+01	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.490573E+02	SIGETA	=	-0.256753E+03	SIG2	=	-0.256754E+03	IETA	=	0
			ZETA	=	0.658154E+02	SIGRZ	=	0.936931E+02	SIGXIET	=	-0.417904E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.720716E-04				GAMA	=	0.657196E+02	IXIETA	=	0
6	IG	= 2	XG	=	0.939000E+01	SIGR	=	-0.219160E+03	SIGXI	=	0.130127E+02	SIG1	=	0.130134E+02	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.213145E+02	SIGETA	=	-0.253487E+03	SIG2	=	-0.253488E+03	IETA	=	0
			ZETA	=	0.690619E+02	SIGRZ	=	0.892749E+02	SIGXIET	=	-0.439946E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.686730E-04				GAMA	=	0.689673E+02	IXIETA	=	0
6	IG	= 3	XG	=	0.118145E+02	SIGR	=	-0.226899E+03	SIGXI	=	0.264245E+02	SIG1	=	0.264253E+02	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.890987E+01	SIGETA	=	-0.262233E+03	SIG2	=	-0.262234E+03	IETA	=	0
			ZETA	=	0.696150E+02	SIGRZ	=	0.946110E+02	SIGXIET	=	-0.476611E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.727777E-04				GAMA	=	0.695204E+02	IXIETA	=	0
6	IG	= 1	XG	=	0.696551E+01	SIGR	=	-0.457007E+03	SIGXI	=	-0.313450E+02	SIG1	=	-0.313442E+02	IXI	=	0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.567941E+02	SIGETA	=	-0.482456E+03	SIG2	=	-0.482457E+03	IETA	=	0
			ZETA	=	0.763341E+02	SIGRZ	=	0.104082E+03	SIGXIET	=	-0.584937E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.800631E-04				GAMA	=	0.762598E+02	IXIETA	=	0
6	IG	= 2	XG	=	0.939000E+01	SIGR	=	-0.440252E+03	SIGXI	=	-0.358445E+01	SIG1	=	-0.358383E+01	IXI	=	0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.236348E+02	SIGETA	=	-0.460302E+03	SIG2	=	-0.460303E+03	IETA	=	0
			ZETA	=	0.779720E+02	SIGRZ	=	0.935715E+02	SIGXIET	=	-0.532045E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.719781E-04				GAMA	=	0.779053E+02	IXIETA	=	0
6	IG	= 3	XG	=	0.118145E+02	SIGR	=	-0.426564E+03	SIGXI	=	0.137505E+02	SIG1	=	0.137511E+02	IXI	=	0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.581366E+01	SIGETA	=	-0.446128E+03	SIG2	=	-0.446129E+03	IETA	=	0
			ZETA	=	0.781624E+02	SIGRZ	=	0.928152E+02	SIGXIET	=	-0.526693E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.713963E-04				GAMA	=	0.780967E+02	IXIETA	=	0
7	IG	= 1	XG	=	0.696551E+01	SIGR	=	0.283520E+03	SIGXI	=	0.288492E+03	SIG1	=	0.288673E+03	IXI	=	1
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.211618E+02	SIGETA	=	-0.261338E+02	SIG2	=	-0.263147E+02	IETA	=	0
			ZETA	=	0.597541E+01	SIGRZ	=	0.399565E+02	SIGXIET	=	0.754493E+01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.457160E-04				GAMA	=	0.734835E+01	IXIETA	=	0
7	IG	= 2	XG	=	0.939000E+01	SIGR	=	0.262324E+03	SIGXI	=	0.275173E+03	SIG1	=	0.277551E+03	IXI	=	1
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	0.181650E+01	SIGETA	=	-0.110328E+02	SIG2	=	-0.134108E+02	IETA	=	0
			ZETA	=	0.803758E+01	SIGRZ	=	0.647974E+02	SIGXIET	=	0.261968E+02	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.887661E-04				GAMA	=	0.132245E+02	IXIETA	=	0
7	IG	= 3	XG	=	0.118145E+02	SIGR	=	0.255666E+03	SIGXI	=	0.262498E+03	SIG1	=	0.262683E+03	IXI	=	1
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.117252E+02	SIGETA	=	-0.185572E+02	SIG2	=	-0.187424E+02	IETA	=	0
			ZETA	=	0.105555E+02	SIGRZ	=	0.438814E+02	SIGXIET	=	-0.721749E+01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.103719E-03				GAMA	=	0.908541E+01	IXIETA	=	0
7	IG	= 1	XG	=	0.696551E+01	SIGR	=	0.276579E+03	SIGXI	=	0.285509E+03	SIG1	=	0.285510E+03	IXI	=	0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.210958E+02	SIGETA	=	-0.300265E+02	SIG2	=	-0.300266E+02	IETA	=	0
			ZETA	=	0.967094E+01	SIGRZ	=	0.523281E+02	SIGXIET	=	0.791343E-01	SIGTH	=	0.0	ITHETA	=	2

						SSTRN =	0.405385E-04					GAMA =	0.968531E+01	IXIETA =	0
7	IG = 2	XG =	0.939000E+01	SIGR =	0.274412E+03	SIGXI =	0.293253E+03	SIG1 =	0.293255E+03	IXI =	1
	JG = 2	YG =	0.821250E+01	SIGZ =	0.465593E+00	SIGETA =	-0.183752E+02	SIG2 =	-0.183775E+02	IETA =	0
		ZETA =	0.143905E+02	SIGRZ =	0.742768E+02	SIGXIET=	-0.846168E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.745373E-04			GAMA =	0.142349E+02	IXIETA =	0
7	IG = 3	XG =	0.118145E+02	SIGR =	0.276909E+03	SIGXI =	0.287611E+03	SIG1 =	0.290540E+03	IXI =	1
	JG = 2	YG =	0.821250E+01	SIGZ =	-0.753006E+01	SIGETA =	-0.182319E+02	SIG2 =	-0.211610E+02	IETA =	0
		ZETA =	0.176336E+02	SIGRZ =	0.637413E+02	SIGXIET=	-0.300732E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.804389E-04			GAMA =	0.120707E+02	IXIETA =	0
7	IG = 1	XG =	0.696551E+01	SIGR =	0.133436E+03	SIGXI =	0.144620E+03	SIG1 =	0.144621E+03	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.532588E+02	SIGETA =	-0.644426E+02	SIG2 =	-0.644430E+02	IETA =	0
		ZETA =	0.132885E+02	SIGRZ =	0.470440E+02	SIGXIET=	0.309287E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.361877E-04			GAMA =	0.133733E+02	IXIETA =	0
7	IG = 2	XG =	0.939000E+01	SIGR =	0.126261E+03	SIGXI =	0.161531E+03	SIG1 =	0.161531E+03	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.175576E+02	SIGETA =	-0.528268E+02	SIG2 =	-0.528272E+02	IETA =	0
		ZETA =	0.238508E+02	SIGRZ =	0.794757E+02	SIGXIET=	0.298786E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.611352E-04			GAMA =	0.239306E+02	IXIETA =	0
7	IG = 3	XG =	0.118145E+02	SIGR =	0.112446E+03	SIGXI =	0.147418E+03	SIG1 =	0.147418E+03	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.150606E+02	SIGETA =	-0.500332E+02	SIG2 =	-0.500332E+02	IETA =	0
		ZETA =	0.248527E+02	SIGRZ =	0.753811E+02	SIGXIET=	0.123882E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.579855E-04			GAMA =	0.248887E+02	IXIETA =	0
8	IG = 1	XG =	0.696551E+01	SIGR =	0.291734E+03	SIGXI =	0.299548E+03	SIG1 =	0.299697E+03	IXI =	1
	JG = 1	YG =	0.617042E+00	SIGZ =	0.212864E+02	SIGETA =	0.134724E+02	SIG2 =	0.133227E+02	IETA =	0
		ZETA =	-0.109094E+02	SIGRZ =	-0.470870E+02	SIGXIET=	0.654502E+01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.381468E-04			GAMA =	-0.959947E+01	IXIETA =	0
8	IG = 2	XG =	0.939000E+01	SIGR =	0.261998E+03	SIGXI =	0.261998E+03	SIG1 =	0.264317E+03	IXI =	1
	JG = 1	YG =	0.617042E+00	SIGZ =	-0.295857E+02	SIGETA =	-0.295857E+02	SIG2 =	-0.319042E+02	IETA =	0
		ZETA =	0.232369E-13	SIGRZ =	0.261037E+02	SIGXIET=	0.261037E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.264411E-04			GAMA =	0.507556E+01	IXIETA =	0
8	IG = 3	XG =	0.118145E+02	SIGR =	0.223989E+03	SIGXI =	0.223989E+03	SIG1 =	0.225388E+03	IXI =	1
	JG = 1	YG =	0.617042E+00	SIGZ =	-0.207272E+02	SIGETA =	-0.207272E+02	SIG2 =	-0.221265E+02	IETA =	0
		ZETA =	-0.120832E-12	SIGRZ =	-0.185572E+02	SIGXIET=	-0.185572E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.226966E-04			GAMA =	-0.431198E+01	IXIETA =	0
8	IG = 1	XG =	0.696551E+01	SIGR =	0.299020E+03	SIGXI =	0.297203E+03	SIG1 =	0.302109E+03	IXI =	1
	JG = 2	YG =	0.273750E+01	SIGZ =	0.132602E+02	SIGETA =	0.150777E+02	SIG2 =	0.101717E+02	IETA =	0
		ZETA =	0.154482E+01	SIGRZ =	-0.298679E+02	SIGXIET=	-0.375255E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.110872E-04			GAMA =	-0.590360E+01	IXIETA =	0
8	IG = 2	XG =	0.939000E+01	SIGR =	0.269589E+03	SIGXI =	0.272425E+03	SIG1 =	0.276799E+03	IXI =	1
	JG = 2	YG =	0.273750E+01	SIGZ =	-0.174934E+01	SIGETA =	-0.458544E+01	SIG2 =	-0.895868E+01	IETA =	0
		ZETA =	0.203311E+01	SIGRZ =	0.448124E+02	SIGXIET=	0.350793E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.605504E-04			GAMA =	0.913934E+01	IXIETA =	0
8	IG = 3	XG =	0.118145E+02	SIGR =	0.250986E+03	SIGXI =	0.248206E+03	SIG1 =	0.253466E+03	IXI =	1
	JG = 2	YG =	0.273750E+01	SIGZ =	0.138057E+02	SIGETA =	0.165859E+02	SIG2 =	0.113258E+02	IETA =	0
		ZETA =	0.266726E+01	SIGRZ =	-0.243791E+02	SIGXIET=	-0.352989E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.184622E-04			GAMA =	-0.580836E+01	IXIETA =	0
8	IG = 1	XG =	0.696551E+01	SIGR =	0.293026E+03	SIGXI =	0.293364E+03	SIG1 =	0.300372E+03	IXI =	1
	JG = 3	YG =	0.485796E+01	SIGZ =	-0.475148E+00	SIGETA =	-0.812893E+00	SIG2 =	-0.782146E+01	IETA =	0

			ZETA =	0.208177E+00	SIGRZ =	0.470119E+02	SIGXIET=	0.459443E+02	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.160223E-04			GAMA =	0.888149E+01	IXIETA =	0
8	IG = 2	XG =	0.939000E+01	SIGR =	0.268226E+03	SIGXI =	0.281413E+03	SIG1 =	0.301804E+03	IXI =	1
	JG = 3	YG =	0.485796E+01	SIGZ =	-0.198736E+02	SIGETA =	-0.330608E+02	SIG2 =	-0.534521E+02	IETA =	0
		ZETA =	0.404322E+01	SIGRZ =	0.103930E+03	SIGXIET=	0.826338E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.947095E-04			GAMA =	0.179050E+02	IXIETA =	0
8	IG = 3	XG =	0.118145E+02	SIGR =	0.268860E+03	SIGXI =	0.270827E+03	SIG1 =	0.270918E+03	IXI =	1
	JG = 3	YG =	0.485796E+01	SIGZ =	-0.184000E+02	SIGETA =	-0.203672E+02	SIG2 =	-0.204581E+02	IETA =	0
		ZETA =	0.583306E+01	SIGRZ =	0.244018E+02	SIGXIET=	-0.514542E+01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.596710E-04			GAMA =	0.482106E+01	IXIETA =	0
9	IG = 1	XG =	0.132255E+02	SIGR =	-0.533746E+03	SIGXI =	0.102982E+02	SIG1 =	0.102985E+02	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	0.101819E+01	SIGETA =	-0.543026E+03	SIG2 =	-0.543027E+03	IETA =	0
		ZETA =	0.826007E+02	SIGRZ =	0.710556E+02	SIGXIET=	-0.403502E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.546581E-04			GAMA =	0.825589E+02	IXIETA =	0
9	IG = 2	XG =	0.156500E+02	SIGR =	-0.507309E+03	SIGXI =	0.959052E+01	SIG1 =	0.959084E+01	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	0.419027E-01	SIGETA =	-0.516858E+03	SIG2 =	-0.516858E+03	IETA =	0
		ZETA =	0.823043E+02	SIGRZ =	0.702556E+02	SIGXIET=	-0.407628E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.540428E-04			GAMA =	0.822600E+02	IXIETA =	0
9	IG = 3	XG =	0.180745E+02	SIGR =	-0.480680E+03	SIGXI =	0.109109E+02	SIG1 =	0.109113E+02	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	0.283537E-01	SIGETA =	-0.491563E+03	SIG2 =	-0.491563E+03	IETA =	0
		ZETA =	0.815857E+02	SIGRZ =	0.731434E+02	SIGXIET=	-0.426324E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.562641E-04			GAMA =	0.815371E+02	IXIETA =	0
9	IG = 1	XG =	0.132255E+02	SIGR =	-0.721069E+03	SIGXI =	0.294950E+01	SIG1 =	0.294959E+01	IXI =	0
	JG = 2	YG =	0.191625E+02	SIGZ =	0.306858E+00	SIGETA =	-0.723711E+03	SIG2 =	-0.723712E+03	IETA =	0
		ZETA =	0.865627E+02	SIGRZ =	0.437423E+02	SIGXIET=	-0.254657E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.336479E-04			GAMA =	0.865426E+02	IXIETA =	0
9	IG = 2	XG =	0.156500E+02	SIGR =	-0.686880E+03	SIGXI =	0.219608E+01	SIG1 =	0.219617E+01	IXI =	0
	JG = 2	YG =	0.191625E+02	SIGZ =	-0.362670E+00	SIGETA =	-0.689438E+03	SIG2 =	-0.689438E+03	IETA =	0
		ZETA =	0.865336E+02	SIGRZ =	0.419909E+02	SIGXIET=	-0.250352E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.323007E-04			GAMA =	0.865128E+02	IXIETA =	0
9	IG = 3	XG =	0.180745E+02	SIGR =	-0.652498E+03	SIGXI =	0.287471E+01	SIG1 =	0.287481E+01	IXI =	0
	JG = 2	YG =	0.191625E+02	SIGZ =	-0.694564E-01	SIGETA =	-0.655442E+03	SIG2 =	-0.655442E+03	IETA =	0
		ZETA =	0.861883E+02	SIGRZ =	0.439271E+02	SIGXIET=	-0.262415E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.337901E-04			GAMA =	0.861654E+02	IXIETA =	0
9	IG = 1	XG =	0.132255E+02	SIGR =	-0.911195E+03	SIGXI =	-0.684977E+00	SIG1 =	-0.684968E+00	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	-0.965177E+00	SIGETA =	-0.911475E+03	SIG2 =	-0.911475E+03	IETA =	0
		ZETA =	0.890008E+02	SIGRZ =	0.159729E+02	SIGXIET=	-0.926922E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.122868E-04			GAMA =	0.889950E+02	IXIETA =	0
9	IG = 2	XG =	0.156500E+02	SIGR =	-0.869253E+03	SIGXI =	-0.112511E+01	SIG1 =	-0.112510E+01	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	-0.132794E+01	SIGETA =	-0.869456E+03	SIG2 =	-0.869456E+03	IETA =	0
		ZETA =	0.891295E+02	SIGRZ =	0.132700E+02	SIGXIET=	-0.795545E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.102077E-04			GAMA =	0.891243E+02	IXIETA =	0
9	IG = 3	XG =	0.180745E+02	SIGR =	-0.827119E+03	SIGXI =	-0.482162E+00	SIG1 =	-0.482154E+00	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	-0.727967E+00	SIGETA =	-0.827365E+03	SIG2 =	-0.827365E+03	IETA =	0
		ZETA =	0.890178E+02	SIGRZ =	0.142548E+02	SIGXIET=	-0.831652E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.109652E-04			GAMA =	0.890121E+02	IXIETA =	0

10	IG	= 1	XG	=	0.132255E+02	SIGR	=	-0.169482E+02	SIGXI	=	0.836355E+02	SIG1	=	0.836357E+02	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.657307E+01	SIGETA	=	-0.107157E+03	SIG2	=	-0.107157E+03	IETA	=	0
			ZETA	=	0.466036E+02	SIGRZ	=	0.952551E+02	SIGXIET	=	-0.149900E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.732732E-04				GAMA	=	0.465586E+02	IXIETA	=	0
10	IG	= 2	XG	=	0.156500E+02	SIGR	=	-0.321263E+02	SIGXI	=	0.746144E+02	SIG1	=	0.746144E+02	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.283644E+01	SIGETA	=	-0.109577E+03	SIG2	=	-0.109577E+03	IETA	=	0
			ZETA	=	0.496110E+02	SIGRZ	=	0.909240E+02	SIGXIET	=	-0.115750E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.699415E-04				GAMA	=	0.495750E+02	IXIETA	=	0
10	IG	= 3	XG	=	0.180745E+02	SIGR	=	-0.477928E+02	SIGXI	=	0.731373E+02	SIG1	=	0.731374E+02	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.154152E+01	SIGETA	=	-0.122472E+03	SIG2	=	-0.122472E+03	IETA	=	0
			ZETA	=	0.518674E+02	SIGRZ	=	0.950312E+02	SIGXIET	=	-0.988365E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.731009E-04				GAMA	=	0.518385E+02	IXIETA	=	0
10	IG	= 1	XG	=	0.132255E+02	SIGR	=	-0.218908E+03	SIGXI	=	0.298746E+02	SIG1	=	0.298753E+02	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.471805E+01	SIGETA	=	-0.253501E+03	SIG2	=	-0.253501E+03	IETA	=	0
			ZETA	=	0.696403E+02	SIGRZ	=	0.927698E+02	SIGXIET	=	-0.447398E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.713614E-04				GAMA	=	0.695498E+02	IXIETA	=	0
10	IG	= 2	XG	=	0.156500E+02	SIGR	=	-0.216549E+03	SIGXI	=	0.296693E+02	SIG1	=	0.296699E+02	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.129387E+01	SIGETA	=	-0.247513E+03	SIG2	=	-0.247513E+03	IETA	=	0
			ZETA	=	0.705568E+02	SIGRZ	=	0.873148E+02	SIGXIET	=	-0.398595E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.671652E-04				GAMA	=	0.704744E+02	IXIETA	=	0
10	IG	= 3	XG	=	0.180745E+02	SIGR	=	-0.214679E+03	SIGXI	=	0.326546E+02	SIG1	=	0.326552E+02	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.311388E+00	SIGETA	=	-0.247645E+03	SIG2	=	-0.247646E+03	IETA	=	0
			ZETA	=	0.700265E+02	SIGRZ	=	0.902982E+02	SIGXIET	=	-0.405647E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.694602E-04				GAMA	=	0.699436E+02	IXIETA	=	0
10	IG	= 1	XG	=	0.132255E+02	SIGR	=	-0.421442E+03	SIGXI	=	0.151183E+02	SIG1	=	0.151189E+02	IXI	=	0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.297779E+01	SIGETA	=	-0.439538E+03	SIG2	=	-0.439538E+03	IETA	=	0
			ZETA	=	0.785539E+02	SIGRZ	=	0.888835E+02	SIGXIET	=	-0.492201E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.683720E-04				GAMA	=	0.784919E+02	IXIETA	=	0
10	IG	= 2	XG	=	0.156500E+02	SIGR	=	-0.401546E+03	SIGXI	=	0.163436E+02	SIG1	=	0.163441E+02	IXI	=	0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	0.133950E+00	SIGETA	=	-0.417756E+03	SIG2	=	-0.417757E+03	IETA	=	0
			ZETA	=	0.789158E+02	SIGRZ	=	0.823047E+02	SIGXIET	=	-0.437689E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.633113E-04				GAMA	=	0.788580E+02	IXIETA	=	0
10	IG	= 3	XG	=	0.180745E+02	SIGR	=	-0.382140E+03	SIGXI	=	0.184849E+02	SIG1	=	0.184854E+02	IXI	=	0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	0.803984E+00	SIGETA	=	-0.399821E+03	SIG2	=	-0.399821E+03	IETA	=	0
			ZETA	=	0.781983E+02	SIGRZ	=	0.841643E+02	SIGXIET	=	-0.456847E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.647418E-04				GAMA	=	0.781357E+02	IXIETA	=	0
11	IG	= 1	XG	=	0.132255E+02	SIGR	=	0.277124E+03	SIGXI	=	0.285953E+03	SIG1	=	0.286148E+03	IXI	=	1
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.168975E+02	SIGETA	=	-0.257265E+02	SIG2	=	-0.259209E+02	IETA	=	0
			ZETA	=	0.112205E+02	SIGRZ	=	0.522924E+02	SIGXIET	=	-0.778638E+01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.763021E-04				GAMA	=	0.979034E+01	IXIETA	=	0
11	IG	= 2	XG	=	0.156500E+02	SIGR	=	0.268039E+03	SIGXI	=	0.284459E+03	SIG1	=	0.286752E+03	IXI	=	1
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	0.511410E+01	SIGETA	=	-0.113064E+02	SIG2	=	-0.135993E+02	IETA	=	0
			ZETA	=	0.944189E+01	SIGRZ	=	0.725975E+02	SIGXIET	=	0.261424E+02	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.759290E-04				GAMA	=	0.144544E+02	IXIETA	=	0
11	IG	= 3	XG	=	0.180745E+02	SIGR	=	0.274620E+03	SIGXI	=	0.282742E+03	SIG1	=	0.282746E+03	IXI	=	1
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.892319E+01	SIGETA	=	-0.170454E+02	SIG2	=	-0.170495E+02	IETA	=	0
			ZETA	=	0.969026E+01	SIGRZ	=	0.486848E+02	SIGXIET	=	-0.111948E+01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.683387E-04				GAMA	=	0.947631E+01	IXIETA	=	0

11	IG	= 1	XG	=	0.132255E+02	SIGR	=	0.247836E+03	SIGXI	=	0.271703E+03	SIG1	=	0.271703E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	0.793457E+01	SIGETA	=	-0.159325E+02	SIG2	=	-0.159326E+02	IETA	= 0
			ZETA	=	0.167648E+02	SIGRZ	=	0.793436E+02	SIGXIET	=	-0.116078E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.614779E-04				GAMA	=	0.167417E+02	IXIETA	= 0
11	IG	= 2	XG	=	0.156500E+02	SIGR	=	0.253462E+03	SIGXI	=	0.281400E+03	SIG1	=	0.281400E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	0.150819E+02	SIGETA	=	-0.128559E+02	SIG2	=	-0.128564E+02	IETA	= 0
			ZETA	=	0.178675E+02	SIGRZ	=	0.862583E+02	SIGXIET	=	0.406617E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.663526E-04				GAMA	=	0.179467E+02	IXIETA	= 0
11	IG	= 3	XG	=	0.180745E+02	SIGR	=	0.257098E+03	SIGXI	=	0.282696E+03	SIG1	=	0.282696E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	0.121866E+02	SIGETA	=	-0.134106E+02	SIG2	=	-0.134110E+02	IETA	= 0
			ZETA	=	0.170393E+02	SIGRZ	=	0.832129E+02	SIGXIET	=	0.307204E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.640099E-04				GAMA	=	0.170987E+02	IXIETA	= 0
11	IG	= 1	XG	=	0.132255E+02	SIGR	=	0.818327E+02	SIGXI	=	0.112468E+03	SIG1	=	0.112468E+03	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.197158E+02	SIGETA	=	-0.503515E+02	SIG2	=	-0.503515E+02	IETA	= 0
			ZETA	=	0.256806E+02	SIGRZ	=	0.636361E+02	SIGXIET	=	0.752926E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.489509E-04				GAMA	=	0.257071E+02	IXIETA	= 0
11	IG	= 2	XG	=	0.156500E+02	SIGR	=	0.687874E+02	SIGXI	=	0.116202E+03	SIG1	=	0.116202E+03	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.817958E+01	SIGETA	=	-0.555939E+02	SIG2	=	-0.555942E+02	IETA	= 0
			ZETA	=	0.316258E+02	SIGRZ	=	0.767952E+02	SIGXIET	=	0.198173E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.590732E-04				GAMA	=	0.316919E+02	IXIETA	= 0
11	IG	= 3	XG	=	0.180745E+02	SIGR	=	0.537368E+02	SIGXI	=	0.109580E+03	SIG1	=	0.109580E+03	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.667017E+01	SIGETA	=	-0.625132E+02	SIG2	=	-0.625135E+02	IETA	= 0
			ZETA	=	0.346468E+02	SIGRZ	=	0.805718E+02	SIGXIET	=	0.235967E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.619783E-04				GAMA	=	0.347254E+02	IXIETA	= 0
12	IG	= 1	XG	=	0.132255E+02	SIGR	=	0.273747E+03	SIGXI	=	0.281944E+03	SIG1	=	0.281944E+03	IXI	= 0
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	0.349242E+02	SIGETA	=	0.267271E+02	SIG2	=	0.267267E+02	IETA	= 0
			ZETA	=	-0.102468E+02	SIGRZ	=	-0.449995E+02	SIGXIET	=	-0.345132E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	-0.346150E-04				GAMA	=	-0.103243E+02	IXIETA	= 0
12	IG	= 2	XG	=	0.156500E+02	SIGR	=	0.273438E+03	SIGXI	=	0.273438E+03	SIG1	=	0.276075E+03	IXI	= 1
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	-0.332883E+02	SIGETA	=	-0.332883E+02	SIG2	=	-0.359252E+02	IETA	= 0
			ZETA	=	-0.125479E-12	SIGRZ	=	0.285615E+02	SIGXIET	=	0.285615E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.244152E-04				GAMA	=	0.527480E+01	IXIETA	= 0
12	IG	= 3	XG	=	0.180745E+02	SIGR	=	0.246088E+03	SIGXI	=	0.245442E+03	SIG1	=	0.251148E+03	IXI	= 1
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	0.201439E+02	SIGETA	=	0.207899E+02	SIG2	=	0.150835E+02	IETA	= 0
			ZETA	=	0.525422E+00	SIGRZ	=	-0.341902E+02	SIGXIET	=	-0.362563E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	-0.146602E-04				GAMA	=	-0.841906E+01	IXIETA	= 0
12	IG	= 1	XG	=	0.132255E+02	SIGR	=	0.298612E+03	SIGXI	=	0.297328E+03	SIG1	=	0.298916E+03	IXI	= 1
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	0.252262E+02	SIGETA	=	0.265095E+02	SIG2	=	0.249222E+02	IETA	= 0
			ZETA	=	0.245639E+01	SIGRZ	=	-0.912179E+01	SIGXIET	=	-0.207945E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	-0.823759E-06				GAMA	=	-0.190890E+01	IXIETA	= 0
12	IG	= 2	XG	=	0.156500E+02	SIGR	=	0.277228E+03	SIGXI	=	0.280627E+03	SIG1	=	0.283548E+03	IXI	= 1
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	0.951206E+01	SIGETA	=	0.611231E+01	SIG2	=	0.319203E+01	IETA	= 0
			ZETA	=	0.277737E+01	SIGRZ	=	0.416163E+02	SIGXIET	=	0.284638E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.593002E-04				GAMA	=	0.863521E+01	IXIETA	= 0
12	IG	= 3	XG	=	0.180745E+02	SIGR	=	0.268279E+03	SIGXI	=	0.264610E+03	SIG1	=	0.269623E+03	IXI	= 1
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	-0.526986E+01	SIGETA	=	-0.160108E+01	SIG2	=	-0.661371E+01	IETA	= 0
			ZETA	=	0.374217E+01	SIGRZ	=	-0.192202E+02	SIGXIET	=	-0.368720E+02	SIGTH	=	0.0	ITHETA	= 2

					SSTRN =	0.213185E-04					GAMA =	-0.399955E+01	IXIETA =	0
12	IG = 1	XG =	0.132255E+02	SIGR =	0.288967E+03	SIGXI =	0.292415E+03	SIG1 =	0.292419E+03	IXI =	1
	JG = 3	YG =	0.485796E+01	SIGZ =	-0.151889E+01	SIGETA =	-0.496689E+01	SIG2 =	-0.497171E+01	IETA =	0
		ZETA =	0.595487E+01	SIGRZ =	0.318578E+02	SIGXIET=	0.119819E+01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.356728E-04			GAMA =	0.618572E+01	IXIETA =	0
12	IG = 2	XG =	0.156500E+02	SIGR =	0.268794E+03	SIGXI =	0.287201E+03	SIG1 =	0.296743E+03	IXI =	1
	JG = 3	YG =	0.485796E+01	SIGZ =	-0.533610E+01	SIGETA =	-0.237439E+02	SIG2 =	-0.332858E+02	IETA =	0
		ZETA =	0.712872E+01	SIGRZ =	0.918859E+02	SIGXIET=	0.552995E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.968906E-04			GAMA =	0.169186E+02	IXIETA =	0
12	IG = 3	XG =	0.180745E+02	SIGR =	0.281038E+03	SIGXI =	0.283208E+03	SIG1 =	0.283420E+03	IXI =	1
	JG = 3	YG =	0.485796E+01	SIGZ =	0.236678E+01	SIGETA =	0.196535E+00	SIG2 =	-0.154897E-01	IETA =	0
		ZETA =	0.682745E+01	SIGRZ =	0.258756E+02	SIGXIET=	-0.774923E+01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.600026E-04			GAMA =	0.526019E+01	IXIETA =	0
13	IG = 1	XG =	0.194855E+02	SIGR =	-0.471440E+03	SIGXI =	0.105186E+02	SIG1 =	0.105190E+02	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	-0.716296E+00	SIGETA =	-0.482675E+03	SIG2 =	-0.482675E+03	IETA =	0
		ZETA =	0.813682E+02	SIGRZ =	0.735863E+02	SIGXIET=	-0.423681E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.566048E-04			GAMA =	0.813190E+02	IXIETA =	0
13	IG = 2	XG =	0.219100E+02	SIGR =	-0.445936E+03	SIGXI =	0.109625E+02	SIG1 =	0.109629E+02	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	-0.159915E+00	SIGETA =	-0.457058E+03	SIG2 =	-0.457059E+03	IETA =	0
		ZETA =	0.811854E+02	SIGRZ =	0.712881E+02	SIGXIET=	-0.437151E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.548370E-04			GAMA =	0.811319E+02	IXIETA =	0
13	IG = 3	XG =	0.243345E+02	SIGR =	-0.420554E+03	SIGXI =	0.121439E+02	SIG1 =	0.121445E+02	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	-0.212519E+00	SIGETA =	-0.432910E+03	SIG2 =	-0.432911E+03	IETA =	0
		ZETA =	0.804704E+02	SIGRZ =	0.731221E+02	SIGXIET=	-0.483394E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.562478E-04			GAMA =	0.804081E+02	IXIETA =	0
13	IG = 1	XG =	0.194855E+02	SIGR =	-0.634952E+03	SIGXI =	0.293890E+01	SIG1 =	0.293901E+01	IXI =	0
	JG = 2	YG =	0.191625E+02	SIGZ =	-0.120969E+00	SIGETA =	-0.638012E+03	SIG2 =	-0.638012E+03	IETA =	0
		ZETA =	0.860617E+02	SIGRZ =	0.441807E+02	SIGXIET=	-0.265651E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.339851E-04			GAMA =	0.860380E+02	IXIETA =	0
13	IG = 2	XG =	0.219100E+02	SIGR =	-0.600905E+03	SIGXI =	0.298921E+01	SIG1 =	0.298933E+01	IXI =	0
	JG = 2	YG =	0.191625E+02	SIGZ =	0.615436E-01	SIGETA =	-0.603833E+03	SIG2 =	-0.603833E+03	IETA =	0
		ZETA =	0.860422E+02	SIGRZ =	0.420485E+02	SIGXIET=	-0.267039E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.323450E-04			GAMA =	0.860170E+02	IXIETA =	0
13	IG = 3	XG =	0.243345E+02	SIGR =	-0.566980E+03	SIGXI =	0.303877E+01	SIG1 =	0.303893E+01	IXI =	0
	JG = 2	YG =	0.191625E+02	SIGZ =	-0.364929E+00	SIGETA =	-0.570384E+03	SIG2 =	-0.570384E+03	IETA =	0
		ZETA =	0.856115E+02	SIGRZ =	0.440484E+02	SIGXIET=	-0.303365E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.338834E-04			GAMA =	0.855812E+02	IXIETA =	0
13	IG = 1	XG =	0.194855E+02	SIGR =	-0.797638E+03	SIGXI =	0.885458E+00	SIG1 =	0.885468E+00	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	0.639617E+00	SIGETA =	-0.797884E+03	SIG2 =	-0.797884E+03	IETA =	0
		ZETA =	0.890013E+02	SIGRZ =	0.140113E+02	SIGXIET=	-0.905840E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.107780E-04			GAMA =	0.889948E+02	IXIETA =	0
13	IG = 2	XG =	0.219100E+02	SIGR =	-0.755048E+03	SIGXI =	0.640241E+00	SIG1 =	0.640249E+00	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	0.448261E+00	SIGETA =	-0.755240E+03	SIG2 =	-0.755240E+03	IETA =	0
		ZETA =	0.890926E+02	SIGRZ =	0.120450E+02	SIGXIET=	-0.763704E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.926542E-05			GAMA =	0.890868E+02	IXIETA =	0
13	IG = 3	XG =	0.243345E+02	SIGR =	-0.712580E+03	SIGXI =	-0.686584E-01	SIG1 =	-0.686453E-01	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	-0.352080E+00	SIGETA =	-0.712863E+03	SIG2 =	-0.712863E+03	IETA =	0

			ZETA =	0.888652E+02	SIGRZ =	0.142109E+02	SIGXIET=	-0.967827E-01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.109315E-04			GAMA =	0.888574E+02	IXIETA =	0
14	IG = 1	XG =	0.194855E+02	SIGR =	-0.328104E+02	SIGXI =	0.832316E+02	SIG1 =	0.832316E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	0.192345E+01	SIGETA =	-0.114119E+03	SIG2 =	-0.114119E+03	IETA =	0
		ZETA =	0.500998E+02	SIGRZ =	0.971348E+02	SIGXIET=	-0.107883E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.747191E-04			GAMA =	0.500685E+02	IXIETA =	0
14	IG = 2	XG =	0.219100E+02	SIGR =	-0.456723E+02	SIGXI =	0.716211E+02	SIG1 =	0.716212E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	-0.832443E+00	SIGETA =	-0.118126E+03	SIG2 =	-0.118126E+03	IETA =	0
		ZETA =	0.518797E+02	SIGRZ =	0.921864E+02	SIGXIET=	-0.149556E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.709126E-04			GAMA =	0.518345E+02	IXIETA =	0
14	IG = 3	XG =	0.243345E+02	SIGR =	-0.581723E+02	SIGXI =	0.687414E+02	SIG1 =	0.687415E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	-0.177831E+01	SIGETA =	-0.128692E+03	SIG2 =	-0.128692E+03	IETA =	0
		ZETA =	0.533507E+02	SIGRZ =	0.946041E+02	SIGXIET=	-0.180205E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.727724E-04			GAMA =	0.532984E+02	IXIETA =	0
14	IG = 1	XG =	0.194855E+02	SIGR =	-0.203225E+03	SIGXI =	0.354170E+02	SIG1 =	0.354176E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	0.711840E+00	SIGETA =	-0.237930E+03	SIG2 =	-0.237931E+03	IETA =	0
		ZETA =	0.692141E+02	SIGRZ =	0.910071E+02	SIGXIET=	-0.422562E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.700054E-04			GAMA =	0.691255E+02	IXIETA =	0
14	IG = 2	XG =	0.219100E+02	SIGR =	-0.200532E+03	SIGXI =	0.312355E+02	SIG1 =	0.312361E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.107928E+01	SIGETA =	-0.232846E+03	SIG2 =	-0.232847E+03	IETA =	0
		ZETA =	0.696156E+02	SIGRZ =	0.865429E+02	SIGXIET=	-0.421213E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.665714E-04			GAMA =	0.695242E+02	IXIETA =	0
14	IG = 3	XG =	0.243345E+02	SIGR =	-0.197476E+03	SIGXI =	0.335662E+02	SIG1 =	0.335668E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.106036E+01	SIGETA =	-0.232103E+03	SIG2 =	-0.232103E+03	IETA =	0
		ZETA =	0.689280E+02	SIGRZ =	0.894447E+02	SIGXIET=	-0.422906E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.688037E-04			GAMA =	0.688368E+02	IXIETA =	0
14	IG = 1	XG =	0.194855E+02	SIGR =	-0.373973E+03	SIGXI =	0.174971E+02	SIG1 =	0.174976E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.566307E+00	SIGETA =	-0.392036E+03	SIG2 =	-0.392037E+03	IETA =	0
		ZETA =	0.779417E+02	SIGRZ =	0.840921E+02	SIGXIET=	-0.465933E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.646862E-04			GAMA =	0.778765E+02	IXIETA =	0
14	IG = 2	XG =	0.219100E+02	SIGR =	-0.355724E+03	SIGXI =	0.158778E+02	SIG1 =	0.158784E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.139264E+01	SIGETA =	-0.372994E+03	SIG2 =	-0.372995E+03	IETA =	0
		ZETA =	0.779034E+02	SIGRZ =	0.801121E+02	SIGXIET=	-0.470859E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.616247E-04			GAMA =	0.778340E+02	IXIETA =	0
14	IG = 3	XG =	0.243345E+02	SIGR =	-0.337112E+03	SIGXI =	0.191595E+02	SIG1 =	0.191602E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.408949E+00	SIGETA =	-0.356681E+03	SIG2 =	-0.356682E+03	IETA =	0
		ZETA =	0.768849E+02	SIGRZ =	0.834982E+02	SIGXIET=	-0.492068E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.642293E-04			GAMA =	0.768099E+02	IXIETA =	0
15	IG = 1	XG =	0.194855E+02	SIGR =	0.287325E+03	SIGXI =	0.294379E+03	SIG1 =	0.294769E+03	IXI =	1
	JG = 1	YG =	0.609204E+01	SIGZ =	-0.107620E+02	SIGETA =	-0.178161E+02	SIG2 =	-0.182057E+02	IETA =	0
		ZETA =	0.108934E+02	SIGRZ =	0.476892E+02	SIGXIET=	-0.110352E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.533306E-04			GAMA =	0.887152E+01	IXIETA =	0
15	IG = 2	XG =	0.219100E+02	SIGR =	0.285053E+03	SIGXI =	0.293440E+03	SIG1 =	0.293792E+03	IXI =	1
	JG = 1	YG =	0.609204E+01	SIGZ =	-0.795889E+01	SIGETA =	-0.163462E+02	SIG2 =	-0.166981E+02	IETA =	0
		ZETA =	0.115874E+02	SIGRZ =	0.513522E+02	SIGXIET=	-0.104471E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.576549E-04			GAMA =	0.965812E+01	IXIETA =	0

15	IG = 3	XG =	0.243345E+02	SIGR =	0.284991E+03	SIGXI =	0.292765E+03	SIG1 =	0.293895E+03	IXI =	1
	JG = 1	YG =	0.609204E+01	SIGZ =	-0.118705E+02	SIGETA =	-0.196443E+02	SIG2 =	-0.207747E+02	IETA =	0
		ZETA =	0.131204E+02	SIGRZ =	0.521786E+02	SIGXIET=	-0.188266E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.581866E-04			GAMA =	0.968418E+01	IXIETA =	0
15	IG = 1	XG =	0.194855E+02	SIGR =	0.198892E+03	SIGXI =	0.225078E+03	SIG1 =	0.225079E+03	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	0.143169E+01	SIGETA =	-0.247551E+02	SIG2 =	-0.247559E+02	IETA =	0
		ZETA =	0.187864E+02	SIGRZ =	0.765297E+02	SIGXIET=	0.453393E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.588690E-04			GAMA =	0.188904E+02	IXIETA =	0
15	IG = 2	XG =	0.219100E+02	SIGR =	0.196849E+03	SIGXI =	0.227190E+03	SIG1 =	0.227191E+03	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	0.874953E+01	SIGETA =	-0.215914E+02	SIG2 =	-0.215921E+02	IETA =	0
		ZETA =	0.203414E+02	SIGRZ =	0.814118E+02	SIGXIET=	0.428623E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.626244E-04			GAMA =	0.204401E+02	IXIETA =	0
15	IG = 3	XG =	0.243345E+02	SIGR =	0.193143E+03	SIGXI =	0.223784E+03	SIG1 =	0.223786E+03	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	0.774681E+01	SIGETA =	-0.228947E+02	SIG2 =	-0.228958E+02	IETA =	0
		ZETA =	0.205200E+02	SIGRZ =	0.813633E+02	SIGXIET=	0.504215E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.625871E-04			GAMA =	0.206371E+02	IXIETA =	0
15	IG = 1	XG =	0.194855E+02	SIGR =	0.560155E+02	SIGXI =	0.114594E+03	SIG1 =	0.114594E+03	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.342199E+01	SIGETA =	-0.620004E+02	SIG2 =	-0.620005E+02	IETA =	0
		ZETA =	0.351066E+02	SIGRZ =	0.831457E+02	SIGXIET=	0.182605E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.639582E-04			GAMA =	0.351658E+02	IXIETA =	0
15	IG = 2	XG =	0.219100E+02	SIGR =	0.429300E+02	SIGXI =	0.111390E+03	SIG1 =	0.111390E+03	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	0.949262E-01	SIGETA =	-0.683648E+02	SIG2 =	-0.683648E+02	IETA =	0
		ZETA =	0.380813E+02	SIGRZ =	0.872881E+02	SIGXIET=	0.803537E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.671447E-04			GAMA =	0.381070E+02	IXIETA =	0
15	IG = 3	XG =	0.243345E+02	SIGR =	0.281804E+02	SIGXI =	0.997850E+02	SIG1 =	0.997851E+02	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.470872E+01	SIGETA =	-0.763133E+02	SIG2 =	-0.763134E+02	IETA =	0
		ZETA =	0.395761E+02	SIGRZ =	0.865000E+02	SIGXIET=	0.128515E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.665385E-04			GAMA =	0.396180E+02	IXIETA =	0
16	IG = 1	XG =	0.194855E+02	SIGR =	0.294861E+03	SIGXI =	0.298225E+03	SIG1 =	0.298346E+03	IXI =	0
	JG = 1	YG =	0.617042E+00	SIGZ =	0.927732E+01	SIGETA =	0.591300E+01	SIG2 =	0.579186E+01	IETA =	0
		ZETA =	-0.510037E+01	SIGRZ =	-0.317417E+02	SIGXIET=	-0.595199E+01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.244249E-04			GAMA =	-0.626637E+01	IXIETA =	0
16	IG = 2	XG =	0.219100E+02	SIGR =	0.280009E+03	SIGXI =	0.279975E+03	SIG1 =	0.280534E+03	IXI =	1
	JG = 1	YG =	0.617042E+00	SIGZ =	-0.387233E+01	SIGETA =	-0.383808E+01	SIG2 =	-0.439777E+01	IETA =	0
		ZETA =	-0.790191E-01	SIGRZ =	0.122245E+02	SIGXIET=	0.126160E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.171592E-04			GAMA =	0.246120E+01	IXIETA =	0
16	IG = 3	XG =	0.243345E+02	SIGR =	0.260096E+03	SIGXI =	0.259802E+03	SIG1 =	0.261976E+03	IXI =	1
	JG = 1	YG =	0.617042E+00	SIGZ =	-0.300638E+01	SIGETA =	-0.271250E+01	SIG2 =	-0.488644E+01	IETA =	0
		ZETA =	0.363609E+00	SIGRZ =	-0.223200E+02	SIGXIET=	-0.239879E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.138450E-04			GAMA =	-0.481477E+01	IXIETA =	0
16	IG = 1	XG =	0.194855E+02	SIGR =	0.299094E+03	SIGXI =	0.297867E+03	SIG1 =	0.299106E+03	IXI =	1
	JG = 2	YG =	0.273750E+01	SIGZ =	-0.101165E+02	SIGETA =	-0.888906E+01	SIG2 =	-0.101289E+02	IETA =	0
		ZETA =	0.399330E+01	SIGRZ =	0.195864E+01	SIGXIET=	-0.195414E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.834532E-05			GAMA =	0.362910E+00	IXIETA =	0
16	IG = 2	XG =	0.219100E+02	SIGR =	0.283577E+03	SIGXI =	0.286260E+03	SIG1 =	0.287327E+03	IXI =	1
	JG = 2	YG =	0.273750E+01	SIGZ =	0.415542E+01	SIGETA =	0.147262E+01	SIG2 =	0.405240E+00	IETA =	0
		ZETA =	0.306794E+01	SIGRZ =	0.325875E+02	SIGXIET=	0.174676E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.470778E-04			GAMA =	0.656474E+01	IXIETA =	0

16	IG	= 3	XG	=	0.243345E+02	SIGR	=	0.276879E+03	SIGXI	=	0.274965E+03	SIG1	=	0.277290E+03	IXI	= 1
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	-0.290215E+01	SIGETA	=	-0.988209E+00	SIG2	=	-0.331335E+01	IETA	= 0
			ZETA	=	0.302892E+01	SIGRZ	=	-0.107339E+02	SIGXIET	=	-0.254369E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.132219E-04				GAMA	=	-0.219388E+01	IXIETA	= 0
16	IG	= 1	XG	=	0.194855E+02	SIGR	=	0.293656E+03	SIGXI	=	0.296003E+03	SIG1	=	0.296331E+03	IXI	= 1
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.690470E+01	SIGETA	=	-0.925117E+01	SIG2	=	-0.957947E+01	IETA	= 0
			ZETA	=	0.724272E+01	SIGRZ	=	0.284796E+02	SIGXIET	=	-0.100160E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.407610E-04				GAMA	=	0.536542E+01	IXIETA	= 0
16	IG	= 2	XG	=	0.219100E+02	SIGR	=	0.276883E+03	SIGXI	=	0.292539E+03	SIG1	=	0.310665E+03	IXI	= 1
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	0.575277E+01	SIGETA	=	-0.990324E+01	SIG2	=	-0.280290E+02	IETA	= 0
			ZETA	=	0.503445E+01	SIGRZ	=	0.101491E+03	SIGXIET	=	0.762270E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.766418E-04				GAMA	=	0.184102E+02	IXIETA	= 0
16	IG	= 3	XG	=	0.243345E+02	SIGR	=	0.287194E+03	SIGXI	=	0.290112E+03	SIG1	=	0.290264E+03	IXI	= 1
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.150070E+01	SIGETA	=	-0.441893E+01	SIG2	=	-0.457018E+01	IETA	= 0
			ZETA	=	0.715412E+01	SIGRZ	=	0.299260E+02	SIGXIET	=	-0.667611E+01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.399342E-04				GAMA	=	0.585629E+01	IXIETA	= 0
17	IG	= 1	XG	=	0.257455E+02	SIGR	=	-0.410202E+03	SIGXI	=	0.112984E+02	SIG1	=	0.112989E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.994006E+00	SIGETA	=	-0.422494E+03	SIG2	=	-0.422495E+03	IETA	= 0
			ZETA	=	0.803732E+02	SIGRZ	=	0.719825E+02	SIGXIET	=	-0.488003E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.553712E-04				GAMA	=	0.803087E+02	IXIETA	= 0
17	IG	= 2	XG	=	0.281700E+02	SIGR	=	-0.386125E+03	SIGXI	=	0.113505E+02	SIG1	=	0.113510E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.789197E+00	SIGETA	=	-0.398265E+03	SIG2	=	-0.398265E+03	IETA	= 0
			ZETA	=	0.801489E+02	SIGRZ	=	0.694655E+02	SIGXIET	=	-0.444450E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.534350E-04				GAMA	=	0.800867E+02	IXIETA	= 0
17	IG	= 3	XG	=	0.305945E+02	SIGR	=	-0.362150E+03	SIGXI	=	0.124491E+02	SIG1	=	0.124496E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.109552E+01	SIGETA	=	-0.375695E+03	SIG2	=	-0.375695E+03	IETA	= 0
			ZETA	=	0.792995E+02	SIGRZ	=	0.712320E+02	SIGXIET	=	-0.447287E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.547938E-04				GAMA	=	0.792335E+02	IXIETA	= 0
17	IG	= 1	XG	=	0.257455E+02	SIGR	=	-0.547732E+03	SIGXI	=	0.293590E+01	SIG1	=	0.293607E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.502345E+00	SIGETA	=	-0.551171E+03	SIG2	=	-0.551171E+03	IETA	= 0
			ZETA	=	0.855133E+02	SIGRZ	=	0.435135E+02	SIGXIET	=	-0.303824E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.334719E-04				GAMA	=	0.854819E+02	IXIETA	= 0
17	IG	= 2	XG	=	0.281700E+02	SIGR	=	-0.514728E+03	SIGXI	=	0.291959E+01	SIG1	=	0.291973E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.330264E+00	SIGETA	=	-0.517978E+03	SIG2	=	-0.517978E+03	IETA	= 0
			ZETA	=	0.854994E+02	SIGRZ	=	0.410165E+02	SIGXIET	=	-0.271313E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.315512E-04				GAMA	=	0.854696E+02	IXIETA	= 0
17	IG	= 3	XG	=	0.305945E+02	SIGR	=	-0.481826E+03	SIGXI	=	0.310856E+01	SIG1	=	0.310873E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.669316E+00	SIGETA	=	-0.485604E+03	SIG2	=	-0.485604E+03	IETA	= 0
			ZETA	=	0.849900E+02	SIGRZ	=	0.428031E+02	SIGXIET	=	-0.291821E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.329255E-04				GAMA	=	0.849558E+02	IXIETA	= 0
17	IG	= 1	XG	=	0.257455E+02	SIGR	=	-0.684828E+03	SIGXI	=	0.377902E+00	SIG1	=	0.377918E+00	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.762325E-01	SIGETA	=	-0.685130E+03	SIG2	=	-0.685130E+03	IETA	= 0
			ZETA	=	0.888067E+02	SIGRZ	=	0.143776E+02	SIGXIET	=	-0.105019E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.110597E-04				GAMA	=	0.887979E+02	IXIETA	= 0
17	IG	= 2	XG	=	0.281700E+02	SIGR	=	-0.642897E+03	SIGXI	=	0.435723E+00	SIG1	=	0.435732E+00	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.215586E+00	SIGETA	=	-0.643117E+03	SIG2	=	-0.643117E+03	IETA	= 0
			ZETA	=	0.889471E+02	SIGRZ	=	0.119007E+02	SIGXIET	=	-0.766396E-01	SIGTH	=	0.0	ITHETA	= 2

					SSTRN =	0.915440E-05				GAMA =	0.889402E+02	IXIETA =	0
17	IG = 3	XG =	0.305945E+02	SIGR =	-0.601067E+03	SIGXI =	0.156305E+00	SIG1 =	0.156322E+00	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	-0.156194E+00	SIGETA =	-0.601380E+03	SIG2 =	-0.601380E+03	IETA =	0
		ZETA =	0.887037E+02	SIGRZ =	0.137074E+02	SIGXIET=	-0.103049E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.105441E-04			GAMA =	0.886939E+02	IXIETA =	0
18	IG = 1	XG =	0.257455E+02	SIGR =	-0.487095E+02	SIGXI =	0.760253E+02	SIG1 =	0.760253E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	0.371593E+00	SIGETA =	-0.124363E+03	SIG2 =	-0.124363E+03	IETA =	0
		ZETA =	0.520821E+02	SIGRZ =	0.971424E+02	SIGXIET=	0.236447E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.747250E-04			GAMA =	0.520888E+02	IXIETA =	0
18	IG = 2	XG =	0.281700E+02	SIGR =	-0.525455E+02	SIGXI =	0.699984E+02	SIG1 =	0.699987E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	-0.186504E+01	SIGETA =	-0.124409E+03	SIG2 =	-0.124409E+03	IETA =	0
		ZETA =	0.526256E+02	SIGRZ =	0.938428E+02	SIGXIET=	-0.237680E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.721868E-04			GAMA =	0.525555E+02	IXIETA =	0
18	IG = 3	XG =	0.305945E+02	SIGR =	-0.562776E+02	SIGXI =	0.693672E+02	SIG1 =	0.693684E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	-0.358211E+01	SIGETA =	-0.129227E+03	SIG2 =	-0.129228E+03	IETA =	0
		ZETA =	0.528338E+02	SIGRZ =	0.957389E+02	SIGXIET=	-0.485974E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.736453E-04			GAMA =	0.526936E+02	IXIETA =	0
18	IG = 1	XG =	0.257455E+02	SIGR =	-0.188680E+03	SIGXI =	0.362688E+02	SIG1 =	0.362693E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.116007E+00	SIGETA =	-0.225065E+03	SIG2 =	-0.225065E+03	IETA =	0
		ZETA =	0.681749E+02	SIGRZ =	0.904702E+02	SIGXIET=	-0.382922E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.695925E-04			GAMA =	0.680910E+02	IXIETA =	0
18	IG = 2	XG =	0.281700E+02	SIGR =	-0.181549E+03	SIGXI =	0.335991E+02	SIG1 =	0.336001E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.169745E+01	SIGETA =	-0.216846E+03	SIG2 =	-0.216847E+03	IETA =	0
		ZETA =	0.680633E+02	SIGRZ =	0.871449E+02	SIGXIET=	-0.495767E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.670346E-04			GAMA =	0.679499E+02	IXIETA =	0
18	IG = 3	XG =	0.305945E+02	SIGR =	-0.174314E+03	SIGXI =	0.350803E+02	SIG1 =	0.350815E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.275932E+01	SIGETA =	-0.212154E+03	SIG2 =	-0.212155E+03	IETA =	0
		ZETA =	0.670980E+02	SIGRZ =	0.890152E+02	SIGXIET=	-0.555078E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.684733E-04			GAMA =	0.669694E+02	IXIETA =	0
18	IG = 1	XG =	0.257455E+02	SIGR =	-0.329104E+03	SIGXI =	0.191955E+02	SIG1 =	0.191963E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.694265E+00	SIGETA =	-0.348994E+03	SIG2 =	-0.348994E+03	IETA =	0
		ZETA =	0.766411E+02	SIGRZ =	0.832339E+02	SIGXIET=	-0.521359E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.640260E-04			GAMA =	0.765600E+02	IXIETA =	0
18	IG = 2	XG =	0.281700E+02	SIGR =	-0.311006E+03	SIGXI =	0.177868E+02	SIG1 =	0.177876E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.162050E+01	SIGETA =	-0.330413E+03	SIG2 =	-0.330414E+03	IETA =	0
		ZETA =	0.764345E+02	SIGRZ =	0.798828E+02	SIGXIET=	-0.548811E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.614483E-04			GAMA =	0.763442E+02	IXIETA =	0
18	IG = 3	XG =	0.305945E+02	SIGR =	-0.292804E+03	SIGXI =	0.193684E+02	SIG1 =	0.193692E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.202718E+01	SIGETA =	-0.314200E+03	SIG2 =	-0.314200E+03	IETA =	0
		ZETA =	0.754163E+02	SIGRZ =	0.817274E+02	SIGXIET=	-0.507613E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.628673E-04			GAMA =	0.753291E+02	IXIETA =	0
19	IG = 1	XG =	0.257455E+02	SIGR =	0.284472E+03	SIGXI =	0.298956E+03	SIG1 =	0.298998E+03	IXI =	1
	JG = 1	YG =	0.609204E+01	SIGZ =	0.623516E+01	SIGETA =	-0.824799E+01	SIG2 =	-0.829064E+01	IETA =	0
		ZETA =	0.118824E+02	SIGRZ =	0.652121E+02	SIGXIET=	0.362023E+01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.523021E-04			GAMA =	0.125575E+02	IXIETA =	0
19	IG = 2	XG =	0.281700E+02	SIGR =	0.270356E+03	SIGXI =	0.285456E+03	SIG1 =	0.285456E+03	IXI =	0

	JG = 1	YG =	0.609204E+01	SIGZ =	0.453001E+01	SIGETA =	-0.105699E+02	SIG2 =	-0.105701E+02	IETA =	0
		ZETA =	0.130048E+02	SIGRZ =	0.651309E+02	SIGXIET=	0.249237E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.501007E-04			GAMA =	0.130530E+02	IXIETA =	0
19	IG = 3	XG =	0.305945E+02	SIGR =	0.248558E+03	SIGXI =	0.264846E+03	SIG1 =	0.264847E+03	IXI =	0
	JG = 1	YG =	0.609204E+01	SIGZ =	0.245933E+01	SIGETA =	-0.138283E+02	SIG2 =	-0.138292E+02	IETA =	0
		ZETA =	0.138876E+02	SIGRZ =	0.653753E+02	SIGXIET=	0.501297E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.502887E-04			GAMA =	0.139907E+02	IXIETA =	0
19	IG = 1	XG =	0.257455E+02	SIGR =	0.156916E+03	SIGXI =	0.188602E+03	SIG1 =	0.188602E+03	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	-0.175533E+00	SIGETA =	-0.318611E+02	SIG2 =	-0.318616E+02	IETA =	0
		ZETA =	0.221917E+02	SIGRZ =	0.773410E+02	SIGXIET=	0.334337E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.594931E-04			GAMA =	0.222786E+02	IXIETA =	0
19	IG = 2	XG =	0.281700E+02	SIGR =	0.142031E+03	SIGXI =	0.175733E+03	SIG1 =	0.175733E+03	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	-0.772030E-01	SIGETA =	-0.337797E+02	SIG2 =	-0.337797E+02	IETA =	0
		ZETA =	0.236070E+02	SIGRZ =	0.769757E+02	SIGXIET=	0.140497E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.592121E-04			GAMA =	0.236454E+02	IXIETA =	0
19	IG = 3	XG =	0.305945E+02	SIGR =	0.127140E+03	SIGXI =	0.165528E+03	SIG1 =	0.165529E+03	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	-0.405283E-02	SIGETA =	-0.383924E+02	SIG2 =	-0.383934E+02	IETA =	0
		ZETA =	0.255869E+02	SIGRZ =	0.797165E+02	SIGXIET=	0.453182E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.613204E-04			GAMA =	0.257143E+02	IXIETA =	0
19	IG = 1	XG =	0.257455E+02	SIGR =	0.271263E+02	SIGXI =	0.991609E+02	SIG1 =	0.991612E+02	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.583802E+01	SIGETA =	-0.778727E+02	SIG2 =	-0.778729E+02	IETA =	0
		ZETA =	0.395648E+02	SIGRZ =	0.869690E+02	SIGXIET=	0.215069E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.668992E-04			GAMA =	0.396344E+02	IXIETA =	0
19	IG = 2	XG =	0.281700E+02	SIGR =	0.191477E+02	SIGXI =	0.975987E+02	SIG1 =	0.975988E+02	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.359586E+01	SIGETA =	-0.820469E+02	SIG2 =	-0.820469E+02	IETA =	0
		ZETA =	0.413877E+02	SIGRZ =	0.891001E+02	SIGXIET=	-0.762400E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.685385E-04			GAMA =	0.413634E+02	IXIETA =	0
19	IG = 3	XG =	0.305945E+02	SIGR =	0.111641E+02	SIGXI =	0.994381E+02	SIG1 =	0.994382E+02	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.137888E+01	SIGETA =	-0.896529E+02	SIG2 =	-0.896530E+02	IETA =	0
		ZETA =	0.431469E+02	SIGRZ =	0.943374E+02	SIGXIET=	-0.160313E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.725672E-04			GAMA =	0.430983E+02	IXIETA =	0
20	IG = 1	XG =	0.257455E+02	SIGR =	0.292536E+03	SIGXI =	0.294480E+03	SIG1 =	0.294480E+03	IXI =	0
	JG = 1	YG =	0.617042E+00	SIGZ =	0.451901E+01	SIGETA =	0.257433E+01	SIG2 =	0.257429E+01	IETA =	0
		ZETA =	-0.466147E+01	SIGRZ =	-0.237465E+02	SIGXIET=	-0.103610E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.182551E-04			GAMA =	-0.468181E+01	IXIETA =	0
20	IG = 2	XG =	0.281700E+02	SIGR =	0.288598E+03	SIGXI =	0.288701E+03	SIG1 =	0.288902E+03	IXI =	1
	JG = 1	YG =	0.617042E+00	SIGZ =	-0.766343E+01	SIGETA =	-0.776584E+01	SIG2 =	-0.796754E+01	IETA =	0
		ZETA =	0.340523E+00	SIGRZ =	0.949678E+01	SIGXIET=	0.773540E+01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.915381E-05			GAMA =	0.183413E+01	IXIETA =	0
20	IG = 3	XG =	0.305945E+02	SIGR =	0.276892E+03	SIGXI =	0.277042E+03	SIG1 =	0.278162E+03	IXI =	1
	JG = 1	YG =	0.617042E+00	SIGZ =	0.709836E+01	SIGETA =	0.694835E+01	SIG2 =	0.582837E+01	IETA =	0
		ZETA =	-0.238866E+00	SIGRZ =	-0.185539E+02	SIGXIET=	-0.174285E+02	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.998305E-05			GAMA =	-0.391571E+01	IXIETA =	0
20	IG = 1	XG =	0.257455E+02	SIGR =	0.299508E+03	SIGXI =	0.299581E+03	SIG1 =	0.299590E+03	IXI =	1
	JG = 2	YG =	0.273750E+01	SIGZ =	0.430934E+01	SIGETA =	0.423621E+01	SIG2 =	0.422745E+01	IETA =	0
		ZETA =	0.126620E+01	SIGRZ =	0.491736E+01	SIGXIET=	-0.160904E+01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.465768E-05			GAMA =	0.954069E+00	IXIETA =	0

20	IG	= 2	XG	=	0.281700E+02	SIGR	=	0.291404E+03	SIGXI	=	0.293269E+03	SIG1	=	0.293378E+03	IXI	= 1
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	-0.151765E+01	SIGETA	=	-0.338284E+01	SIG2	=	-0.349139E+01	IETA	= 0
			ZETA	=	0.358134E+01	SIGRZ	=	0.241256E+02	SIGXIET	=	0.567558E+01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.329897E-04				GAMA	=	0.467700E+01	IXIETA	= 0
20	IG	= 3	XG	=	0.305945E+02	SIGR	=	0.287967E+03	SIGXI	=	0.287324E+03	SIG1	=	0.288020E+03	IXI	= 1
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	0.102168E+02	SIGETA	=	0.108604E+02	SIG2	=	0.101644E+02	IETA	= 0
			ZETA	=	0.365516E+01	SIGRZ	=	0.381352E+01	SIGXIET	=	-0.138884E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.147760E-04				GAMA	=	0.786474E+00	IXIETA	= 0
20	IG	= 1	XG	=	0.257455E+02	SIGR	=	0.295474E+03	SIGXI	=	0.298360E+03	SIG1	=	0.298720E+03	IXI	= 1
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.265965E+01	SIGETA	=	-0.554580E+01	SIG2	=	-0.590591E+01	IETA	= 0
			ZETA	=	0.789558E+01	SIGRZ	=	0.312787E+02	SIGXIET	=	-0.104676E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.284962E-04				GAMA	=	0.592523E+01	IXIETA	= 0
20	IG	= 2	XG	=	0.281700E+02	SIGR	=	0.284497E+03	SIGXI	=	0.297440E+03	SIG1	=	0.299664E+03	IXI	= 1
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.300954E+01	SIGETA	=	-0.159533E+02	SIG2	=	-0.181765E+02	IETA	= 0
			ZETA	=	0.782028E+01	SIGRZ	=	0.677542E+02	SIGXIET	=	0.264893E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.577513E-04				GAMA	=	0.126178E+02	IXIETA	= 0
20	IG	= 3	XG	=	0.305945E+02	SIGR	=	0.297243E+03	SIGXI	=	0.297180E+03	SIG1	=	0.299230E+03	IXI	= 1
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	0.183124E+00	SIGETA	=	0.246483E+00	SIG2	=	-0.180317E+01	IETA	= 0
			ZETA	=	0.939241E+01	SIGRZ	=	0.243720E+02	SIGXIET	=	-0.247551E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.404607E-04				GAMA	=	0.465926E+01	IXIETA	= 0
21	IG	= 1	XG	=	0.320055E+02	SIGR	=	-0.349150E+03	SIGXI	=	0.121458E+02	SIG1	=	0.121464E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.147118E+01	SIGETA	=	-0.362767E+03	SIG2	=	-0.362768E+03	IETA	= 0
			ZETA	=	0.790859E+02	SIGRZ	=	0.701427E+02	SIGXIET	=	-0.475767E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.539559E-04				GAMA	=	0.790132E+02	IXIETA	= 0
21	IG	= 2	XG	=	0.344300E+02	SIGR	=	-0.326287E+03	SIGXI	=	0.114382E+02	SIG1	=	0.114386E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.166469E+01	SIGETA	=	-0.339390E+03	SIG2	=	-0.339390E+03	IETA	= 0
			ZETA	=	0.789247E+02	SIGRZ	=	0.665232E+02	SIGXIET	=	-0.415567E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.511717E-04				GAMA	=	0.788569E+02	IXIETA	= 0
21	IG	= 3	XG	=	0.368545E+02	SIGR	=	-0.303410E+03	SIGXI	=	0.124209E+02	SIG1	=	0.124214E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.179074E+01	SIGETA	=	-0.317622E+03	SIG2	=	-0.317622E+03	IETA	= 0
			ZETA	=	0.780897E+02	SIGRZ	=	0.669973E+02	SIGXIET	=	-0.381811E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.515364E-04				GAMA	=	0.780234E+02	IXIETA	= 0
21	IG	= 1	XG	=	0.320055E+02	SIGR	=	-0.462565E+03	SIGXI	=	0.301778E+01	SIG1	=	0.301797E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.800567E+00	SIGETA	=	-0.466383E+03	SIG2	=	-0.466384E+03	IETA	= 0
			ZETA	=	0.848615E+02	SIGRZ	=	0.421645E+02	SIGXIET	=	-0.296587E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.324342E-04				GAMA	=	0.848253E+02	IXIETA	= 0
21	IG	= 2	XG	=	0.344300E+02	SIGR	=	-0.431151E+03	SIGXI	=	0.259871E+01	SIG1	=	0.259886E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.928891E+00	SIGETA	=	-0.434679E+03	SIG2	=	-0.434679E+03	IETA	= 0
			ZETA	=	0.848803E+02	SIGRZ	=	0.391173E+02	SIGXIET	=	-0.255995E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.300902E-04				GAMA	=	0.848468E+02	IXIETA	= 0
21	IG	= 3	XG	=	0.368545E+02	SIGR	=	-0.399724E+03	SIGXI	=	0.301547E+01	SIG1	=	0.301563E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.989758E+00	SIGETA	=	-0.403729E+03	SIG2	=	-0.403729E+03	IETA	= 0
			ZETA	=	0.843401E+02	SIGRZ	=	0.401637E+02	SIGXIET	=	-0.249319E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.308952E-04				GAMA	=	0.843049E+02	IXIETA	= 0
21	IG	= 1	XG	=	0.320055E+02	SIGR	=	-0.574788E+03	SIGXI	=	0.429136E+00	SIG1	=	0.429151E+00	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.108410E+00	SIGETA	=	-0.575109E+03	SIG2	=	-0.575109E+03	IETA	= 0
			ZETA	=	0.886566E+02	SIGRZ	=	0.135829E+02	SIGXIET	=	-0.939245E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.104484E-04				GAMA	=	0.886473E+02	IXIETA	= 0

21	IG = 2	XG =	0.344300E+02	SIGR =	-0.534824E+03	SIGXI =	0.275848E+00	SIG1 =	0.275858E+00	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	0.452674E-01	SIGETA =	-0.535054E+03	SIG2 =	-0.535054E+03	IETA =	0
		ZETA =	0.888185E+02	SIGRZ =	0.111081E+02	SIGXIET=	-0.723568E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.854466E-05			GAMA =	0.888108E+02	IXIETA =	0
21	IG = 3	XG =	0.368545E+02	SIGR =	-0.494845E+03	SIGXI =	0.376638E+00	SIG1 =	0.376653E+00	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	0.495819E-01	SIGETA =	-0.495172E+03	SIG2 =	-0.495172E+03	IETA =	0
		ZETA =	0.885380E+02	SIGRZ =	0.127269E+02	SIGXIET=	-0.877711E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.978989E-05			GAMA =	0.885279E+02	IXIETA =	0
22	IG = 1	XG =	0.320055E+02	SIGR =	-0.568471E+02	SIGXI =	0.684938E+02	SIG1 =	0.684941E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	-0.422580E+01	SIGETA =	-0.129567E+03	SIG2 =	-0.129567E+03	IETA =	0
		ZETA =	0.527657E+02	SIGRZ =	0.954714E+02	SIGXIET=	-0.214248E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.734396E-04			GAMA =	0.527037E+02	IXIETA =	0
22	IG = 2	XG =	0.344300E+02	SIGR =	-0.558985E+02	SIGXI =	0.656858E+02	SIG1 =	0.656860E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	-0.518699E+01	SIGETA =	-0.126771E+03	SIG2 =	-0.126771E+03	IETA =	0
		ZETA =	0.526859E+02	SIGRZ =	0.928281E+02	SIGXIET=	-0.158464E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.714062E-04			GAMA =	0.526388E+02	IXIETA =	0
22	IG = 3	XG =	0.368545E+02	SIGR =	-0.549432E+02	SIGXI =	0.668021E+02	SIG1 =	0.668022E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	-0.611429E+01	SIGETA =	-0.127860E+03	SIG2 =	-0.127860E+03	IETA =	0
		ZETA =	0.523000E+02	SIGRZ =	0.942191E+02	SIGXIET=	-0.123763E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.724762E-04			GAMA =	0.522636E+02	IXIETA =	0
22	IG = 1	XG =	0.320055E+02	SIGR =	-0.169172E+03	SIGXI =	0.351150E+02	SIG1 =	0.351157E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.312011E+01	SIGETA =	-0.207407E+03	SIG2 =	-0.207407E+03	IETA =	0
		ZETA =	0.667037E+02	SIGRZ =	0.883804E+02	SIGXIET=	-0.416389E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.679849E-04			GAMA =	0.666053E+02	IXIETA =	0
22	IG = 2	XG =	0.344300E+02	SIGR =	-0.159753E+03	SIGXI =	0.337016E+02	SIG1 =	0.337022E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.380300E+01	SIGETA =	-0.197258E+03	SIG2 =	-0.197258E+03	IETA =	0
		ZETA =	0.663285E+02	SIGRZ =	0.851797E+02	SIGXIET=	-0.373662E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.655229E-04			GAMA =	0.662358E+02	IXIETA =	0
22	IG = 3	XG =	0.368545E+02	SIGR =	-0.150328E+03	SIGXI =	0.353847E+02	SIG1 =	0.353853E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.445201E+01	SIGETA =	-0.190165E+03	SIG2 =	-0.190165E+03	IETA =	0
		ZETA =	0.652380E+02	SIGRZ =	0.860135E+02	SIGXIET=	-0.351602E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.661642E-04			GAMA =	0.651487E+02	IXIETA =	0
22	IG = 1	XG =	0.320055E+02	SIGR =	-0.282733E+03	SIGXI =	0.193347E+02	SIG1 =	0.193354E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.226174E+01	SIGETA =	-0.304329E+03	SIG2 =	-0.304330E+03	IETA =	0
		ZETA =	0.751164E+02	SIGRZ =	0.807701E+02	SIGXIET=	-0.488815E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.621308E-04			GAMA =	0.750299E+02	IXIETA =	0
22	IG = 2	XG =	0.344300E+02	SIGR =	-0.264844E+03	SIGXI =	0.182809E+02	SIG1 =	0.182815E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.266633E+01	SIGETA =	-0.285792E+03	SIG2 =	-0.285792E+03	IETA =	0
		ZETA =	0.748653E+02	SIGRZ =	0.770122E+02	SIGXIET=	-0.435094E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.592402E-04			GAMA =	0.747833E+02	IXIETA =	0
22	IG = 3	XG =	0.368545E+02	SIGR =	-0.246950E+03	SIGXI =	0.193906E+02	SIG1 =	0.193912E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.303704E+01	SIGETA =	-0.269377E+03	SIG2 =	-0.269378E+03	IETA =	0
		ZETA =	0.738985E+02	SIGRZ =	0.772887E+02	SIGXIET=	-0.406100E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.594528E-04			GAMA =	0.738179E+02	IXIETA =	0
23	IG = 1	XG =	0.320055E+02	SIGR =	0.225162E+03	SIGXI =	0.245277E+03	SIG1 =	0.245277E+03	IXI =	0
	JG = 1	YG =	0.609204E+01	SIGZ =	-0.194350E+01	SIGETA =	-0.220582E+02	SIG2 =	-0.220583E+02	IETA =	0

			ZETA =	0.158784E+02	SIGRZ =	0.705180E+02	SIGXIET=	0.196407E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.542446E-04			GAMA =	0.159205E+02	IXIETA =	0
23	IG	= 2	XG =	0.344300E+02	SIGR =	0.203696E+03	SIGXI =	0.224818E+03	SIG1 =	0.224819E+03	IXI =	0
	JG	= 1	YG =	0.609204E+01	SIGZ =	-0.599723E+01	SIGETA =	-0.271196E+02	SIG2 =	-0.271198E+02	IETA =	0
			ZETA =	0.167721E+02	SIGRZ =	0.698243E+02	SIGXIET=	0.259437E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.537110E-04			GAMA =	0.168311E+02	IXIETA =	0
23	IG	= 3	XG =	0.368545E+02	SIGR =	0.182734E+03	SIGXI =	0.207624E+03	SIG1 =	0.207625E+03	IXI =	0
	JG	= 1	YG =	0.609204E+01	SIGZ =	-0.752931E+01	SIGETA =	-0.324193E+02	SIG2 =	-0.324198E+02	IETA =	0
			ZETA =	0.187004E+02	SIGRZ =	0.731798E+02	SIGXIET=	0.352578E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.562922E-04			GAMA =	0.187846E+02	IXIETA =	0
23	IG	= 1	XG =	0.320055E+02	SIGR =	0.119388E+03	SIGXI =	0.161885E+03	SIG1 =	0.161885E+03	IXI =	0
	JG	= 2	YG =	0.821250E+01	SIGZ =	-0.154096E+01	SIGETA =	-0.440375E+02	SIG2 =	-0.440377E+02	IETA =	0
			ZETA =	0.269620E+02	SIGRZ =	0.833371E+02	SIGXIET=	0.203891E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.641055E-04			GAMA =	0.270188E+02	IXIETA =	0
23	IG	= 2	XG =	0.344300E+02	SIGR =	0.106372E+03	SIGXI =	0.149203E+03	SIG1 =	0.149203E+03	IXI =	0
	JG	= 2	YG =	0.821250E+01	SIGZ =	-0.557115E+01	SIGETA =	-0.484017E+02	SIG2 =	-0.484020E+02	IETA =	0
			ZETA =	0.276773E+02	SIGRZ =	0.814193E+02	SIGXIET=	0.239556E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.626302E-04			GAMA =	0.277467E+02	IXIETA =	0
23	IG	= 3	XG =	0.368545E+02	SIGR =	0.938601E+02	SIGXI =	0.141001E+03	SIG1 =	0.141001E+03	IXI =	0
	JG	= 2	YG =	0.821250E+01	SIGZ =	-0.707968E+01	SIGETA =	-0.542204E+02	SIG2 =	-0.542208E+02	IETA =	0
			ZETA =	0.293489E+02	SIGRZ =	0.835506E+02	SIGXIET=	0.285360E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.642697E-04			GAMA =	0.294327E+02	IXIETA =	0
23	IG	= 1	XG =	0.320055E+02	SIGR =	0.902616E+01	SIGXI =	0.991907E+02	SIG1 =	0.991907E+02	IXI =	0
	JG	= 3	YG =	0.103330E+02	SIGZ =	-0.205610E+01	SIGETA =	-0.922206E+02	SIG2 =	-0.922206E+02	IETA =	0
			ZETA =	0.433435E+02	SIGRZ =	0.955451E+02	SIGXIET=	-0.101819E-01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.734962E-04			GAMA =	0.433404E+02	IXIETA =	0
23	IG	= 2	XG =	0.344300E+02	SIGR =	0.445973E+01	SIGXI =	0.917512E+02	SIG1 =	0.917512E+02	IXI =	0
	JG	= 3	YG =	0.103330E+02	SIGZ =	-0.606273E+01	SIGETA =	-0.933542E+02	SIG2 =	-0.933542E+02	IETA =	0
			ZETA =	0.433627E+02	SIGRZ =	0.924030E+02	SIGXIET=	0.255057E-01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.710793E-04			GAMA =	0.433706E+02	IXIETA =	0
23	IG	= 3	XG =	0.368545E+02	SIGR =	0.397631E+00	SIGXI =	0.898197E+02	SIG1 =	0.898198E+02	IXI =	0
	JG	= 3	YG =	0.103330E+02	SIGZ =	-0.754771E+01	SIGETA =	-0.969698E+02	SIG2 =	-0.969698E+02	IETA =	0
			ZETA =	0.437646E+02	SIGRZ =	0.933103E+02	SIGXIET=	0.536578E-01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.717771E-04			GAMA =	0.437811E+02	IXIETA =	0
24	IG	= 1	XG =	0.320055E+02	SIGR =	0.294272E+03	SIGXI =	0.294428E+03	SIG1 =	0.295219E+03	IXI =	1
	JG	= 1	YG =	0.617042E+00	SIGZ =	-0.111526E+01	SIGETA =	-0.127106E+01	SIG2 =	-0.206161E+01	IETA =	0
			ZETA =	-0.278473E+00	SIGRZ =	-0.167462E+02	SIGXIET=	-0.153098E+02	SIGTH =	0.0	ITHETA =	2
					SSTRN =	-0.507822E-05			GAMA =	-0.323442E+01	IXIETA =	0
24	IG	= 2	XG =	0.344300E+02	SIGR =	0.293940E+03	SIGXI =	0.293947E+03	SIG1 =	0.294152E+03	IXI =	1
	JG	= 1	YG =	0.617042E+00	SIGZ =	-0.808202E+01	SIGETA =	-0.808918E+01	SIG2 =	-0.829416E+01	IETA =	0
			ZETA =	-0.258428E-01	SIGRZ =	-0.800730E+01	SIGXIET=	-0.787107E+01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	-0.200931E-05			GAMA =	-0.151762E+01	IXIETA =	0
24	IG	= 3	XG =	0.368545E+02	SIGR =	0.293714E+03	SIGXI =	0.293553E+03	SIG1 =	0.293972E+03	IXI =	1
	JG	= 1	YG =	0.617042E+00	SIGZ =	-0.563782E+01	SIGETA =	-0.547641E+01	SIG2 =	-0.589585E+01	IETA =	0
			ZETA =	0.462415E+00	SIGRZ =	-0.879250E+01	SIGXIET=	-0.112072E+02	SIGTH =	0.0	ITHETA =	2
					SSTRN =	-0.431136E-05			GAMA =	-0.168095E+01	IXIETA =	0
24	IG	= 1	XG =	0.320055E+02	SIGR =	0.297957E+03	SIGXI =	0.297590E+03	SIG1 =	0.298102E+03	IXI =	1

	JG	= 2	YG	=	0.273750E+01	SIGZ	=	0.763754E+01	SIGETA	=	0.800419E+01	SIG2	=	0.749191E+01	IETA	= 0
			ZETA	=	0.368900E+01	SIGRZ	=	0.650392E+01	SIGXIET	=	-0.121906E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.154316E-04				GAMA	=	0.128272E+01	IXIETA	= 0
24	IG	= 2	XG	=	0.344300E+02	SIGR	=	0.296877E+03	SIGXI	=	0.297747E+03	SIG1	=	0.297824E+03	IXI	= 1
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	-0.253809E+00	SIGETA	=	-0.112438E+01	SIG2	=	-0.120149E+01	IETA	= 0
			ZETA	=	0.414739E+01	SIGRZ	=	0.168073E+02	SIGXIET	=	-0.480149E+01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.190049E-04				GAMA	=	0.322723E+01	IXIETA	= 0
24	IG	= 3	XG	=	0.368545E+02	SIGR	=	0.298641E+03	SIGXI	=	0.297958E+03	SIG1	=	0.298889E+03	IXI	= 1
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	-0.315726E+00	SIGETA	=	0.367470E+00	SIG2	=	-0.563268E+00	IETA	= 0
			ZETA	=	0.484351E+01	SIGRZ	=	0.860615E+01	SIGXIET	=	-0.166687E+02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.172073E-04				GAMA	=	0.164757E+01	IXIETA	= 0
24	IG	= 1	XG	=	0.320055E+02	SIGR	=	0.279111E+03	SIGXI	=	0.286621E+03	SIG1	=	0.286621E+03	IXI	= 0
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	0.430971E+01	SIGETA	=	-0.320044E+01	SIG2	=	-0.320047E+01	IETA	= 0
			ZETA	=	0.928427E+01	SIGRZ	=	0.460457E+02	SIGXIET	=	-0.104881E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.354198E-04				GAMA	=	0.926353E+01	IXIETA	= 0
24	IG	= 2	XG	=	0.344300E+02	SIGR	=	0.258015E+03	SIGXI	=	0.267622E+03	SIG1	=	0.267623E+03	IXI	= 0
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.679010E+01	SIGETA	=	-0.163972E+02	SIG2	=	-0.163978E+02	IETA	= 0
			ZETA	=	0.105111E+02	SIGRZ	=	0.513467E+02	SIGXIET	=	0.432540E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.394975E-04				GAMA	=	0.105983E+02	IXIETA	= 0
24	IG	= 3	XG	=	0.368545E+02	SIGR	=	0.238460E+03	SIGXI	=	0.248013E+03	SIG1	=	0.248013E+03	IXI	= 0
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.101905E+02	SIGETA	=	-0.197433E+02	SIG2	=	-0.197436E+02	IETA	= 0
			ZETA	=	0.108242E+02	SIGRZ	=	0.496654E+02	SIGXIET	=	0.297483E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.382042E-04				GAMA	=	0.108878E+02	IXIETA	= 0
25	IG	= 1	XG	=	0.382655E+02	SIGR	=	-0.290200E+03	SIGXI	=	0.125054E+02	SIG1	=	0.125059E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.180332E+01	SIGETA	=	-0.304509E+03	SIG2	=	-0.304509E+03	IETA	= 0
			ZETA	=	0.778032E+02	SIGRZ	=	0.658140E+02	SIGXIET	=	-0.384401E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.506261E-04				GAMA	=	0.777337E+02	IXIETA	= 0
25	IG	= 2	XG	=	0.406900E+02	SIGR	=	-0.268174E+03	SIGXI	=	0.121120E+02	SIG1	=	0.121124E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.173813E+01	SIGETA	=	-0.282025E+03	SIG2	=	-0.282025E+03	IETA	= 0
			ZETA	=	0.775373E+02	SIGRZ	=	0.623067E+02	SIGXIET	=	-0.360270E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.479282E-04				GAMA	=	0.774672E+02	IXIETA	= 0
25	IG	= 3	XG	=	0.431145E+02	SIGR	=	-0.246109E+03	SIGXI	=	0.135233E+02	SIG1	=	0.135238E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.147412E+01	SIGETA	=	-0.261107E+03	SIG2	=	-0.261107E+03	IETA	= 0
			ZETA	=	0.765594E+02	SIGRZ	=	0.624015E+02	SIGXIET	=	-0.353769E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.480011E-04				GAMA	=	0.764856E+02	IXIETA	= 0
25	IG	= 1	XG	=	0.382655E+02	SIGR	=	-0.381267E+03	SIGXI	=	0.313234E+01	SIG1	=	0.313250E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.905720E+00	SIGETA	=	-0.385305E+03	SIG2	=	-0.385306E+03	IETA	= 0
			ZETA	=	0.841843E+02	SIGRZ	=	0.393991E+02	SIGXIET	=	-0.246498E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.303070E-04				GAMA	=	0.841479E+02	IXIETA	= 0
25	IG	= 2	XG	=	0.406900E+02	SIGR	=	-0.351756E+03	SIGXI	=	0.279525E+01	SIG1	=	0.279539E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.971903E+00	SIGETA	=	-0.355523E+03	SIG2	=	-0.355523E+03	IETA	= 0
			ZETA	=	0.841512E+02	SIGRZ	=	0.365472E+02	SIGXIET	=	-0.228090E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.281132E-04				GAMA	=	0.841147E+02	IXIETA	= 0
25	IG	= 3	XG	=	0.431145E+02	SIGR	=	-0.322204E+03	SIGXI	=	0.343248E+01	SIG1	=	0.343264E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.839273E+00	SIGETA	=	-0.326476E+03	SIG2	=	-0.326476E+03	IETA	= 0
			ZETA	=	0.835064E+02	SIGRZ	=	0.372974E+02	SIGXIET	=	-0.232683E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.286903E-04				GAMA	=	0.834660E+02	IXIETA	= 0

25	IG	= 1	XG	=	0.382655E+02	SIGR	=	-0.471063E+03	SIGXI	=	0.571533E+00	SIG1	=	0.571546E+00	IXI	=	0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.246218E+00	SIGETA	=	-0.471388E+03	SIG2	=	-0.471388E+03	IETA	=	0
			ZETA	=	0.885050E+02	SIGRZ	=	0.123869E+02	SIGXIET	=	-0.777393E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.952841E-05				GAMA	=	0.884955E+02	IXIETA	=	0
25	IG	= 2	XG	=	0.406900E+02	SIGR	=	-0.434065E+03	SIGXI	=	0.287730E+00	SIG1	=	0.287739E+00	IXI	=	0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.486618E-01	SIGETA	=	-0.434304E+03	SIG2	=	-0.434304E+03	IETA	=	0
			ZETA	=	0.886645E+02	SIGRZ	=	0.101904E+02	SIGXIET	=	-0.639787E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.783876E-05				GAMA	=	0.886560E+02	IXIETA	=	0
25	IG	= 3	XG	=	0.431145E+02	SIGR	=	-0.397028E+03	SIGXI	=	0.388254E+00	SIG1	=	0.388268E+00	IXI	=	0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.499193E-01	SIGETA	=	-0.397366E+03	SIG2	=	-0.397366E+03	IETA	=	0
			ZETA	=	0.883395E+02	SIGRZ	=	0.115959E+02	SIGXIET	=	-0.749206E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.891993E-05				GAMA	=	0.883287E+02	IXIETA	=	0
26	IG	= 1	XG	=	0.382655E+02	SIGR	=	-0.536718E+02	SIGXI	=	0.658158E+02	SIG1	=	0.658158E+02	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.625836E+01	SIGETA	=	-0.125746E+03	SIG2	=	-0.125746E+03	IETA	=	0
			ZETA	=	0.522008E+02	SIGRZ	=	0.928007E+02	SIGXIET	=	-0.119322E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.713852E-04				GAMA	=	0.521651E+02	IXIETA	=	0
26	IG	= 2	XG	=	0.406900E+02	SIGR	=	-0.519175E+02	SIGXI	=	0.632162E+02	SIG1	=	0.632163E+02	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.591376E+01	SIGETA	=	-0.121047E+03	SIG2	=	-0.121048E+03	IETA	=	0
			ZETA	=	0.522694E+02	SIGRZ	=	0.892144E+02	SIGXIET	=	-0.130586E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.686264E-04				GAMA	=	0.522288E+02	IXIETA	=	0
26	IG	= 3	XG	=	0.431145E+02	SIGR	=	-0.500775E+02	SIGXI	=	0.645947E+02	SIG1	=	0.645948E+02	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.514108E+01	SIGETA	=	-0.119813E+03	SIG2	=	-0.119813E+03	IETA	=	0
			ZETA	=	0.520979E+02	SIGRZ	=	0.894247E+02	SIGXIET	=	-0.148057E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.687883E-04				GAMA	=	0.520519E+02	IXIETA	=	0
26	IG	= 1	XG	=	0.382655E+02	SIGR	=	-0.145028E+03	SIGXI	=	0.351018E+02	SIG1	=	0.351023E+02	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.468237E+01	SIGETA	=	-0.184812E+03	SIG2	=	-0.184813E+03	IETA	=	0
			ZETA	=	0.649145E+02	SIGRZ	=	0.846548E+02	SIGXIET	=	-0.331351E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.651191E-04				GAMA	=	0.648282E+02	IXIETA	=	0
26	IG	= 2	XG	=	0.406900E+02	SIGR	=	-0.135369E+03	SIGXI	=	0.342838E+02	SIG1	=	0.342843E+02	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.440653E+01	SIGETA	=	-0.174060E+03	SIG2	=	-0.174060E+03	IETA	=	0
			ZETA	=	0.645606E+02	SIGRZ	=	0.810187E+02	SIGXIET	=	-0.318659E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.623221E-04				GAMA	=	0.644730E+02	IXIETA	=	0
26	IG	= 3	XG	=	0.431145E+02	SIGR	=	-0.125625E+03	SIGXI	=	0.368560E+02	SIG1	=	0.368565E+02	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.370261E+01	SIGETA	=	-0.166183E+03	SIG2	=	-0.166184E+03	IETA	=	0
			ZETA	=	0.635406E+02	SIGRZ	=	0.811793E+02	SIGXIET	=	-0.313269E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.624456E-04				GAMA	=	0.634522E+02	IXIETA	=	0
26	IG	= 1	XG	=	0.382655E+02	SIGR	=	-0.236820E+03	SIGXI	=	0.193007E+02	SIG1	=	0.193013E+02	IXI	=	0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.319347E+01	SIGETA	=	-0.259314E+03	SIG2	=	-0.259315E+03	IETA	=	0
			ZETA	=	0.735752E+02	SIGRZ	=	0.759038E+02	SIGXIET	=	-0.403128E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.583876E-04				GAMA	=	0.734923E+02	IXIETA	=	0
26	IG	= 2	XG	=	0.406900E+02	SIGR	=	-0.219257E+03	SIGXI	=	0.189112E+02	SIG1	=	0.189117E+02	IXI	=	0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.298640E+01	SIGETA	=	-0.241154E+03	SIG2	=	-0.241155E+03	IETA	=	0
			ZETA	=	0.732157E+02	SIGRZ	=	0.722180E+02	SIGXIET	=	-0.381977E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.555523E-04				GAMA	=	0.731315E+02	IXIETA	=	0
26	IG	= 3	XG	=	0.431145E+02	SIGR	=	-0.201607E+03	SIGXI	=	0.211348E+02	SIG1	=	0.211353E+02	IXI	=	0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.235125E+01	SIGETA	=	-0.225093E+03	SIG2	=	-0.225094E+03	IETA	=	0
			ZETA	=	0.720971E+02	SIGRZ	=	0.723289E+02	SIGXIET	=	-0.372717E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.556376E-04				GAMA	=	0.720104E+02	IXIETA	=	0

27	IG	= 1	XG	=	0.382655E+02	SIGR	=	0.172375E+03	SIGXI	=	0.198988E+03	SIG1	=	0.198989E+03	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.760497E+01	SIGETA	=	-0.342174E+02	SIG2	=	-0.342182E+02	IETA	= 0
			ZETA	=	0.196362E+02	SIGRZ	=	0.741493E+02	SIGXIET	=	0.437780E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.570380E-04				GAMA	=	0.197438E+02	IXIETA	= 0
27	IG	= 2	XG	=	0.406900E+02	SIGR	=	0.156900E+03	SIGXI	=	0.184622E+03	SIG1	=	0.184622E+03	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.776827E+01	SIGETA	=	-0.354903E+02	SIG2	=	-0.354909E+02	IETA	= 0
			ZETA	=	0.206896E+02	SIGRZ	=	0.730314E+02	SIGXIET	=	0.373174E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.561780E-04				GAMA	=	0.207867E+02	IXIETA	= 0
27	IG	= 3	XG	=	0.431145E+02	SIGR	=	0.141519E+03	SIGXI	=	0.172747E+03	SIG1	=	0.172747E+03	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.745555E+01	SIGETA	=	-0.386831E+02	SIG2	=	-0.386836E+02	IETA	= 0
			ZETA	=	0.225114E+02	SIGRZ	=	0.750159E+02	SIGXIET	=	0.331397E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.577045E-04				GAMA	=	0.226013E+02	IXIETA	= 0
27	IG	= 1	XG	=	0.382655E+02	SIGR	=	0.866562E+02	SIGXI	=	0.135308E+03	SIG1	=	0.135308E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.730223E+01	SIGETA	=	-0.559540E+02	SIG2	=	-0.559545E+02	IETA	= 0
			ZETA	=	0.301981E+02	SIGRZ	=	0.832966E+02	SIGXIET	=	0.301961E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.640743E-04				GAMA	=	0.302885E+02	IXIETA	= 0
27	IG	= 2	XG	=	0.406900E+02	SIGR	=	0.777111E+02	SIGXI	=	0.126990E+03	SIG1	=	0.126991E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.716626E+01	SIGETA	=	-0.564455E+02	SIG2	=	-0.564459E+02	IETA	= 0
			ZETA	=	0.311408E+02	SIGRZ	=	0.813093E+02	SIGXIET	=	0.250383E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.625456E-04				GAMA	=	0.312190E+02	IXIETA	= 0
27	IG	= 3	XG	=	0.431145E+02	SIGR	=	0.688612E+02	SIGXI	=	0.121794E+03	SIG1	=	0.121794E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.655426E+01	SIGETA	=	-0.594866E+02	SIG2	=	-0.594869E+02	IETA	= 0
			ZETA	=	0.326395E+02	SIGRZ	=	0.824245E+02	SIGXIET	=	0.217867E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.634035E-04				GAMA	=	0.327084E+02	IXIETA	= 0
27	IG	= 1	XG	=	0.382655E+02	SIGR	=	-0.131576E+01	SIGXI	=	0.877428E+02	SIG1	=	0.877428E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.745005E+01	SIGETA	=	-0.965086E+02	SIG2	=	-0.965086E+02	IETA	= 0
			ZETA	=	0.440325E+02	SIGRZ	=	0.920747E+02	SIGXIET	=	0.435150E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.708267E-04				GAMA	=	0.440460E+02	IXIETA	= 0
27	IG	= 2	XG	=	0.406900E+02	SIGR	=	-0.373041E+01	SIGXI	=	0.838605E+02	SIG1	=	0.838605E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.701480E+01	SIGETA	=	-0.946057E+02	SIG2	=	-0.946057E+02	IETA	= 0
			ZETA	=	0.444689E+02	SIGRZ	=	0.892180E+02	SIGXIET	=	0.119009E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.686292E-04				GAMA	=	0.444728E+02	IXIETA	= 0
27	IG	= 3	XG	=	0.431145E+02	SIGR	=	-0.604986E+01	SIGXI	=	0.833871E+02	SIG1	=	0.833871E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.610353E+01	SIGETA	=	-0.955405E+02	SIG2	=	-0.955405E+02	IETA	= 0
			ZETA	=	0.449925E+02	SIGRZ	=	0.894638E+02	SIGXIET	=	-0.332856E-02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.688183E-04				GAMA	=	0.449914E+02	IXIETA	= 0
28	IG	= 1	XG	=	0.382655E+02	SIGR	=	0.296517E+03	SIGXI	=	0.296785E+03	SIG1	=	0.297085E+03	IXI	= 1
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	0.563237E+01	SIGETA	=	0.536373E+01	SIG2	=	0.506441E+01	IETA	= 0
			ZETA	=	-0.692946E+00	SIGRZ	=	-0.128660E+02	SIGXIET	=	-0.934455E+01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	-0.163370E-05				GAMA	=	-0.252764E+01	IXIETA	= 0
28	IG	= 2	XG	=	0.406900E+02	SIGR	=	0.297734E+03	SIGXI	=	0.297803E+03	SIG1	=	0.298033E+03	IXI	= 1
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	-0.347110E+01	SIGETA	=	-0.354011E+01	SIG2	=	-0.376959E+01	IETA	= 0
			ZETA	=	-0.222061E+00	SIGRZ	=	-0.948662E+01	SIGXIET	=	-0.831896E+01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	-0.289642E-05				GAMA	=	-0.180218E+01	IXIETA	= 0
28	IG	= 3	XG	=	0.431145E+02	SIGR	=	0.299053E+03	SIGXI	=	0.298948E+03	SIG1	=	0.299196E+03	IXI	= 1
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	-0.761697E+01	SIGETA	=	-0.751272E+01	SIG2	=	-0.776075E+01	IETA	= 0

			ZETA =	0.388788E+00	SIGRZ =	-0.664167E+01	SIGXIET=	-0.872194E+01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	-0.273884E-05			GAMA =	-0.124010E+01	IXIETA =	0
28	IG = 1	XG =	0.382655E+02	SIGR =	0.294569E+03	SIGXI =	0.296352E+03	SIG1 =	0.296352E+03	IXI =	0
	JG = 2	YG =	0.273750E+01	SIGZ =	0.400761E+01	SIGETA =	0.222463E+01	SIG2 =	0.222456E+01	IETA =	0
		ZETA =	0.443893E+01	SIGRZ =	0.228312E+02	SIGXIET=	0.136690E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.175624E-04			GAMA =	0.446555E+01	IXIETA =	0
28	IG = 2	XG =	0.406900E+02	SIGR =	0.271581E+03	SIGXI =	0.273702E+03	SIG1 =	0.273702E+03	IXI =	0
	JG = 2	YG =	0.273750E+01	SIGZ =	0.552475E+00	SIGETA =	-0.156827E+01	SIG2 =	-0.156835E+01	IETA =	0
		ZETA =	0.500423E+01	SIGRZ =	0.240687E+02	SIGXIET=	0.150941E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.185144E-04			GAMA =	0.503564E+01	IXIETA =	0
28	IG = 3	XG =	0.431145E+02	SIGR =	0.248874E+03	SIGXI =	0.251785E+03	SIG1 =	0.251785E+03	IXI =	0
	JG = 2	YG =	0.273750E+01	SIGZ =	-0.149599E+01	SIGETA =	-0.440675E+01	SIG2 =	-0.440684E+01	IETA =	0
		ZETA =	0.608435E+01	SIGRZ =	0.271526E+02	SIGXIET=	0.154684E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.208866E-04			GAMA =	0.611894E+01	IXIETA =	0
28	IG = 1	XG =	0.382655E+02	SIGR =	0.216864E+03	SIGXI =	0.227018E+03	SIG1 =	0.227019E+03	IXI =	0
	JG = 3	YG =	0.485796E+01	SIGZ =	-0.117417E+02	SIGETA =	-0.218955E+02	SIG2 =	-0.218959E+02	IETA =	0
		ZETA =	0.115760E+02	SIGRZ =	0.492383E+02	SIGXIET=	0.332004E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.378756E-04			GAMA =	0.116525E+02	IXIETA =	0
28	IG = 2	XG =	0.406900E+02	SIGR =	0.198712E+03	SIGXI =	0.211546E+03	SIG1 =	0.211546E+03	IXI =	0
	JG = 3	YG =	0.485796E+01	SIGZ =	-0.102704E+02	SIGETA =	-0.231037E+02	SIG2 =	-0.231041E+02	IETA =	0
		ZETA =	0.134480E+02	SIGRZ =	0.533549E+02	SIGXIET=	0.314306E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.410422E-04			GAMA =	0.135248E+02	IXIETA =	0
28	IG = 3	XG =	0.431145E+02	SIGR =	0.180842E+03	SIGXI =	0.197974E+03	SIG1 =	0.197975E+03	IXI =	0
	JG = 3	YG =	0.485796E+01	SIGZ =	-0.739232E+01	SIGETA =	-0.245252E+02	SIG2 =	-0.245256E+02	IETA =	0
		ZETA =	0.160359E+02	SIGRZ =	0.593178E+02	SIGXIET=	0.290422E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.456291E-04			GAMA =	0.161107E+02	IXIETA =	0
29	IG = 1	XG =	0.445255E+02	SIGR =	-0.233698E+03	SIGXI =	0.139952E+02	SIG1 =	0.139957E+02	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	-0.126178E+01	SIGETA =	-0.248955E+03	SIG2 =	-0.248956E+03	IETA =	0
		ZETA =	0.761372E+02	SIGRZ =	0.614750E+02	SIGXIET=	-0.347873E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.472885E-04			GAMA =	0.760614E+02	IXIETA =	0
29	IG = 2	XG =	0.469500E+02	SIGR =	-0.212515E+03	SIGXI =	0.146108E+02	SIG1 =	0.146113E+02	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	-0.752199E+00	SIGETA =	-0.227878E+03	SIG2 =	-0.227878E+03	IETA =	0
		ZETA =	0.754996E+02	SIGRZ =	0.590715E+02	SIGXIET=	-0.331254E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.454396E-04			GAMA =	0.754213E+02	IXIETA =	0
29	IG = 3	XG =	0.493745E+02	SIGR =	-0.191316E+03	SIGXI =	0.170965E+02	SIG1 =	0.170970E+02	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	-0.166064E+00	SIGETA =	-0.208578E+03	SIG2 =	-0.208579E+03	IETA =	0
		ZETA =	0.740270E+02	SIGRZ =	0.599820E+02	SIGXIET=	-0.326931E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.461400E-04			GAMA =	0.739440E+02	IXIETA =	0
29	IG = 1	XG =	0.445255E+02	SIGR =	-0.304861E+03	SIGXI =	0.376258E+01	SIG1 =	0.376274E+01	IXI =	0
	JG = 2	YG =	0.191625E+02	SIGZ =	-0.604989E+00	SIGETA =	-0.309228E+03	SIG2 =	-0.309228E+03	IETA =	0
		ZETA =	0.832576E+02	SIGRZ =	0.367149E+02	SIGXIET=	-0.228475E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.282422E-04			GAMA =	0.832158E+02	IXIETA =	0
29	IG = 2	XG =	0.469500E+02	SIGR =	-0.276829E+03	SIGXI =	0.385464E+01	SIG1 =	0.385480E+01	IXI =	0
	JG = 2	YG =	0.191625E+02	SIGZ =	-0.411889E+00	SIGETA =	-0.281096E+03	SIG2 =	-0.281096E+03	IETA =	0
		ZETA =	0.830146E+02	SIGRZ =	0.346062E+02	SIGXIET=	-0.215389E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.266202E-04			GAMA =	0.829713E+02	IXIETA =	0
29	IG = 3	XG =	0.493745E+02	SIGR =	-0.248782E+03	SIGXI =	0.491271E+01	SIG1 =	0.491290E+01	IXI =	0

	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.142235E+00	SIGETA	=	-0.253837E+03	SIG2	=	-0.253837E+03	IETA	= 0
			ZETA	=	0.820142E+02	SIGRZ	=	0.358115E+02	SIGXIET	=	-0.220900E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.275473E-04				GAMA	=	0.819652E+02	IXIETA	= 0
29	IG	= 1	XG	=	0.445255E+02	SIGR	=	-0.375441E+03	SIGXI	=	0.509997E+00	SIG1	=	0.510011E+00	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.168176E+00	SIGETA	=	-0.375783E+03	SIG2	=	-0.375783E+03	IETA	= 0
			ZETA	=	0.882839E+02	SIGRZ	=	0.113364E+02	SIGXIET	=	-0.725151E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.872029E-05				GAMA	=	0.882728E+02	IXIETA	= 0
29	IG	= 2	XG	=	0.469500E+02	SIGR	=	-0.340561E+03	SIGXI	=	0.310802E+00	SIG1	=	0.310813E+00	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.447964E-01	SIGETA	=	-0.340827E+03	SIG2	=	-0.340827E+03	IETA	= 0
			ZETA	=	0.884101E+02	SIGRZ	=	0.952248E+01	SIGXIET	=	-0.612058E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.732499E-05				GAMA	=	0.883998E+02	IXIETA	= 0
29	IG	= 3	XG	=	0.493745E+02	SIGR	=	-0.305666E+03	SIGXI	=	0.394921E+00	SIG1	=	0.394937E+00	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	-0.202905E-02	SIGETA	=	-0.306063E+03	SIG2	=	-0.306063E+03	IETA	= 0
			ZETA	=	0.879506E+02	SIGRZ	=	0.110225E+02	SIGXIET	=	-0.706308E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.847886E-05				GAMA	=	0.879374E+02	IXIETA	= 0
30	IG	= 1	XG	=	0.445255E+02	SIGR	=	-0.482469E+02	SIGXI	=	0.649100E+02	SIG1	=	0.649102E+02	IXI	= 0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.433501E+01	SIGETA	=	-0.117492E+03	SIG2	=	-0.117492E+03	IETA	= 0
			ZETA	=	0.520098E+02	SIGRZ	=	0.885188E+02	SIGXIET	=	-0.141929E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.680914E-04				GAMA	=	0.519652E+02	IXIETA	= 0
30	IG	= 2	XG	=	0.469500E+02	SIGR	=	-0.455733E+02	SIGXI	=	0.642155E+02	SIG1	=	0.642156E+02	IXI	= 0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.284032E+01	SIGETA	=	-0.112629E+03	SIG2	=	-0.112629E+03	IETA	= 0
			ZETA	=	0.520359E+02	SIGRZ	=	0.858020E+02	SIGXIET	=	-0.136381E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.660016E-04				GAMA	=	0.519917E+02	IXIETA	= 0
30	IG	= 3	XG	=	0.493745E+02	SIGR	=	-0.428616E+02	SIGXI	=	0.670469E+02	SIG1	=	0.670470E+02	IXI	= 0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.115516E+01	SIGETA	=	-0.111064E+03	SIG2	=	-0.111064E+03	IETA	= 0
			ZETA	=	0.518134E+02	SIGRZ	=	0.865795E+02	SIGXIET	=	-0.131728E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.665996E-04				GAMA	=	0.517711E+02	IXIETA	= 0
30	IG	= 1	XG	=	0.445255E+02	SIGR	=	-0.120108E+03	SIGXI	=	0.376689E+02	SIG1	=	0.376694E+02	IXI	= 0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.317111E+01	SIGETA	=	-0.160948E+03	SIG2	=	-0.160949E+03	IETA	= 0
			ZETA	=	0.631227E+02	SIGRZ	=	0.802728E+02	SIGXIET	=	-0.306312E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.617483E-04				GAMA	=	0.630343E+02	IXIETA	= 0
30	IG	= 2	XG	=	0.469500E+02	SIGR	=	-0.110224E+03	SIGXI	=	0.384491E+02	SIG1	=	0.384495E+02	IXI	= 0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.206155E+01	SIGETA	=	-0.150735E+03	SIG2	=	-0.150735E+03	IETA	= 0
			ZETA	=	0.625225E+02	SIGRZ	=	0.776075E+02	SIGXIET	=	-0.287417E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.596981E-04				GAMA	=	0.624355E+02	IXIETA	= 0
30	IG	= 3	XG	=	0.493745E+02	SIGR	=	-0.100302E+03	SIGXI	=	0.423623E+02	SIG1	=	0.423627E+02	IXI	= 0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.761515E+00	SIGETA	=	-0.143426E+03	SIG2	=	-0.143426E+03	IETA	= 0
			ZETA	=	0.612821E+02	SIGRZ	=	0.784365E+02	SIGXIET	=	-0.272318E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.603358E-04				GAMA	=	0.611981E+02	IXIETA	= 0
30	IG	= 1	XG	=	0.445255E+02	SIGR	=	-0.192003E+03	SIGXI	=	0.218005E+02	SIG1	=	0.218011E+02	IXI	= 0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.201395E+01	SIGETA	=	-0.215817E+03	SIG2	=	-0.215818E+03	IETA	= 0
			ZETA	=	0.716321E+02	SIGRZ	=	0.713565E+02	SIGXIET	=	-0.366763E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.548896E-04				GAMA	=	0.715437E+02	IXIETA	= 0
30	IG	= 2	XG	=	0.469500E+02	SIGR	=	-0.174908E+03	SIGXI	=	0.226320E+02	SIG1	=	0.226325E+02	IXI	= 0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.128952E+01	SIGETA	=	-0.198830E+03	SIG2	=	-0.198830E+03	IETA	= 0
			ZETA	=	0.709022E+02	SIGRZ	=	0.687428E+02	SIGXIET	=	-0.346665E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.528791E-04				GAMA	=	0.708125E+02	IXIETA	= 0

30	IG	= 3	XG	=	0.493745E+02	SIGR	=	-0.157776E+03	SIGXI	=	0.260014E+02	SIG1	=	0.260019E+02	IXI	= 0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.374615E+00	SIGETA	=	-0.184152E+03	SIG2	=	-0.184152E+03	IETA	= 0
			ZETA	=	0.693427E+02	SIGRZ	=	0.696234E+02	SIGXIET	=	-0.336180E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.535565E-04				GAMA	=	0.692510E+02	IXIETA	= 0
31	IG	= 1	XG	=	0.445255E+02	SIGR	=	0.132991E+03	SIGXI	=	0.165100E+03	SIG1	=	0.165101E+03	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.656812E+01	SIGETA	=	-0.386768E+02	SIG2	=	-0.386773E+02	IETA	= 0
			ZETA	=	0.232995E+02	SIGRZ	=	0.742438E+02	SIGXIET	=	0.313451E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.571106E-04				GAMA	=	0.233877E+02	IXIETA	= 0
31	IG	= 2	XG	=	0.469500E+02	SIGR	=	0.118988E+03	SIGXI	=	0.152829E+03	SIG1	=	0.152830E+03	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.421131E+01	SIGETA	=	-0.380529E+02	SIG2	=	-0.380533E+02	IETA	= 0
			ZETA	=	0.248138E+02	SIGRZ	=	0.729011E+02	SIGXIET	=	0.292280E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.560778E-04				GAMA	=	0.249016E+02	IXIETA	= 0
31	IG	= 3	XG	=	0.493745E+02	SIGR	=	0.104961E+03	SIGXI	=	0.143310E+03	SIG1	=	0.143311E+03	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.196662E+01	SIGETA	=	-0.403157E+02	SIG2	=	-0.403161E+02	IETA	= 0
			ZETA	=	0.271080E+02	SIGRZ	=	0.746412E+02	SIGXIET	=	0.273817E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.574163E-04				GAMA	=	0.271934E+02	IXIETA	= 0
31	IG	= 1	XG	=	0.445255E+02	SIGR	=	0.636938E+02	SIGXI	=	0.117732E+03	SIG1	=	0.117732E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.574296E+01	SIGETA	=	-0.597810E+02	SIG2	=	-0.597812E+02	IETA	= 0
			ZETA	=	0.334217E+02	SIGRZ	=	0.816846E+02	SIGXIET	=	0.200971E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.628343E-04				GAMA	=	0.334865E+02	IXIETA	= 0
31	IG	= 2	XG	=	0.469500E+02	SIGR	=	0.560610E+02	SIGXI	=	0.111392E+03	SIG1	=	0.111392E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.367640E+01	SIGETA	=	-0.590070E+02	SIG2	=	-0.590072E+02	IETA	= 0
			ZETA	=	0.346800E+02	SIGRZ	=	0.797923E+02	SIGXIET	=	0.174953E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.613787E-04				GAMA	=	0.347388E+02	IXIETA	= 0
31	IG	= 3	XG	=	0.493745E+02	SIGR	=	0.484058E+02	SIGXI	=	0.108114E+03	SIG1	=	0.108115E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.172195E+01	SIGETA	=	-0.614306E+02	SIG2	=	-0.614307E+02	IETA	= 0
			ZETA	=	0.363509E+02	SIGRZ	=	0.809827E+02	SIGXIET	=	0.149699E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.622944E-04				GAMA	=	0.364014E+02	IXIETA	= 0
31	IG	= 1	XG	=	0.445255E+02	SIGR	=	-0.671221E+01	SIGXI	=	0.826293E+02	SIG1	=	0.826293E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.513946E+01	SIGETA	=	-0.944810E+02	SIG2	=	-0.944810E+02	IETA	= 0
			ZETA	=	0.452552E+02	SIGRZ	=	0.885516E+02	SIGXIET	=	-0.232807E-02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.681166E-04				GAMA	=	0.452544E+02	IXIETA	= 0
31	IG	= 2	XG	=	0.469500E+02	SIGR	=	-0.797381E+01	SIGXI	=	0.804721E+02	SIG1	=	0.804721E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.336314E+01	SIGETA	=	-0.918091E+02	SIG2	=	-0.918091E+02	IETA	= 0
			ZETA	=	0.457720E+02	SIGRZ	=	0.861097E+02	SIGXIET	=	-0.157145E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.662383E-04				GAMA	=	0.457668E+02	IXIETA	= 0
31	IG	= 3	XG	=	0.493745E+02	SIGR	=	-0.925782E+01	SIGXI	=	0.813544E+02	SIG1	=	0.813544E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.169895E+01	SIGETA	=	-0.923112E+02	SIG2	=	-0.923112E+02	IETA	= 0
			ZETA	=	0.462565E+02	SIGRZ	=	0.867505E+02	SIGXIET	=	-0.278639E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.667312E-04				GAMA	=	0.462473E+02	IXIETA	= 0
32	IG	= 1	XG	=	0.445255E+02	SIGR	=	0.292881E+03	SIGXI	=	0.292911E+03	SIG1	=	0.292911E+03	IXI	= 0
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	0.141616E+00	SIGETA	=	0.111853E+00	SIG2	=	0.111852E+00	IETA	= 0
			ZETA	=	-0.573777E+00	SIGRZ	=	-0.295197E+01	SIGXIET	=	-0.199938E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	-0.225433E-05				GAMA	=	-0.577690E+00	IXIETA	= 0
32	IG	= 2	XG	=	0.469500E+02	SIGR	=	0.272303E+03	SIGXI	=	0.272305E+03	SIG1	=	0.272305E+03	IXI	= 0
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	-0.793392E+00	SIGETA	=	-0.794907E+00	SIG2	=	-0.794907E+00	IETA	= 0
			ZETA	=	-0.136683E+00	SIGRZ	=	-0.643360E+00	SIGXIET	=	0.813537E-02	SIGTH	=	0.0	ITHETA	= 2

							SSTRN =	-0.494892E-06						GAMA =	-0.134976E+00	IXIETA =	0
32	IG	= 3	XG =	0.493745E+02	SIGR =	0.251953E+03	SIGXI =	0.251978E+03	SIG1 =	0.251978E+03	IXI =	0
	JG	= 1	YG =	0.617042E+00	SIGZ =	-0.594219E+00	SIGETA =	-0.618769E+00	SIG2 =	-0.618770E+00	IETA =	0
			ZETA =	0.560743E+00	SIGRZ =	0.249018E+01	SIGXIET=	0.182242E-01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.191552E-05			GAMA =	0.564877E+00	IXIETA =	0
32	IG	= 1	XG =	0.445255E+02	SIGR =	0.233734E+03	SIGXI =	0.237176E+03	SIG1 =	0.237176E+03	IXI =	0
	JG	= 2	YG =	0.273750E+01	SIGZ =	-0.261837E+01	SIGETA =	-0.606071E+01	SIG2 =	-0.606083E+01	IETA =	0
			ZETA =	0.679147E+01	SIGRZ =	0.287312E+02	SIGXIET=	0.173678E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.221010E-04			GAMA =	0.683238E+01	IXIETA =	0
32	IG	= 2	XG =	0.469500E+02	SIGR =	0.215143E+03	SIGXI =	0.219210E+03	SIG1 =	0.219210E+03	IXI =	0
	JG	= 2	YG =	0.273750E+01	SIGZ =	-0.244892E+01	SIGETA =	-0.651607E+01	SIG2 =	-0.651622E+01	IETA =	0
			ZETA =	0.766748E+01	SIGRZ =	0.300259E+02	SIGXIET=	0.184534E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.230969E-04			GAMA =	0.771432E+01	IXIETA =	0
32	IG	= 3	XG =	0.493745E+02	SIGR =	0.196779E+03	SIGXI =	0.201875E+03	SIG1 =	0.201876E+03	IXI =	0
	JG	= 2	YG =	0.273750E+01	SIGZ =	-0.114436E+01	SIGETA =	-0.624075E+01	SIG2 =	-0.624093E+01	IETA =	0
			ZETA =	0.894917E+01	SIGRZ =	0.321668E+02	SIGXIET=	0.196275E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.247437E-04			GAMA =	0.900320E+01	IXIETA =	0
32	IG	= 1	XG =	0.445255E+02	SIGR =	0.171563E+03	SIGXI =	0.190304E+03	SIG1 =	0.190304E+03	IXI =	0
	JG	= 3	YG =	0.485796E+01	SIGZ =	-0.598421E+01	SIGETA =	-0.247255E+02	SIG2 =	-0.247258E+02	IETA =	0
			ZETA =	0.170935E+02	SIGRZ =	0.606528E+02	SIGXIET=	0.291236E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.466560E-04			GAMA =	0.171711E+02	IXIETA =	0
32	IG	= 2	XG =	0.469500E+02	SIGR =	0.154958E+03	SIGXI =	0.175567E+03	SIG1 =	0.175568E+03	IXI =	0
	JG	= 3	YG =	0.485796E+01	SIGZ =	-0.470938E+01	SIGETA =	-0.253189E+02	SIG2 =	-0.253193E+02	IETA =	0
			ZETA =	0.185961E+02	SIGRZ =	0.609549E+02	SIGXIET=	0.298909E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.468884E-04			GAMA =	0.186813E+02	IXIETA =	0
32	IG	= 3	XG =	0.493745E+02	SIGR =	0.138580E+03	SIGXI =	0.162047E+03	SIG1 =	0.162048E+03	IXI =	0
	JG	= 3	YG =	0.485796E+01	SIGZ =	-0.229944E+01	SIGETA =	-0.257665E+02	SIG2 =	-0.257669E+02	IETA =	0
			ZETA =	0.206089E+02	SIGRZ =	0.621032E+02	SIGXIET=	0.300375E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.477717E-04			GAMA =	0.207005E+02	IXIETA =	0
33	IG	= 1	XG =	0.507855E+02	SIGR =	-0.179231E+03	SIGXI =	0.183421E+02	SIG1 =	0.183426E+02	IXI =	0
	JG	= 1	YG =	0.170420E+02	SIGZ =	0.136253E+00	SIGETA =	-0.197437E+03	SIG2 =	-0.197438E+03	IETA =	0
			ZETA =	0.731991E+02	SIGRZ =	0.599758E+02	SIGXIET=	-0.321399E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.461352E-04			GAMA =	0.731137E+02	IXIETA =	0
33	IG	= 2	XG =	0.532100E+02	SIGR =	-0.158399E+03	SIGXI =	0.199413E+02	SIG1 =	0.199418E+02	IXI =	0
	JG	= 1	YG =	0.170420E+02	SIGZ =	0.594637E+00	SIGETA =	-0.177745E+03	SIG2 =	-0.177746E+03	IETA =	0
			ZETA =	0.718579E+02	SIGRZ =	0.587400E+02	SIGXIET=	-0.304403E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.451846E-04			GAMA =	0.717697E+02	IXIETA =	0
33	IG	= 3	XG =	0.556345E+02	SIGR =	-0.137581E+03	SIGXI =	0.239360E+02	SIG1 =	0.239364E+02	IXI =	0
	JG	= 1	YG =	0.170420E+02	SIGZ =	0.976305E+00	SIGETA =	-0.160541E+03	SIG2 =	-0.160541E+03	IETA =	0
			ZETA =	0.694335E+02	SIGRZ =	0.608972E+02	SIGXIET=	-0.294667E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.468440E-04			GAMA =	0.693420E+02	IXIETA =	0
33	IG	= 1	XG =	0.507855E+02	SIGR =	-0.231954E+03	SIGXI =	0.553860E+01	SIG1 =	0.553880E+01	IXI =	0
	JG	= 2	YG =	0.191625E+02	SIGZ =	0.131985E+00	SIGETA =	-0.237361E+03	SIG2 =	-0.237361E+03	IETA =	0
			ZETA =	0.814716E+02	SIGRZ =	0.358341E+02	SIGXIET=	-0.220180E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.275647E-04			GAMA =	0.814197E+02	IXIETA =	0
33	IG	= 2	XG =	0.532100E+02	SIGR =	-0.204098E+03	SIGXI =	0.597755E+01	SIG1 =	0.597775E+01	IXI =	0
	JG	= 2	YG =	0.191625E+02	SIGZ =	0.324724E+00	SIGETA =	-0.209751E+03	SIG2 =	-0.209751E+03	IETA =	0

			ZETA =	0.807399E+02	SIGRZ =	0.344611E+02	SIGXIET=	-0.209908E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.265085E-04			GAMA =	0.806841E+02	IXIETA =	0
33	IG	= 3	XG =	0.556345E+02	SIGR =	-0.176258E+03	SIGXI =	0.767611E+01	SIG1 =	0.767636E+01	IXI =	0
	JG	= 2	YG =	0.191625E+02	SIGZ =	0.440748E+00	SIGETA =	-0.183493E+03	SIG2 =	-0.183493E+03	IETA =	0
			ZETA =	0.788466E+02	SIGRZ =	0.364811E+02	SIGXIET=	-0.216752E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.280624E-04			GAMA =	0.787816E+02	IXIETA =	0
33	IG	= 1	XG =	0.507855E+02	SIGR =	-0.284917E+03	SIGXI =	0.509931E+00	SIG1 =	0.509949E+00	IXI =	0
	JG	= 3	YG =	0.212830E+02	SIGZ =	0.798529E-01	SIGETA =	-0.285347E+03	SIG2 =	-0.285347E+03	IETA =	0
			ZETA =	0.877912E+02	SIGRZ =	0.110798E+02	SIGXIET=	-0.708594E-01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.852289E-05			GAMA =	0.877770E+02	IXIETA =	0
33	IG	= 2	XG =	0.532100E+02	SIGR =	-0.250037E+03	SIGXI =	0.372640E+00	SIG1 =	0.372655E+00	IXI =	0
	JG	= 3	YG =	0.212830E+02	SIGZ =	0.694825E-02	SIGETA =	-0.250403E+03	SIG2 =	-0.250403E+03	IETA =	0
			ZETA =	0.878255E+02	SIGRZ =	0.956957E+01	SIGXIET=	-0.612470E-01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.736121E-05			GAMA =	0.878115E+02	IXIETA =	0
33	IG	= 3	XG =	0.556345E+02	SIGR =	-0.215173E+03	SIGXI =	0.465538E+00	SIG1 =	0.465563E+00	IXI =	0
	JG	= 3	YG =	0.212830E+02	SIGZ =	-0.142671E+00	SIGETA =	-0.215781E+03	SIG2 =	-0.215781E+03	IETA =	0
			ZETA =	0.869793E+02	SIGRZ =	0.114525E+02	SIGXIET=	-0.732124E-01	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.880959E-05			GAMA =	0.869599E+02	IXIETA =	0
34	IG	= 1	XG =	0.507855E+02	SIGR =	-0.409203E+02	SIGXI =	0.682359E+02	SIG1 =	0.682360E+02	IXI =	0
	JG	= 1	YG =	0.115670E+02	SIGZ =	-0.679710E-01	SIGETA =	-0.109224E+03	SIG2 =	-0.109224E+03	IETA =	0
			ZETA =	0.516965E+02	SIGRZ =	0.863470E+02	SIGXIET=	-0.129647E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.664208E-04			GAMA =	0.516546E+02	IXIETA =	0
34	IG	= 2	XG =	0.532100E+02	SIGR =	-0.385043E+02	SIGXI =	0.683901E+02	SIG1 =	0.683902E+02	IXI =	0
	JG	= 1	YG =	0.115670E+02	SIGZ =	0.122879E+01	SIGETA =	-0.105666E+03	SIG2 =	-0.105666E+03	IETA =	0
			ZETA =	0.516393E+02	SIGRZ =	0.847301E+02	SIGXIET=	-0.125836E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.651770E-04			GAMA =	0.515979E+02	IXIETA =	0
34	IG	= 3	XG =	0.556345E+02	SIGR =	-0.361940E+02	SIGXI =	0.715542E+02	SIG1 =	0.715542E+02	IXI =	0
	JG	= 1	YG =	0.115670E+02	SIGZ =	0.199716E+01	SIGETA =	-0.105751E+03	SIG2 =	-0.105751E+03	IETA =	0
			ZETA =	0.512585E+02	SIGRZ =	0.865717E+02	SIGXIET=	-0.120883E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.665936E-04			GAMA =	0.512194E+02	IXIETA =	0
34	IG	= 1	XG =	0.507855E+02	SIGR =	-0.949956E+02	SIGXI =	0.440286E+02	SIG1 =	0.440290E+02	IXI =	0
	JG	= 2	YG =	0.136875E+02	SIGZ =	-0.147478E-01	SIGETA =	-0.139039E+03	SIG2 =	-0.139039E+03	IETA =	0
			ZETA =	0.607091E+02	SIGRZ =	0.782506E+02	SIGXIET=	-0.262802E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.601928E-04			GAMA =	0.606268E+02	IXIETA =	0
34	IG	= 2	XG =	0.532100E+02	SIGR =	-0.854108E+02	SIGXI =	0.458934E+02	SIG1 =	0.458938E+02	IXI =	0
	JG	= 2	YG =	0.136875E+02	SIGZ =	0.106041E+01	SIGETA =	-0.130244E+03	SIG2 =	-0.130244E+03	IETA =	0
			ZETA =	0.597800E+02	SIGRZ =	0.767256E+02	SIGXIET=	-0.243489E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.590197E-04			GAMA =	0.597008E+02	IXIETA =	0
34	IG	= 3	XG =	0.556345E+02	SIGR =	-0.759317E+02	SIGXI =	0.505320E+02	SIG1 =	0.505323E+02	IXI =	0
	JG	= 2	YG =	0.136875E+02	SIGZ =	0.160717E+01	SIGETA =	-0.124857E+03	SIG2 =	-0.124857E+03	IETA =	0
			ZETA =	0.581922E+02	SIGRZ =	0.786592E+02	SIGXIET=	-0.224447E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.605071E-04			GAMA =	0.581189E+02	IXIETA =	0
34	IG	= 1	XG =	0.507855E+02	SIGR =	-0.148467E+03	SIGXI =	0.276260E+02	SIG1 =	0.276265E+02	IXI =	0
	JG	= 3	YG =	0.158080E+02	SIGZ =	0.159260E+00	SIGETA =	-0.175934E+03	SIG2 =	-0.175934E+03	IETA =	0
			ZETA =	0.685409E+02	SIGRZ =	0.695472E+02	SIGXIET=	-0.327649E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.534978E-04			GAMA =	0.684487E+02	IXIETA =	0
34	IG	= 2	XG =	0.532100E+02	SIGR =	-0.131713E+03	SIGXI =	0.297470E+02	SIG1 =	0.297475E+02	IXI =	0

	JG	= 3	YG	=	0.158080E+02	SIGZ	=	0.101282E+01	SIGETA	=	-0.160448E+03	SIG2	=	-0.160448E+03	IETA	= 0
			ZETA	=	0.672194E+02	SIGRZ	=	0.681141E+02	SIGXIET	=	-0.306577E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.523955E-04				GAMA	=	0.671270E+02	IXIETA	= 0
34	IG	= 3	XG	=	0.556345E+02	SIGR	=	-0.115066E+03	SIGXI	=	0.342785E+02	SIG1	=	0.342790E+02	IXI	= 0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	0.133797E+01	SIGETA	=	-0.148006E+03	SIG2	=	-0.148007E+03	IETA	= 0
			ZETA	=	0.649337E+02	SIGRZ	=	0.701396E+02	SIGXIET	=	-0.288831E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.539535E-04				GAMA	=	0.648429E+02	IXIETA	= 0
35	IG	= 1	XG	=	0.507855E+02	SIGR	=	0.989623E+02	SIGXI	=	0.138897E+03	SIG1	=	0.138898E+03	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.550846E+00	SIGETA	=	-0.404858E+02	SIG2	=	-0.404862E+02	IETA	= 0
			ZETA	=	0.280684E+02	SIGRZ	=	0.746252E+02	SIGXIET	=	0.265722E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.574040E-04				GAMA	=	0.281533E+02	IXIETA	= 0
35	IG	= 2	XG	=	0.532100E+02	SIGR	=	0.865095E+02	SIGXI	=	0.128044E+03	SIG1	=	0.128044E+03	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	0.615421E+00	SIGETA	=	-0.409190E+02	SIG2	=	-0.409193E+02	IETA	= 0
			ZETA	=	0.296419E+02	SIGRZ	=	0.727511E+02	SIGXIET	=	0.238247E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.559624E-04				GAMA	=	0.297227E+02	IXIETA	= 0
35	IG	= 3	XG	=	0.556345E+02	SIGR	=	0.739434E+02	SIGXI	=	0.119622E+03	SIG1	=	0.119623E+03	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	0.121540E+01	SIGETA	=	-0.444635E+02	SIG2	=	-0.444638E+02	IETA	= 0
			ZETA	=	0.317715E+02	SIGRZ	=	0.735442E+02	SIGXIET	=	0.210210E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.565724E-04				GAMA	=	0.318449E+02	IXIETA	= 0
35	IG	= 1	XG	=	0.507855E+02	SIGR	=	0.442215E+02	SIGXI	=	0.105560E+03	SIG1	=	0.105560E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.609448E+00	SIGETA	=	-0.619481E+02	SIG2	=	-0.619482E+02	IETA	= 0
			ZETA	=	0.371913E+02	SIGRZ	=	0.806990E+02	SIGXIET	=	0.137290E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.620761E-04				GAMA	=	0.372382E+02	IXIETA	= 0
35	IG	= 2	XG	=	0.532100E+02	SIGR	=	0.374120E+02	SIGXI	=	0.100292E+03	SIG1	=	0.100292E+03	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	0.960663E+00	SIGETA	=	-0.619194E+02	SIG2	=	-0.619195E+02	IETA	= 0
			ZETA	=	0.384668E+02	SIGRZ	=	0.790315E+02	SIGXIET	=	0.113581E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.607935E-04				GAMA	=	0.385069E+02	IXIETA	= 0
35	IG	= 3	XG	=	0.556345E+02	SIGR	=	0.304893E+02	SIGXI	=	0.975190E+02	SIG1	=	0.975190E+02	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	0.196449E+01	SIGETA	=	-0.650652E+02	SIG2	=	-0.650653E+02	IETA	= 0
			ZETA	=	0.399159E+02	SIGRZ	=	0.800312E+02	SIGXIET	=	0.901016E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.615625E-04				GAMA	=	0.399477E+02	IXIETA	= 0
35	IG	= 1	XG	=	0.507855E+02	SIGR	=	-0.963712E+01	SIGXI	=	0.815633E+02	SIG1	=	0.815633E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.491626E+00	SIGETA	=	-0.916920E+02	SIG2	=	-0.916920E+02	IETA	= 0
			ZETA	=	0.465239E+02	SIGRZ	=	0.865069E+02	SIGXIET	=	-0.331920E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.665438E-04				GAMA	=	0.465129E+02	IXIETA	= 0
35	IG	= 2	XG	=	0.532100E+02	SIGR	=	-0.108033E+02	SIGXI	=	0.806071E+02	SIG1	=	0.806072E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	0.148233E+01	SIGETA	=	-0.899281E+02	SIG2	=	-0.899281E+02	IETA	= 0
			ZETA	=	0.470796E+02	SIGRZ	=	0.850461E+02	SIGXIET	=	-0.414634E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.654201E-04				GAMA	=	0.470656E+02	IXIETA	= 0
35	IG	= 3	XG	=	0.556345E+02	SIGR	=	-0.120827E+02	SIGXI	=	0.819803E+02	SIG1	=	0.819803E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	0.289000E+01	SIGETA	=	-0.911731E+02	SIG2	=	-0.911731E+02	IETA	= 0
			ZETA	=	0.474964E+02	SIGRZ	=	0.862524E+02	SIGXIET	=	-0.486256E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.663480E-04				GAMA	=	0.474803E+02	IXIETA	= 0
36	IG	= 1	XG	=	0.507855E+02	SIGR	=	0.237973E+03	SIGXI	=	0.238019E+03	SIG1	=	0.238019E+03	IXI	= 0
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	-0.344633E+00	SIGETA	=	-0.390565E+00	SIG2	=	-0.390566E+00	IETA	= 0
			ZETA	=	0.791096E+00	SIGRZ	=	0.330892E+01	SIGXIET	=	0.175702E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.254532E-05				GAMA	=	0.795318E+00	IXIETA	= 0

36	IG	= 2	XG	=	0.532100E+02	SIGR	=	0.214339E+03	SIGXI	=	0.214356E+03	SIG1	=	0.214356E+03	IXI	= 0
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	-0.331793E-01	SIGETA	=	-0.501642E-01	SIG2	=	-0.501647E-01	IETA	= 0
			ZETA	=	0.507282E+00	SIGRZ	=	0.190826E+01	SIGXIET	=	0.100708E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.146790E-05				GAMA	=	0.509973E+00	IXIETA	= 0
36	IG	= 3	XG	=	0.556345E+02	SIGR	=	0.190558E+03	SIGXI	=	0.190590E+03	SIG1	=	0.190590E+03	IXI	= 0
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	-0.457134E+00	SIGETA	=	-0.489149E+00	SIG2	=	-0.489150E+00	IETA	= 0
			ZETA	=	0.737025E+00	SIGRZ	=	0.247317E+01	SIGXIET	=	0.155018E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.190244E-05				GAMA	=	0.741673E+00	IXIETA	= 0
36	IG	= 1	XG	=	0.507855E+02	SIGR	=	0.183638E+03	SIGXI	=	0.189293E+03	SIG1	=	0.189294E+03	IXI	= 0
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	-0.575883E+00	SIGETA	=	-0.623085E+01	SIG2	=	-0.623105E+01	IETA	= 0
			ZETA	=	0.973365E+01	SIGRZ	=	0.327680E+02	SIGXIET	=	0.198283E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.252062E-04				GAMA	=	0.979176E+01	IXIETA	= 0
36	IG	= 2	XG	=	0.532100E+02	SIGR	=	0.164235E+03	SIGXI	=	0.170115E+03	SIG1	=	0.170115E+03	IXI	= 0
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	0.392050E+00	SIGETA	=	-0.548798E+01	SIG2	=	-0.548819E+01	IETA	= 0
			ZETA	=	0.104824E+02	SIGRZ	=	0.315913E+02	SIGXIET	=	0.188808E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.243010E-04				GAMA	=	0.105441E+02	IXIETA	= 0
36	IG	= 3	XG	=	0.556345E+02	SIGR	=	0.144685E+03	SIGXI	=	0.151628E+03	SIG1	=	0.151628E+03	IXI	= 0
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	0.624575E+00	SIGETA	=	-0.631860E+01	SIG2	=	-0.631883E+01	IETA	= 0
			ZETA	=	0.120342E+02	SIGRZ	=	0.323802E+02	SIGXIET	=	0.189249E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.249079E-04				GAMA	=	0.121029E+02	IXIETA	= 0
36	IG	= 1	XG	=	0.507855E+02	SIGR	=	0.130353E+03	SIGXI	=	0.155158E+03	SIG1	=	0.155159E+03	IXI	= 0
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.597315E+00	SIGETA	=	-0.254021E+02	SIG2	=	-0.254026E+02	IETA	= 0
			ZETA	=	0.216621E+02	SIGRZ	=	0.621576E+02	SIGXIET	=	0.294225E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.478135E-04				GAMA	=	0.217555E+02	IXIETA	= 0
36	IG	= 2	XG	=	0.532100E+02	SIGR	=	0.115180E+03	SIGXI	=	0.141792E+03	SIG1	=	0.141792E+03	IXI	= 0
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	0.102710E+01	SIGETA	=	-0.255844E+02	SIG2	=	-0.255848E+02	IETA	= 0
			ZETA	=	0.234070E+02	SIGRZ	=	0.612049E+02	SIGXIET	=	0.269914E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.470807E-04				GAMA	=	0.234994E+02	IXIETA	= 0
36	IG	= 3	XG	=	0.556345E+02	SIGR	=	0.998606E+02	SIGXI	=	0.130067E+03	SIG1	=	0.130067E+03	IXI	= 0
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	0.191610E+01	SIGETA	=	-0.282903E+02	SIG2	=	-0.282907E+02	IETA	= 0
			ZETA	=	0.258073E+02	SIGRZ	=	0.622177E+02	SIGXIET	=	0.246929E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.478598E-04				GAMA	=	0.258967E+02	IXIETA	= 0
37	IG	= 1	XG	=	0.570455E+02	SIGR	=	-0.125622E+03	SIGXI	=	0.259638E+02	SIG1	=	0.259643E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	0.969720E+00	SIGETA	=	-0.150616E+03	SIG2	=	-0.150616E+03	IETA	= 0
			ZETA	=	0.679919E+02	SIGRZ	=	0.615535E+02	SIGXIET	=	-0.283973E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.473488E-04				GAMA	=	0.678998E+02	IXIETA	= 0
37	IG	= 2	XG	=	0.594700E+02	SIGR	=	-0.105070E+03	SIGXI	=	0.274561E+02	SIG1	=	0.274565E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	0.332978E+00	SIGETA	=	-0.132193E+03	SIG2	=	-0.132194E+03	IETA	= 0
			ZETA	=	0.657495E+02	SIGRZ	=	0.599549E+02	SIGXIET	=	-0.254770E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.461191E-04				GAMA	=	0.656581E+02	IXIETA	= 0
37	IG	= 3	XG	=	0.618945E+02	SIGR	=	-0.846261E+02	SIGXI	=	0.321522E+02	SIG1	=	0.321525E+02	IXI	= 0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.842944E+00	SIGETA	=	-0.117621E+03	SIG2	=	-0.117622E+03	IETA	= 0
			ZETA	=	0.620926E+02	SIGRZ	=	0.620738E+02	SIGXIET	=	-0.223615E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.477491E-04				GAMA	=	0.620071E+02	IXIETA	= 0
37	IG	= 1	XG	=	0.570455E+02	SIGR	=	-0.159419E+03	SIGXI	=	0.868436E+01	SIG1	=	0.868462E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	0.557031E+00	SIGETA	=	-0.167547E+03	SIG2	=	-0.167547E+03	IETA	= 0
			ZETA	=	0.776690E+02	SIGRZ	=	0.369632E+02	SIGXIET	=	-0.215503E+00	SIGTH	=	0.0	ITHETA	= 2

					SSTRN =	0.284333E-04					GAMA =	0.775990E+02	IXIETA =	0
37	IG = 2	XG =	0.594700E+02	SIGR =	-0.131054E+03	SIGXI =	0.909916E+01	SIG1 =	0.909942E+01	IXI =	0
	JG = 2	YG =	0.191625E+02	SIGZ =	0.222536E+00	SIGETA =	-0.139931E+03	SIG2 =	-0.139931E+03	IETA =	0
		ZETA =	0.759505E+02	SIGRZ =	0.352722E+02	SIGXIET=	-0.199540E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.271324E-04			GAMA =	0.758738E+02	IXIETA =	0
37	IG = 3	XG =	0.618945E+02	SIGR =	-0.102796E+03	SIGXI =	0.115184E+02	SIG1 =	0.115187E+02	IXI =	0
	JG = 2	YG =	0.191625E+02	SIGZ =	-0.651139E+00	SIGETA =	-0.114966E+03	SIG2 =	-0.114966E+03	IETA =	0
		ZETA =	0.720172E+02	SIGRZ =	0.372987E+02	SIGXIET=	-0.193549E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.286913E-04			GAMA =	0.719295E+02	IXIETA =	0
37	IG = 1	XG =	0.570455E+02	SIGR =	-0.193006E+03	SIGXI =	0.918165E+00	SIG1 =	0.918195E+00	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	0.186646E+00	SIGETA =	-0.193737E+03	SIG2 =	-0.193737E+03	IETA =	0
		ZETA =	0.865077E+02	SIGRZ =	0.119107E+02	SIGXIET=	-0.759133E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.916207E-05			GAMA =	0.864853E+02	IXIETA =	0
37	IG = 2	XG =	0.594700E+02	SIGR =	-0.156826E+03	SIGXI =	0.804999E+00	SIG1 =	0.805026E+00	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	0.154399E+00	SIGETA =	-0.157477E+03	SIG2 =	-0.157477E+03	IETA =	0
		ZETA =	0.863474E+02	SIGRZ =	0.101271E+02	SIGXIET=	-0.644333E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.779011E-05			GAMA =	0.863240E+02	IXIETA =	0
37	IG = 3	XG =	0.618945E+02	SIGR =	-0.120755E+03	SIGXI =	0.779877E+00	SIG1 =	0.779924E+00	IXI =	0
	JG = 3	YG =	0.212830E+02	SIGZ =	-0.417028E+00	SIGETA =	-0.121952E+03	SIG2 =	-0.121952E+03	IETA =	0
		ZETA =	0.843679E+02	SIGRZ =	0.120612E+02	SIGXIET=	-0.758087E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.927781E-05			GAMA =	0.843325E+02	IXIETA =	0
38	IG = 1	XG =	0.570455E+02	SIGR =	-0.345957E+02	SIGXI =	0.725539E+02	SIG1 =	0.725540E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	0.217036E+01	SIGETA =	-0.104979E+03	SIG2 =	-0.104979E+03	IETA =	0
		ZETA =	0.510137E+02	SIGRZ =	0.868423E+02	SIGXIET=	-0.116611E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.668018E-04			GAMA =	0.509761E+02	IXIETA =	0
38	IG = 2	XG =	0.594700E+02	SIGR =	-0.316383E+02	SIGXI =	0.714628E+02	SIG1 =	0.714628E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	0.879793E+00	SIGETA =	-0.102221E+03	SIG2 =	-0.102221E+03	IETA =	0
		ZETA =	0.504296E+02	SIGRZ =	0.853065E+02	SIGXIET=	-0.103401E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.656204E-04			GAMA =	0.503954E+02	IXIETA =	0
38	IG = 3	XG =	0.618945E+02	SIGR =	-0.291326E+02	SIGXI =	0.720529E+02	SIG1 =	0.720530E+02	IXI =	0
	JG = 1	YG =	0.115670E+02	SIGZ =	-0.266991E+01	SIGETA =	-0.103855E+03	SIG2 =	-0.103856E+03	IETA =	0
		ZETA =	0.493536E+02	SIGRZ =	0.869533E+02	SIGXIET=	-0.845557E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.668872E-04			GAMA =	0.493261E+02	IXIETA =	0
38	IG = 1	XG =	0.570455E+02	SIGR =	-0.709951E+02	SIGXI =	0.522873E+02	SIG1 =	0.522876E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	0.164925E+01	SIGETA =	-0.121633E+03	SIG2 =	-0.121633E+03	IETA =	0
		ZETA =	0.574145E+02	SIGRZ =	0.790116E+02	SIGXIET=	-0.213129E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.607781E-04			GAMA =	0.573443E+02	IXIETA =	0
38	IG = 2	XG =	0.594700E+02	SIGR =	-0.613502E+02	SIGXI =	0.529956E+02	SIG1 =	0.529958E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	0.606429E+00	SIGETA =	-0.113739E+03	SIG2 =	-0.113740E+03	IETA =	0
		ZETA =	0.559706E+02	SIGRZ =	0.773984E+02	SIGXIET=	-0.185697E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.595373E-04			GAMA =	0.559067E+02	IXIETA =	0
38	IG = 3	XG =	0.618945E+02	SIGR =	-0.521571E+02	SIGXI =	0.553236E+02	SIG1 =	0.553237E+02	IXI =	0
	JG = 2	YG =	0.136875E+02	SIGZ =	-0.269552E+01	SIGETA =	-0.110176E+03	SIG2 =	-0.110176E+03	IETA =	0
		ZETA =	0.537474E+02	SIGRZ =	0.789680E+02	SIGXIET=	-0.152381E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.607446E-04			GAMA =	0.536946E+02	IXIETA =	0
38	IG = 1	XG =	0.570455E+02	SIGR =	-0.105834E+03	SIGXI =	0.366109E+02	SIG1 =	0.366113E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	0.144017E+01	SIGETA =	-0.141005E+03	SIG2 =	-0.141005E+03	IETA =	0

			ZETA =	0.636661E+02	SIGRZ =	0.707811E+02	SIGXIET=	-0.275478E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.544470E-04			GAMA =	0.635772E+02	IXIETA =	0
38	IG = 2	XG =	0.594700E+02	SIGR =	-0.895019E+02	SIGXI =	0.380646E+02	SIG1 =	0.380649E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	0.645106E+00	SIGETA =	-0.126921E+03	SIG2 =	-0.126922E+03	IETA =	0
		ZETA =	0.616443E+02	SIGRZ =	0.690907E+02	SIGXIET=	-0.243278E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.531467E-04			GAMA =	0.615598E+02	IXIETA =	0
38	IG = 3	XG =	0.618945E+02	SIGR =	-0.736213E+02	SIGXI =	0.410400E+02	SIG1 =	0.410402E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.240909E+01	SIGETA =	-0.117070E+03	SIG2 =	-0.117071E+03	IETA =	0
		ZETA =	0.584588E+02	SIGRZ =	0.705831E+02	SIGXIET=	-0.204958E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.542947E-04			GAMA =	0.583845E+02	IXIETA =	0
39	IG = 1	XG =	0.570455E+02	SIGR =	0.657146E+02	SIGXI =	0.113072E+03	SIG1 =	0.113072E+03	IXI =	0
	JG = 1	YG =	0.609204E+01	SIGZ =	0.226038E+01	SIGETA =	-0.450973E+02	SIG2 =	-0.450975E+02	IETA =	0
		ZETA =	0.331064E+02	SIGRZ =	0.724418E+02	SIGXIET=	0.186864E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.557245E-04			GAMA =	0.331741E+02	IXIETA =	0
39	IG = 2	XG =	0.594700E+02	SIGR =	0.523237E+02	SIGXI =	0.103638E+03	SIG1 =	0.103638E+03	IXI =	0
	JG = 1	YG =	0.609204E+01	SIGZ =	0.372363E+01	SIGETA =	-0.475903E+02	SIG2 =	-0.475904E+02	IETA =	0
		ZETA =	0.355711E+02	SIGRZ =	0.716031E+02	SIGXIET=	0.148023E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.550793E-04			GAMA =	0.356271E+02	IXIETA =	0
39	IG = 3	XG =	0.618945E+02	SIGR =	0.381766E+02	SIGXI =	0.959408E+02	SIG1 =	0.959409E+02	IXI =	0
	JG = 1	YG =	0.609204E+01	SIGZ =	0.140583E+01	SIGETA =	-0.563583E+02	SIG2 =	-0.563584E+02	IETA =	0
		ZETA =	0.379711E+02	SIGRZ =	0.738969E+02	SIGXIET=	0.114866E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.568437E-04			GAMA =	0.380143E+02	IXIETA =	0
39	IG = 1	XG =	0.570455E+02	SIGR =	0.248066E+02	SIGXI =	0.944804E+02	SIG1 =	0.944804E+02	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	0.234411E+01	SIGETA =	-0.673296E+02	SIG2 =	-0.673296E+02	IETA =	0
		ZETA =	0.409849E+02	SIGRZ =	0.801217E+02	SIGXIET=	0.714318E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.616320E-04			GAMA =	0.410102E+02	IXIETA =	0
39	IG = 2	XG =	0.594700E+02	SIGR =	0.175312E+02	SIGXI =	0.893666E+02	SIG1 =	0.893666E+02	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	0.171878E+01	SIGETA =	-0.701166E+02	SIG2 =	-0.701166E+02	IETA =	0
		ZETA =	0.421368E+02	SIGRZ =	0.793487E+02	SIGXIET=	0.505567E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.610374E-04			GAMA =	0.421549E+02	IXIETA =	0
39	IG = 3	XG =	0.618945E+02	SIGR =	0.949964E+01	SIGXI =	0.853412E+02	SIG1 =	0.853412E+02	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	-0.268761E+01	SIGETA =	-0.785291E+02	SIG2 =	-0.785291E+02	IETA =	0
		ZETA =	0.428538E+02	SIGRZ =	0.817083E+02	SIGXIET=	0.391235E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.628525E-04			GAMA =	0.428675E+02	IXIETA =	0
39	IG = 1	XG =	0.570455E+02	SIGR =	-0.130661E+02	SIGXI =	0.819447E+02	SIG1 =	0.819447E+02	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	0.303487E+01	SIGETA =	-0.919759E+02	SIG2 =	-0.919760E+02	IETA =	0
		ZETA =	0.476730E+02	SIGRZ =	0.865869E+02	SIGXIET=	-0.519093E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.666053E-04			GAMA =	0.476559E+02	IXIETA =	0
39	IG = 2	XG =	0.594700E+02	SIGR =	-0.142261E+02	SIGXI =	0.792346E+02	SIG1 =	0.792346E+02	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	0.320950E+00	SIGETA =	-0.931397E+02	SIG2 =	-0.931397E+02	IETA =	0
		ZETA =	0.474361E+02	SIGRZ =	0.858797E+02	SIGXIET=	-0.469159E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.660613E-04			GAMA =	0.474205E+02	IXIETA =	0
39	IG = 3	XG =	0.618945E+02	SIGR =	-0.161422E+02	SIGXI =	0.772874E+02	SIG1 =	0.772875E+02	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.617402E+01	SIGETA =	-0.996037E+02	SIG2 =	-0.996037E+02	IETA =	0
		ZETA =	0.466257E+02	SIGRZ =	0.883050E+02	SIGXIET=	-0.322321E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.679269E-04			GAMA =	0.466152E+02	IXIETA =	0

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40  IG  = 1   XG   =  0.570455E+02   SIGR  =  0.174308E+03   SIGXI  =  0.174334E+03   SIG1  =  0.174334E+03   IXI    =  0
    JG  = 1   YG   =  0.617042E+00   SIGZ  = -0.110176E+01   SIGETA = -0.112799E+01   SIG2  = -0.112799E+01   IETA   =  0
              ZETA =  0.695852E+00   SIGRZ =  0.214515E+01   SIGXIET=  0.143893E-01   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.165012E-05                            GAMA  =  0.700550E+00   IXIETA =  0

40  IG  = 2   XG   =  0.594700E+02   SIGR  =  0.153462E+03   SIGXI  =  0.153493E+03   SIG1  =  0.153493E+03   IXI    =  0
    JG  = 1   YG   =  0.617042E+00   SIGZ  =  0.370080E+00   SIGETA =  0.339633E+00   SIG2  =  0.339631E+00   IETA   =  0
              ZETA =  0.802572E+00   SIGRZ =  0.215925E+01   SIGXIET=  0.142423E-01   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.166096E-05                            GAMA  =  0.807900E+00   IXIETA =  0

40  IG  = 3   XG   =  0.618945E+02   SIGR  =  0.132798E+03   SIGXI  =  0.132884E+03   SIG1  =  0.132884E+03   IXI    =  0
    JG  = 1   YG   =  0.617042E+00   SIGZ  =  0.275311E+01   SIGETA =  0.266758E+01   SIG2  =  0.266758E+01   IETA   =  0
              ZETA =  0.145914E+01   SIGRZ =  0.333612E+01   SIGXIET=  0.213978E-01   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.256624E-05                            GAMA  =  0.146855E+01   IXIETA =  0

40  IG  = 1   XG   =  0.570455E+02   SIGR  =  0.134890E+03   SIGXI  =  0.142019E+03   SIG1  =  0.142019E+03   IXI    =  0
    JG  = 2   YG   =  0.273750E+01   SIGZ  =  0.603113E+00   SIGETA = -0.652523E+01   SIG2  = -0.652546E+01   IETA   =  0
              ZETA =  0.125832E+02   SIGRZ =  0.317505E+02   SIGXIET=  0.183873E+00   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.244235E-04                            GAMA  =  0.126541E+02   IXIETA =  0

40  IG  = 2   XG   =  0.594700E+02   SIGR  =  0.116132E+03   SIGXI  =  0.123551E+03   SIG1  =  0.123552E+03   IXI    =  0
    JG  = 2   YG   =  0.273750E+01   SIGZ  =  0.386874E+00   SIGETA = -0.703260E+01   SIG2  = -0.703283E+01   IETA   =  0
              ZETA =  0.137148E+02   SIGRZ =  0.302299E+02   SIGXIET=  0.171884E+00   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.232538E-04                            GAMA  =  0.137902E+02   IXIETA =  0

40  IG  = 3   XG   =  0.618945E+02   SIGR  =  0.975555E+02   SIGXI  =  0.106056E+03   SIG1  =  0.106056E+03   IXI    =  0
    JG  = 2   YG   =  0.273750E+01   SIGZ  =  0.108182E+01   SIGETA = -0.741849E+01   SIG2  = -0.741873E+01   IETA   =  0
              ZETA =  0.158022E+02   SIGRZ =  0.298720E+02   SIGXIET=  0.163049E+00   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.229785E-04                            GAMA  =  0.158845E+02   IXIETA =  0

40  IG  = 1   XG   =  0.570455E+02   SIGR  =  0.914416E+02   SIGXI  =  0.121921E+03   SIG1  =  0.121921E+03   IXI    =  0
    JG  = 3   YG   =  0.485796E+01   SIGZ  =  0.150176E+01   SIGETA = -0.289777E+02   SIG2  = -0.289781E+02   IETA   =  0
              ZETA =  0.266194E+02   SIGRZ =  0.605836E+02   SIGXIET=  0.231084E+00   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.466027E-04                            GAMA  =  0.267071E+02   IXIETA =  0

40  IG  = 2   XG   =  0.594700E+02   SIGR  =  0.747704E+02   SIGXI  =  0.105902E+03   SIG1  =  0.105902E+03   IXI    =  0
    JG  = 3   YG   =  0.485796E+01   SIGZ  = -0.402557E+00   SIGETA = -0.315344E+02   SIG2  = -0.315347E+02   IETA   =  0
              ZETA =  0.283363E+02   SIGRZ =  0.575282E+02   SIGXIET=  0.202032E+00   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.442525E-04                            GAMA  =  0.284206E+02   IXIETA =  0

40  IG  = 3   XG   =  0.618945E+02   SIGR  =  0.582814E+02   SIGXI  =  0.915748E+02   SIG1  =  0.915750E+02   IXI    =  0
    JG  = 3   YG   =  0.485796E+01   SIGZ  = -0.139569E+01   SIGETA = -0.346891E+02   SIG2  = -0.346893E+02   IETA   =  0
              ZETA =  0.308203E+02   SIGRZ =  0.556357E+02   SIGXIET=  0.169409E+00   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.427967E-04                            GAMA  =  0.308972E+02   IXIETA =  0


41  IG  = 1   XG   =  0.633055E+02   SIGR  = -0.720005E+02   SIGXI  =  0.329619E+02   SIG1  =  0.329622E+02   IXI    =  0
    JG  = 1   YG   =  0.170420E+02   SIGZ  = -0.235276E+01   SIGETA = -0.107315E+03   SIG2  = -0.107315E+03   IETA   =  0
              ZETA =  0.599639E+02   SIGRZ =  0.608831E+02   SIGXIET= -0.194778E+00   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.468332E-04                            GAMA  =  0.598843E+02   IXIETA =  0

41  IG  = 2   XG   =  0.657300E+02   SIGR  = -0.533481E+02   SIGXI  =  0.272640E+02   SIG1  =  0.272642E+02   IXI    =  0
    JG  = 1   YG   =  0.170420E+02   SIGZ  = -0.711687E+01   SIGETA = -0.877290E+02   SIG2  = -0.877292E+02   IETA   =  0
              ZETA =  0.569207E+02   SIGRZ =  0.526454E+02   SIGXIET= -0.136440E+00   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.404964E-04                            GAMA  =  0.568527E+02   IXIETA =  0

41  IG  = 3   XG   =  0.681545E+02   SIGR  = -0.347691E+02   SIGXI  =  0.250776E+02   SIG1  =  0.250777E+02   IXI    =  0
    JG  = 1   YG   =  0.170420E+02   SIGZ  = -0.122478E+02   SIGETA = -0.720945E+02   SIG2  = -0.720946E+02   IETA   =  0
              ZETA =  0.517422E+02   SIGRZ =  0.472632E+02   SIGXIET= -0.706570E-01   SIGTH =  0.0            ITHETA =  2
                                     SSTRN =  0.363563E-04                            GAMA  =  0.517005E+02   IXIETA =  0
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41	IG	= 1	XG	=	0.633055E+02	SIGR	=	-0.868671E+02	SIGXI	=	0.119405E+02	SIG1	=	0.119408E+02	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.147737E+01	SIGETA	=	-0.100285E+03	SIG2	=	-0.100285E+03	IETA	= 0
			ZETA	=	0.698615E+02	SIGRZ	=	0.364118E+02	SIGXIET	=	-0.178110E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.280091E-04				GAMA	=	0.697706E+02	IXIETA	= 0
41	IG	= 2	XG	=	0.657300E+02	SIGR	=	-0.617320E+02	SIGXI	=	0.973367E+01	SIG1	=	0.973389E+01	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.360584E+01	SIGETA	=	-0.750716E+02	SIG2	=	-0.750718E+02	IETA	= 0
			ZETA	=	0.667257E+02	SIGRZ	=	0.308761E+02	SIGXIET	=	-0.136135E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.237509E-04				GAMA	=	0.666337E+02	IXIETA	= 0
41	IG	= 3	XG	=	0.681545E+02	SIGR	=	-0.366704E+02	SIGXI	=	0.106865E+02	SIG1	=	0.106866E+02	IXI	= 0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.610116E+01	SIGETA	=	-0.534580E+02	SIG2	=	-0.534582E+02	IETA	= 0
			ZETA	=	0.593080E+02	SIGRZ	=	0.281961E+02	SIGXIET	=	-0.865670E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.216893E-04				GAMA	=	0.592307E+02	IXIETA	= 0
41	IG	= 1	XG	=	0.633055E+02	SIGR	=	-0.955827E+02	SIGXI	=	0.220850E+01	SIG1	=	0.220856E+01	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.628214E+00	SIGETA	=	-0.971630E+02	SIG2	=	-0.971631E+02	IETA	= 0
			ZETA	=	0.827997E+02	SIGRZ	=	0.124316E+02	SIGXIET	=	-0.771839E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.956274E-05				GAMA	=	0.827552E+02	IXIETA	= 0
41	IG	= 2	XG	=	0.657300E+02	SIGR	=	-0.639651E+02	SIGXI	=	0.252092E+01	SIG1	=	0.252097E+01	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.113538E+01	SIGETA	=	-0.653506E+02	SIG2	=	-0.653507E+02	IETA	= 0
			ZETA	=	0.818353E+02	SIGRZ	=	0.959805E+01	SIGXIET	=	-0.590427E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.738312E-05				GAMA	=	0.817854E+02	IXIETA	= 0
41	IG	= 3	XG	=	0.681545E+02	SIGR	=	-0.324208E+02	SIGXI	=	0.382865E+01	SIG1	=	0.382873E+01	IXI	= 0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.127569E+01	SIGETA	=	-0.349737E+02	SIG2	=	-0.349738E+02	IETA	= 0
			ZETA	=	0.752163E+02	SIGRZ	=	0.962010E+01	SIGXIET	=	-0.536467E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.740008E-05				GAMA	=	0.751371E+02	IXIETA	= 0
42	IG	= 1	XG	=	0.633055E+02	SIGR	=	-0.304984E+02	SIGXI	=	0.703850E+02	SIG1	=	0.703850E+02	IXI	= 0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.874280E+01	SIGETA	=	-0.109626E+03	SIG2	=	-0.109626E+03	IETA	= 0
			ZETA	=	0.484930E+02	SIGRZ	=	0.893458E+02	SIGXIET	=	-0.697316E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.687276E-04				GAMA	=	0.484708E+02	IXIETA	= 0
42	IG	= 2	XG	=	0.657300E+02	SIGR	=	-0.219305E+02	SIGXI	=	0.594813E+02	SIG1	=	0.594813E+02	IXI	= 0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.224464E+02	SIGETA	=	-0.103858E+03	SIG2	=	-0.103858E+03	IETA	= 0
			ZETA	=	0.449090E+02	SIGRZ	=	0.816693E+02	SIGXIET	=	0.163196E-02	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.628225E-04				GAMA	=	0.449095E+02	IXIETA	= 0
42	IG	= 3	XG	=	0.681545E+02	SIGR	=	-0.136651E+02	SIGXI	=	0.506519E+02	SIG1	=	0.506519E+02	IXI	= 0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.376623E+02	SIGETA	=	-0.101979E+03	SIG2	=	-0.101979E+03	IETA	= 0
			ZETA	=	0.404484E+02	SIGRZ	=	0.753665E+02	SIGXIET	=	0.764295E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.579742E-04				GAMA	=	0.404771E+02	IXIETA	= 0
42	IG	= 1	XG	=	0.633055E+02	SIGR	=	-0.473289E+02	SIGXI	=	0.544489E+02	SIG1	=	0.544490E+02	IXI	= 0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.693140E+01	SIGETA	=	-0.108709E+03	SIG2	=	-0.108709E+03	IETA	= 0
			ZETA	=	0.522120E+02	SIGRZ	=	0.790390E+02	SIGXIET	=	-0.126296E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.607992E-04				GAMA	=	0.521677E+02	IXIETA	= 0
42	IG	= 2	XG	=	0.657300E+02	SIGR	=	-0.351214E+02	SIGXI	=	0.461545E+02	SIG1	=	0.461545E+02	IXI	= 0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.167615E+02	SIGETA	=	-0.980374E+02	SIG2	=	-0.980374E+02	IETA	= 0
			ZETA	=	0.486810E+02	SIGRZ	=	0.715092E+02	SIGXIET	=	-0.587758E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.550070E-04				GAMA	=	0.486577E+02	IXIETA	= 0
42	IG	= 3	XG	=	0.681545E+02	SIGR	=	-0.232163E+02	SIGXI	=	0.397385E+02	SIG1	=	0.397385E+02	IXI	= 0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.281039E+02	SIGETA	=	-0.910588E+02	SIG2	=	-0.910588E+02	IETA	= 0
			ZETA	=	0.439223E+02	SIGRZ	=	0.653530E+02	SIGXIET	=	0.157512E-01	SIGTH	=	0.0	ITHETA	= 2

						SSTRN =	0.502715E-04					GAMA =	0.439292E+02	IXIETA =	0
42	IG = 1	XG =	0.633055E+02	SIGR =	-0.626839E+02	SIGXI =	0.418823E+02	SIG1 =	0.418825E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.482490E+01	SIGETA =	-0.109391E+03	SIG2 =	-0.109391E+03	IETA =	0
		ZETA =	0.563089E+02	SIGRZ =	0.698859E+02	SIGXIET=	-0.172401E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.537583E-04			GAMA =	0.562436E+02	IXIETA =	0
42	IG = 2	XG =	0.657300E+02	SIGR =	-0.468368E+02	SIGXI =	0.362413E+02	SIG1 =	0.362414E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.107815E+02	SIGETA =	-0.938597E+02	SIG2 =	-0.938598E+02	IETA =	0
		ZETA =	0.530938E+02	SIGRZ =	0.625027E+02	SIGXIET=	-0.111750E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.480790E-04			GAMA =	0.530446E+02	IXIETA =	0
42	IG = 3	XG =	0.681545E+02	SIGR =	-0.312921E+02	SIGXI =	0.320970E+02	SIG1 =	0.320970E+02	IXI =	0
	JG = 3	YG =	0.158080E+02	SIGZ =	-0.182505E+02	SIGETA =	-0.816396E+02	SIG2 =	-0.816396E+02	IETA =	0
		ZETA =	0.483132E+02	SIGRZ =	0.564932E+02	SIGXIET=	-0.417970E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.434563E-04			GAMA =	0.482921E+02	IXIETA =	0
43	IG = 1	XG =	0.633055E+02	SIGR =	0.338904E+02	SIGXI =	0.951253E+02	SIG1 =	0.951254E+02	IXI =	0
	JG = 1	YG =	0.609204E+01	SIGZ =	-0.320107E+01	SIGETA =	-0.644360E+02	SIG2 =	-0.644361E+02	IETA =	0
		ZETA =	0.382373E+02	SIGRZ =	0.775953E+02	SIGXIET=	0.116287E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.596887E-04			GAMA =	0.382791E+02	IXIETA =	0
43	IG = 2	XG =	0.657300E+02	SIGR =	0.207830E+02	SIGXI =	0.815621E+02	SIG1 =	0.815623E+02	IXI =	0
	JG = 1	YG =	0.609204E+01	SIGZ =	-0.280063E+02	SIGETA =	-0.887854E+02	SIG2 =	-0.887856E+02	IETA =	0
		ZETA =	0.366277E+02	SIGRZ =	0.816057E+02	SIGXIET=	0.150699E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.627737E-04			GAMA =	0.366784E+02	IXIETA =	0
43	IG = 3	XG =	0.681545E+02	SIGR =	0.408359E+01	SIGXI =	0.636788E+02	SIG1 =	0.636791E+02	IXI =	0
	JG = 1	YG =	0.609204E+01	SIGZ =	-0.707717E+02	SIGETA =	-0.130367E+03	SIG2 =	-0.130367E+03	IETA =	0
		ZETA =	0.335888E+02	SIGRZ =	0.895135E+02	SIGXIET=	0.222577E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.688565E-04			GAMA =	0.336545E+02	IXIETA =	0
43	IG = 1	XG =	0.633055E+02	SIGR =	0.714917E+01	SIGXI =	0.836421E+02	SIG1 =	0.836421E+02	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	-0.642491E+01	SIGETA =	-0.829178E+02	SIG2 =	-0.829178E+02	IETA =	0
		ZETA =	0.426477E+02	SIGRZ =	0.830030E+02	SIGXIET=	0.435449E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.638484E-04			GAMA =	0.426627E+02	IXIETA =	0
43	IG = 2	XG =	0.657300E+02	SIGR =	0.354382E+01	SIGXI =	0.720461E+02	SIG1 =	0.720461E+02	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	-0.243601E+02	SIGETA =	-0.928624E+02	SIG2 =	-0.928625E+02	IETA =	0
		ZETA =	0.400983E+02	SIGRZ =	0.812653E+02	SIGXIET=	0.886427E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.625118E-04			GAMA =	0.401291E+02	IXIETA =	0
43	IG = 3	XG =	0.681545E+02	SIGR =	-0.365356E+01	SIGXI =	0.561399E+02	SIG1 =	0.561401E+02	IXI =	0
	JG = 2	YG =	0.821250E+01	SIGZ =	-0.602555E+02	SIGETA =	-0.120049E+03	SIG2 =	-0.120049E+03	IETA =	0
		ZETA =	0.355743E+02	SIGRZ =	0.834249E+02	SIGXIET=	0.172766E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.641730E-04			GAMA =	0.356305E+02	IXIETA =	0
43	IG = 1	XG =	0.633055E+02	SIGR =	-0.183415E+02	SIGXI =	0.764740E+02	SIG1 =	0.764740E+02	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.939865E+01	SIGETA =	-0.104214E+03	SIG2 =	-0.104214E+03	IETA =	0
		ZETA =	0.464276E+02	SIGRZ =	0.902333E+02	SIGXIET=	-0.289484E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.694102E-04			GAMA =	0.464185E+02	IXIETA =	0
43	IG = 2	XG =	0.657300E+02	SIGR =	-0.124448E+02	SIGXI =	0.663903E+02	SIG1 =	0.663903E+02	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.204639E+02	SIGETA =	-0.992990E+02	SIG2 =	-0.992990E+02	IETA =	0
		ZETA =	0.436040E+02	SIGRZ =	0.827476E+02	SIGXIET=	0.257691E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.636520E-04			GAMA =	0.436129E+02	IXIETA =	0
43	IG = 3	XG =	0.681545E+02	SIGR =	-0.101401E+02	SIGXI =	0.517527E+02	SIG1 =	0.517528E+02	IXI =	0
	JG = 3	YG =	0.103330E+02	SIGZ =	-0.494893E+02	SIGETA =	-0.111382E+03	SIG2 =	-0.111382E+03	IETA =	0

			ZETA =	0.379779E+02	SIGRZ =	0.791591E+02	SIGXIET=	0.123118E+00	SIGTH =	0.0	ITHETA =	2
					SSTRN =	0.608916E-04			GAMA =	0.380211E+02	IXIETA =	0
44	IG = 1	XG =	0.633055E+02	SIGR =	0.140125E+03	SIGXI =	0.140304E+03	SIG1 =	0.140304E+03	IXI =	0
	JG = 1	YG =	0.617042E+00	SIGZ =	0.103759E+02	SIGETA =	0.101967E+02	SIG2 =	0.101967E+02	IETA =	0
		ZETA =	-0.211319E+01	SIGRZ =	-0.482516E+01	SIGXIET=	-0.309470E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.371166E-05			GAMA =	-0.212682E+01	IXIETA =	0
44	IG = 2	XG =	0.657300E+02	SIGR =	0.109168E+03	SIGXI =	0.109286E+03	SIG1 =	0.109286E+03	IXI =	0
	JG = 1	YG =	0.617042E+00	SIGZ =	0.932908E+00	SIGETA =	0.815188E+00	SIG2 =	0.815183E+00	IETA =	0
		ZETA =	-0.187581E+01	SIGRZ =	-0.357155E+01	SIGXIET=	-0.229049E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	-0.274734E-05			GAMA =	-0.188790E+01	IXIETA =	0
44	IG = 3	XG =	0.681545E+02	SIGR =	0.726179E+02	SIGXI =	0.726404E+02	SIG1 =	0.726404E+02	IXI =	0
	JG = 1	YG =	0.617042E+00	SIGZ =	-0.364782E+02	SIGETA =	-0.365007E+02	SIG2 =	-0.365007E+02	IETA =	0
		ZETA =	0.816839E+00	SIGRZ =	0.156579E+01	SIGXIET=	0.100364E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.120446E-05			GAMA =	0.822107E+00	IXIETA =	0
44	IG = 1	XG =	0.633055E+02	SIGR =	0.732203E+02	SIGXI =	0.827709E+02	SIG1 =	0.827711E+02	IXI =	0
	JG = 2	YG =	0.273750E+01	SIGZ =	0.178083E+01	SIGETA =	-0.776974E+01	SIG2 =	-0.776996E+01	IETA =	0
		ZETA =	0.188634E+02	SIGRZ =	0.278123E+02	SIGXIET=	0.141010E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.213940E-04			GAMA =	0.189526E+02	IXIETA =	0
44	IG = 2	XG =	0.657300E+02	SIGR =	0.507161E+02	SIGXI =	0.686861E+02	SIG1 =	0.686863E+02	IXI =	0
	JG = 2	YG =	0.273750E+01	SIGZ =	-0.589843E+01	SIGETA =	-0.238685E+02	SIG2 =	-0.238687E+02	IETA =	0
		ZETA =	0.260551E+02	SIGRZ =	0.366102E+02	SIGXIET=	0.144106E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.281617E-04			GAMA =	0.261443E+02	IXIETA =	0
44	IG = 3	XG =	0.681545E+02	SIGR =	0.226182E+02	SIGXI =	0.493488E+02	SIG1 =	0.493491E+02	IXI =	0
	JG = 2	YG =	0.273750E+01	SIGZ =	-0.415458E+02	SIGETA =	-0.682764E+02	SIG2 =	-0.682767E+02	IETA =	0
		ZETA =	0.283865E+02	SIGRZ =	0.492920E+02	SIGXIET=	0.173130E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.379169E-04			GAMA =	0.284708E+02	IXIETA =	0
44	IG = 1	XG =	0.633055E+02	SIGR =	0.440990E+02	SIGXI =	0.866651E+02	SIG1 =	0.866652E+02	IXI =	0
	JG = 3	YG =	0.485796E+01	SIGZ =	0.742453E+00	SIGETA =	-0.418237E+02	SIG2 =	-0.418238E+02	IETA =	0
		ZETA =	0.350810E+02	SIGRZ =	0.604765E+02	SIGXIET=	0.131723E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.465204E-04			GAMA =	0.351397E+02	IXIETA =	0
44	IG = 2	XG =	0.657300E+02	SIGR =	0.300473E+02	SIGXI =	0.912486E+02	SIG1 =	0.912487E+02	IXI =	0
	JG = 3	YG =	0.485796E+01	SIGZ =	-0.517305E+01	SIGETA =	-0.663744E+02	SIG2 =	-0.663744E+02	IETA =	0
		ZETA =	0.385040E+02	SIGRZ =	0.768189E+02	SIGXIET=	0.110767E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.590915E-04			GAMA =	0.385442E+02	IXIETA =	0
44	IG = 3	XG =	0.681545E+02	SIGR =	0.104020E+02	SIGXI =	0.858188E+02	SIG1 =	0.858190E+02	IXI =	0
	JG = 3	YG =	0.485796E+01	SIGZ =	-0.390566E+02	SIGETA =	-0.114473E+03	SIG2 =	-0.114474E+03	IETA =	0
		ZETA =	0.378078E+02	SIGRZ =	0.970450E+02	SIGXIET=	0.154530E+00	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.746500E-04			GAMA =	0.378520E+02	IXIETA =	0
45	IG = 1	XG =	0.695655E+02	SIGR =	-0.226848E+02	SIGXI =	0.209476E+02	SIG1 =	0.209476E+02	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	-0.153000E+02	SIGETA =	-0.589324E+02	SIG2 =	-0.589324E+02	IETA =	0
		ZETA =	0.476692E+02	SIGRZ =	0.397690E+02	SIGXIET=	-0.237216E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.305915E-04			GAMA =	0.476522E+02	IXIETA =	0
45	IG = 2	XG =	0.719900E+02	SIGR =	-0.119990E+02	SIGXI =	0.804276E+01	SIG1 =	0.804277E+01	IXI =	0
	JG = 1	YG =	0.170420E+02	SIGZ =	-0.177440E+02	SIGETA =	-0.377858E+02	SIG2 =	-0.377858E+02	IETA =	0
		ZETA =	0.413763E+02	SIGRZ =	0.227335E+02	SIGXIET=	0.183846E-01	SIGTH =	0.0	ITHETA =	2
				SSTRN =	0.174873E-04			GAMA =	0.413993E+02	IXIETA =	0

45	IG	= 3	XG	=	0.744145E+02	SIGR	=	0.345343E+00	SIGXI	=	0.241713E+01	SIG1	=	0.241717E+01	IXI	=	0
	JG	= 1	YG	=	0.170420E+02	SIGZ	=	-0.118948E+02	SIGETA	=	-0.139665E+02	SIG2	=	-0.139666E+02	IETA	=	0
			ZETA	=	0.207392E+02	SIGRZ	=	0.544535E+01	SIGXIET	=	0.261538E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.418873E-05				GAMA	=	0.208306E+02	IXIETA	=	0
45	IG	= 1	XG	=	0.695655E+02	SIGR	=	-0.231467E+02	SIGXI	=	0.805678E+01	SIG1	=	0.805683E+01	IXI	=	0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.834587E+01	SIGETA	=	-0.395493E+02	SIG2	=	-0.395494E+02	IETA	=	0
			ZETA	=	0.541113E+02	SIGRZ	=	0.226235E+02	SIGXIET	=	-0.453528E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.174027E-04				GAMA	=	0.540568E+02	IXIETA	=	0
45	IG	= 2	XG	=	0.719900E+02	SIGR	=	-0.129170E+02	SIGXI	=	0.648747E+00	SIG1	=	0.648749E+00	IXI	=	0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.104345E+02	SIGETA	=	-0.240003E+02	SIG2	=	-0.240003E+02	IETA	=	0
			ZETA	=	0.479086E+02	SIGRZ	=	0.122618E+02	SIGXIET	=	-0.796780E-02	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.943219E-05				GAMA	=	0.478901E+02	IXIETA	=	0
45	IG	= 3	XG	=	0.744145E+02	SIGR	=	-0.102862E+01	SIGXI	=	-0.332266E+00	SIG1	=	-0.332254E+00	IXI	=	0
	JG	= 2	YG	=	0.191625E+02	SIGZ	=	-0.422998E+01	SIGETA	=	-0.492633E+01	SIG2	=	-0.492634E+01	IETA	=	0
			ZETA	=	0.228208E+02	SIGRZ	=	0.164749E+01	SIGXIET	=	0.738335E-02	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.126730E-05				GAMA	=	0.229129E+02	IXIETA	=	0
45	IG	= 1	XG	=	0.695655E+02	SIGR	=	-0.154535E+02	SIGXI	=	0.205696E+01	SIG1	=	0.205701E+01	IXI	=	0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.239297E+00	SIGETA	=	-0.172712E+02	SIG2	=	-0.172712E+02	IETA	=	0
			ZETA	=	0.722288E+02	SIGRZ	=	0.564172E+01	SIGXIET	=	-0.294270E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.433979E-05				GAMA	=	0.721415E+02	IXIETA	=	0
45	IG	= 2	XG	=	0.719900E+02	SIGR	=	-0.567983E+01	SIGXI	=	-0.723749E+00	SIG1	=	-0.723734E+00	IXI	=	0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	-0.149407E+01	SIGETA	=	-0.645015E+01	SIG2	=	-0.645016E+01	IETA	=	0
			ZETA	=	0.685751E+02	SIGRZ	=	0.195393E+01	SIGXIET	=	-0.918268E-02	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.150302E-05				GAMA	=	0.684833E+02	IXIETA	=	0
45	IG	= 3	XG	=	0.744145E+02	SIGR	=	0.575249E+01	SIGXI	=	0.742520E+01	SIG1	=	0.742520E+01	IXI	=	0
	JG	= 3	YG	=	0.212830E+02	SIGZ	=	0.506582E+01	SIGETA	=	0.339312E+01	SIG2	=	0.339312E+01	IETA	=	0
			ZETA	=	-0.400663E+02	SIGRZ	=	-0.198659E+01	SIGXIET	=	-0.218174E-02	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	-0.152815E-05				GAMA	=	-0.400973E+02	IXIETA	=	0
46	IG	= 1	XG	=	0.695655E+02	SIGR	=	-0.100240E+02	SIGXI	=	0.436102E+02	SIG1	=	0.436103E+02	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.504649E+02	SIGETA	=	-0.104099E+03	SIG2	=	-0.104099E+03	IETA	=	0
			ZETA	=	0.370065E+02	SIGRZ	=	0.710328E+02	SIGXIET	=	0.125392E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.546406E-04				GAMA	=	0.370551E+02	IXIETA	=	0
46	IG	= 2	XG	=	0.719900E+02	SIGR	=	-0.645441E+01	SIGXI	=	0.149529E+02	SIG1	=	0.149532E+02	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.708415E+02	SIGETA	=	-0.922488E+02	SIG2	=	-0.922491E+02	IETA	=	0
			ZETA	=	0.264545E+02	SIGRZ	=	0.428562E+02	SIGXIET	=	0.165674E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.329663E-04				GAMA	=	0.265431E+02	IXIETA	=	0
46	IG	= 3	XG	=	0.744145E+02	SIGR	=	-0.431283E+00	SIGXI	=	0.249946E+01	SIG1	=	0.249957E+01	IXI	=	0
	JG	= 1	YG	=	0.115670E+02	SIGZ	=	-0.789505E+02	SIGETA	=	-0.818813E+02	SIG2	=	-0.818814E+02	IETA	=	0
			ZETA	=	0.106783E+02	SIGRZ	=	0.154505E+02	SIGXIET	=	0.922415E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.118850E-04				GAMA	=	0.107410E+02	IXIETA	=	0
46	IG	= 1	XG	=	0.695655E+02	SIGR	=	-0.150425E+02	SIGXI	=	0.333726E+02	SIG1	=	0.333727E+02	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.371288E+02	SIGETA	=	-0.855439E+02	SIG2	=	-0.855439E+02	IETA	=	0
			ZETA	=	0.396144E+02	SIGRZ	=	0.584238E+02	SIGXIET	=	0.699857E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.449414E-04				GAMA	=	0.396482E+02	IXIETA	=	0
46	IG	= 2	XG	=	0.719900E+02	SIGR	=	-0.839797E+01	SIGXI	=	0.110815E+02	SIG1	=	0.110817E+02	IXI	=	0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.501690E+02	SIGETA	=	-0.696484E+02	SIG2	=	-0.696486E+02	IETA	=	0
			ZETA	=	0.293388E+02	SIGRZ	=	0.345419E+02	SIGXIET	=	0.115109E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.265707E-04				GAMA	=	0.294205E+02	IXIETA	=	0

46	IG	= 3	XG	=	0.744145E+02	SIGR	=	0.700023E+00	SIGXI	=	0.311698E+01	SIG1	=	0.311706E+01	IXI	= 0
	JG	= 2	YG	=	0.136875E+02	SIGZ	=	-0.509416E+02	SIGETA	=	-0.533586E+02	SIG2	=	-0.533587E+02	IETA	= 0
			ZETA	=	0.118713E+02	SIGRZ	=	0.114308E+02	SIGXIET	=	0.670748E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.879289E-05				GAMA	=	0.119394E+02	IXIETA	= 0
46	IG	= 1	XG	=	0.695655E+02	SIGR	=	-0.201146E+02	SIGXI	=	0.263562E+02	SIG1	=	0.263562E+02	IXI	= 0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.238034E+02	SIGETA	=	-0.702741E+02	SIG2	=	-0.702742E+02	IETA	= 0
			ZETA	=	0.438991E+02	SIGRZ	=	0.482799E+02	SIGXIET	=	0.118965E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.371384E-04				GAMA	=	0.439061E+02	IXIETA	= 0
46	IG	= 2	XG	=	0.719900E+02	SIGR	=	-0.103952E+02	SIGXI	=	0.102908E+02	SIG1	=	0.102909E+02	IXI	= 0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.295072E+02	SIGETA	=	-0.501933E+02	SIG2	=	-0.501933E+02	IETA	= 0
			ZETA	=	0.357346E+02	SIGRZ	=	0.286927E+02	SIGXIET	=	0.584607E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.220713E-04				GAMA	=	0.357899E+02	IXIETA	= 0
46	IG	= 3	XG	=	0.744145E+02	SIGR	=	0.177762E+01	SIGXI	=	0.523858E+01	SIG1	=	0.523866E+01	IXI	= 0
	JG	= 3	YG	=	0.158080E+02	SIGZ	=	-0.229435E+02	SIGETA	=	-0.264044E+02	SIG2	=	-0.264045E+02	IETA	= 0
			ZETA	=	0.192228E+02	SIGRZ	=	0.987621E+01	SIGXIET	=	0.495845E-01	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.759708E-05				GAMA	=	0.193126E+02	IXIETA	= 0
47	IG	= 1	XG	=	0.695655E+02	SIGR	=	0.125136E+02	SIGXI	=	0.409011E+02	SIG1	=	0.409015E+02	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.902768E+02	SIGETA	=	-0.118664E+03	SIG2	=	-0.118665E+03	IETA	= 0
			ZETA	=	0.248568E+02	SIGRZ	=	0.610236E+02	SIGXIET	=	0.252950E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.469412E-04				GAMA	=	0.249476E+02	IXIETA	= 0
47	IG	= 2	XG	=	0.719900E+02	SIGR	=	0.111825E+02	SIGXI	=	0.231416E+02	SIG1	=	0.231419E+02	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.125522E+03	SIGETA	=	-0.137481E+03	SIG2	=	-0.137482E+03	IETA	= 0
			ZETA	=	0.157527E+02	SIGRZ	=	0.421656E+02	SIGXIET	=	0.230458E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.324351E-04				GAMA	=	0.158349E+02	IXIETA	= 0
47	IG	= 3	XG	=	0.744145E+02	SIGR	=	0.574888E+01	SIGXI	=	0.868391E+01	SIG1	=	0.868402E+01	IXI	= 0
	JG	= 1	YG	=	0.609204E+01	SIGZ	=	-0.181281E+03	SIGETA	=	-0.184216E+03	SIG2	=	-0.184216E+03	IETA	= 0
			ZETA	=	0.704203E+01	SIGRZ	=	0.236130E+02	SIGXIET	=	0.146812E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.181638E-04				GAMA	=	0.708564E+01	IXIETA	= 0
47	IG	= 1	XG	=	0.695655E+02	SIGR	=	-0.120957E+01	SIGXI	=	0.364636E+02	SIG1	=	0.364639E+02	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.766573E+02	SIGETA	=	-0.114330E+03	SIG2	=	-0.114331E+03	IETA	= 0
			ZETA	=	0.299090E+02	SIGRZ	=	0.652814E+02	SIGXIET	=	0.210385E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.502165E-04				GAMA	=	0.299889E+02	IXIETA	= 0
47	IG	= 2	XG	=	0.719900E+02	SIGR	=	0.166373E+00	SIGXI	=	0.154265E+02	SIG1	=	0.154268E+02	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.101552E+03	SIGETA	=	-0.116812E+03	SIG2	=	-0.116813E+03	IETA	= 0
			ZETA	=	0.197685E+02	SIGRZ	=	0.422511E+02	SIGXIET	=	0.208880E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.325008E-04				GAMA	=	0.198590E+02	IXIETA	= 0
47	IG	= 3	XG	=	0.744145E+02	SIGR	=	-0.256020E+01	SIGXI	=	0.334867E-01	SIG1	=	0.335844E-01	IXI	= 0
	JG	= 2	YG	=	0.821250E+01	SIGZ	=	-0.146959E+03	SIGETA	=	-0.149553E+03	SIG2	=	-0.149553E+03	IETA	= 0
			ZETA	=	0.752039E+01	SIGRZ	=	0.195261E+02	SIGXIET	=	0.120882E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.150201E-04				GAMA	=	0.756669E+01	IXIETA	= 0
47	IG	= 1	XG	=	0.695655E+02	SIGR	=	-0.830664E+01	SIGXI	=	0.428496E+02	SIG1	=	0.428498E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.617126E+02	SIGETA	=	-0.112869E+03	SIG2	=	-0.112869E+03	IETA	= 0
			ZETA	=	0.349117E+02	SIGRZ	=	0.731371E+02	SIGXIET	=	0.161690E+00	SIGTH	=	0.0	ITHETA	= 2
						SSTRN	=	0.562593E-04				GAMA	=	0.349712E+02	IXIETA	= 0
47	IG	= 2	XG	=	0.719900E+02	SIGR	=	-0.422363E+01	SIGXI	=	0.181304E+02	SIG1	=	0.181307E+02	IXI	= 0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.762565E+02	SIGETA	=	-0.986105E+02	SIG2	=	-0.986108E+02	IETA	= 0
			ZETA	=	0.258607E+02	SIGRZ	=	0.459343E+02	SIGXIET	=	0.182405E+00	SIGTH	=	0.0	ITHETA	= 2

							SSTRN	=	0.353341E-04				GAMA	=	0.259503E+02	IXIETA	=	0
47	IG	= 3	XG	=	0.744145E+02	SIGR	=	-0.424313E+01	SIGXI	=	-0.959221E+00	SIG1	=	-0.959105E+00	IXI	=	0
	JG	= 3	YG	=	0.103330E+02	SIGZ	=	-0.111313E+03	SIGETA	=	-0.114597E+03	SIG2	=	-0.114597E+03	IETA	=	0
			ZETA	=	0.972963E+01	SIGRZ	=	0.190369E+02	SIGXIET	=	0.115071E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.146438E-04				GAMA	=	0.978765E+01	IXIETA	=	0
48	IG	= 1	XG	=	0.695655E+02	SIGR	=	-0.475209E+02	SIGXI	=	0.268679E+02	SIG1	=	0.268682E+02	IXI	=	0
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	-0.139098E+03	SIGETA	=	-0.213487E+03	SIG2	=	-0.213487E+03	IETA	=	0
			ZETA	=	0.337369E+02	SIGRZ	=	0.111113E+03	SIGXIET	=	0.272902E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.854714E-04				GAMA	=	0.338020E+02	IXIETA	=	0
48	IG	= 2	XG	=	0.719900E+02	SIGR	=	-0.841467E+02	SIGXI	=	-0.836758E+02	SIG1	=	-0.836758E+02	IXI	=	0
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	-0.248867E+03	SIGETA	=	-0.249338E+03	SIG2	=	-0.249338E+03	IETA	=	0
			ZETA	=	0.303669E+01	SIGRZ	=	0.881963E+01	SIGXIET	=	0.562363E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.678433E-05				GAMA	=	0.305614E+01	IXIETA	=	0
48	IG	= 3	XG	=	0.744145E+02	SIGR	=	-0.819770E+02	SIGXI	=	-0.249630E+02	SIG1	=	-0.249627E+02	IXI	=	0
	JG	= 1	YG	=	0.617042E+00	SIGZ	=	-0.164659E+03	SIGETA	=	-0.221673E+03	SIG2	=	-0.221673E+03	IETA	=	0
			ZETA	=	-0.325021E+02	SIGRZ	=	-0.892450E+02	SIGXIET	=	-0.241721E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	-0.686500E-04				GAMA	=	-0.325725E+02	IXIETA	=	0
48	IG	= 1	XG	=	0.695655E+02	SIGR	=	0.375549E+02	SIGXI	=	0.833596E+02	SIG1	=	0.833602E+02	IXI	=	0
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	-0.117310E+03	SIGETA	=	-0.163114E+03	SIG2	=	-0.163115E+03	IETA	=	0
			ZETA	=	0.254469E+02	SIGRZ	=	0.958735E+02	SIGXIET	=	0.387649E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.737489E-04				GAMA	=	0.255370E+02	IXIETA	=	0
48	IG	= 2	XG	=	0.719900E+02	SIGR	=	0.998633E+01	SIGXI	=	0.116968E+02	SIG1	=	0.116969E+02	IXI	=	0
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	-0.225888E+03	SIGETA	=	-0.227599E+03	SIG2	=	-0.227599E+03	IETA	=	0
			ZETA	=	0.481948E+01	SIGRZ	=	0.201594E+02	SIGXIET	=	0.127401E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.155072E-04				GAMA	=	0.484999E+01	IXIETA	=	0
48	IG	= 3	XG	=	0.744145E+02	SIGR	=	0.212133E+02	SIGXI	=	0.361285E+02	SIG1	=	0.361289E+02	IXI	=	0
	JG	= 2	YG	=	0.273750E+01	SIGZ	=	-0.140490E+03	SIGETA	=	-0.155405E+03	SIG2	=	-0.155406E+03	IETA	=	0
			ZETA	=	-0.161209E+02	SIGRZ	=	-0.513262E+02	SIGXIET	=	-0.278286E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	-0.394817E-04				GAMA	=	-0.162041E+02	IXIETA	=	0
48	IG	= 1	XG	=	0.695655E+02	SIGR	=	0.319948E+02	SIGXI	=	0.676539E+02	SIG1	=	0.676545E+02	IXI	=	0
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.113649E+03	SIGETA	=	-0.149308E+03	SIG2	=	-0.149308E+03	IETA	=	0
			ZETA	=	0.238252E+02	SIGRZ	=	0.804065E+02	SIGXIET	=	0.347176E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.618511E-04				GAMA	=	0.239169E+02	IXIETA	=	0
48	IG	= 2	XG	=	0.719900E+02	SIGR	=	0.134835E+02	SIGXI	=	0.175815E+02	SIG1	=	0.175816E+02	IXI	=	0
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.221037E+03	SIGETA	=	-0.225135E+03	SIG2	=	-0.225135E+03	IETA	=	0
			ZETA	=	0.742040E+01	SIGRZ	=	0.312713E+02	SIGXIET	=	0.193763E+00	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	0.240549E-04				GAMA	=	0.746614E+01	IXIETA	=	0
48	IG	= 3	XG	=	0.744145E+02	SIGR	=	0.337676E+02	SIGXI	=	0.348657E+02	SIG1	=	0.348657E+02	IXI	=	0
	JG	= 3	YG	=	0.485796E+01	SIGZ	=	-0.134448E+03	SIGETA	=	-0.135546E+03	SIG2	=	-0.135546E+03	IETA	=	0
			ZETA	=	-0.457522E+01	SIGRZ	=	-0.136352E+02	SIGXIET	=	-0.862805E-01	SIGTH	=	0.0	ITHETA	=	2
						SSTRN	=	-0.104886E-04				GAMA	=	-0.460423E+01	IXIETA	=	0

OUTPUT FOR THIS LOAD STEP COMPLETED

VARIABLES AND ARRAYS STORED ON FILES IST , ILD

STRESSES AT THE GAUSS POINTS FOR LONG. REINFORCING ELEMENTS
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ME	NL	JG	XG	YG	SIGT	EPST	BTAU
4	4	1	0.7055E+00	0.3750E+01	0.935377E+04	0.292305E-03	0.418331E+02
4	4	2	0.3130E+01	0.3750E+01	0.942378E+04	0.294493E-03	0.456138E+02
4	4	3	0.5554E+01	0.3750E+01	0.949379E+04	0.296681E-03	-0.167459E+03
8	4	1	0.6966E+01	0.3750E+01	0.841692E+04	0.263029E-03	-0.138633E+03
8	4	2	0.9390E+01	0.3750E+01	0.837696E+04	0.261780E-03	0.600340E+02
8	4	3	0.1181E+02	0.3750E+01	0.833701E+04	0.260532E-03	-0.133933E+03
12	4	1	0.1323E+02	0.3750E+01	0.741463E+04	0.231707E-03	-0.167183E+03
12	4	2	0.1565E+02	0.3750E+01	0.703674E+04	0.219898E-03	-0.657447E+01
12	4	3	0.1807E+02	0.3750E+01	0.665884E+04	0.208089E-03	-0.113265E+03
16	4	1	0.1949E+02	0.3750E+01	0.600949E+04	0.187797E-03	-0.125979E+03
16	4	2	0.2191E+02	0.3750E+01	0.566436E+04	0.177011E-03	-0.146269E+02
16	4	3	0.2433E+02	0.3750E+01	0.531923E+04	0.166226E-03	-0.956610E+02
20	4	1	0.2575E+02	0.3750E+01	0.474810E+04	0.148378E-03	-0.111565E+03
20	4	2	0.2817E+02	0.3750E+01	0.438615E+04	0.137067E-03	-0.309152E+02
20	4	3	0.3059E+02	0.3750E+01	0.402420E+04	0.125756E-03	-0.585739E+02
24	4	1	0.3201E+02	0.3750E+01	0.371403E+04	0.116064E-03	-0.744827E+02
24	4	2	0.3443E+02	0.3750E+01	0.333722E+04	0.104288E-03	-0.469970E+02
24	4	3	0.3685E+02	0.3750E+01	0.296041E+04	0.925129E-04	-0.433933E+02
28	4	1	0.3827E+02	0.3750E+01	0.278111E+04	0.869097E-04	-0.433738E+02
28	4	2	0.4069E+02	0.3750E+01	0.252185E+04	0.788079E-04	-0.343393E+02
28	4	3	0.4311E+02	0.3750E+01	0.226260E+04	0.707061E-04	-0.297121E+02
32	4	1	0.4453E+02	0.3750E+01	0.214650E+04	0.670782E-04	-0.283991E+02
32	4	2	0.4695E+02	0.3750E+01	0.194919E+04	0.609121E-04	-0.264839E+02
32	4	3	0.4937E+02	0.3750E+01	0.175187E+04	0.547459E-04	-0.258302E+02
36	4	1	0.5079E+02	0.3750E+01	0.164196E+04	0.513112E-04	-0.256262E+02
36	4	2	0.5321E+02	0.3750E+01	0.145772E+04	0.455538E-04	-0.248917E+02
36	4	3	0.5563E+02	0.3750E+01	0.127349E+04	0.397964E-04	-0.243545E+02
40	4	1	0.5705E+02	0.3750E+01	0.117262E+04	0.366444E-04	-0.244255E+02
40	4	2	0.5947E+02	0.3750E+01	0.982170E+03	0.306928E-04	-0.256245E+02
40	4	3	0.6189E+02	0.3750E+01	0.791720E+03	0.247413E-04	-0.276680E+02
44	4	1	0.6331E+02	0.3750E+01	0.646659E+03	0.202081E-04	-0.264543E+02
44	4	2	0.6573E+02	0.3750E+01	0.538958E+03	0.168424E-04	-0.156220E+02
44	4	3	0.6815E+02	0.3750E+01	0.431257E+03	0.134768E-04	0.151948E+01
48	4	1	0.6957E+02	0.3750E+01	0.526682E+03	0.164588E-04	0.336637E+01
48	4	2	0.7199E+02	0.3750E+01	0.358357E+03	0.111987E-04	-0.204591E+02
48	4	3	0.7441E+02	0.3750E+01	0.190032E+03	0.593849E-05	-0.581627E+02

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APPENDIX A

LISTING OF NORCO PROGRAM

```
      C                         PROGRAM NORCO
      C                         PROGRAM NORCO
      C                         PROGRAM NORCO
      C                    EDMONTON, ALBERTA,
      C                         ******************
      C
      C     A FINITE ELEMENT PROGRAM FOR NONLINEAR ANALYSIS OF PLANE
      C     OR AXISYMMETRIC-REINFORCED AND/OR PRESTRESSED CONCRETE
      C     STRUCTURES.
      C
      C     WRITTEN BY:    S.BALAKRISHNAN, A.E.ELWI, AND D.W.MURRAY
      C                    UNIVERSITY OF ALBERTA,
      C                    EDMONTON, ALBERTA,
      C                    1979
      C     FIRST UPDATE:  DECEMBER 1982
      C                    VARIABLE THICKNESS PLANE ELEMENT INTRODUCED.
      C                    MAIN SEGMENT REARRANGED TO ELIMINATE NEED TO
      C                    COMPILE IT TO ADJUST SIZE OF MAIN ARRAYS.
      C                    ****  PERMISSION MUST BE OBTAINED FROM     *
      C                    ****  DEPARTMENT OF CIVIL ENGINEERING      *
      C                    ****  UNIVERSITY OF ALBERTA TO USE THIS    *
      C                    ****  VERSION ON THE UNIVERSITY OF ALBERTA*
      C                    ****  COMPUTER.                            *
      C
      C     ***************************************************************
      C     ADDITIONAL FEATURES ADDED BY
      C                     S.BALAKRISHNAN,D.W.MURRAY AND A.E.ELWI
      C                     DEPARTMENT OF CIVIL ENGINEERING
      C                     UNIVERSITY OF ALBERTA
      C
      C               DATE: MAY 1984
      C                     1.INCORPORATED ID ARRAY
      C                     2.INTRODUCED LAGRANGIAN QUADRATIC AND
      C                       CUBIC ELEMENTS
      C                     3.INTRODUCED VARIABLE NUMBER NODE ELEMENTS
      C               DATE: MARCH 1985
      C                     4.INTRODUCED PSEUDO-ELASTIC CRACKING
      C                       CONCRETE MODEL
      C               DATE: MAY 1985
      C                     5.INTRODUCED EIGEN ANALYSIS CAPABILITY
      C                       FOR THE ENTIRE STRUCTURE OR FOR
      C                       AN INDIVIDUAL ELEMENT
      C               DATE: SEP 1985
      C                     6.BOND-SLIP ELEMENT INTRODUCED
      C
      C     ***************************************************************
      C     *    THIS VERSION INCORPORATES THE NEW SOLUTION STRATEGY      *
      C     *    WHERE STRESS INFORMATION IS WRITTEN ON THE SAME FILE     *
      C     *    AS IT WAS READ FROM. I.E.,UNIT 3= INS= IOS               *
      C     *    THE RESTART FILE IS ATTACHED TO UNIT 2                   *
      C     *                                                 SEPT 1985   *
      C     ***************************************************************
      C
      C
      C     Array    position within master array A
      C
      C      AAA                  ICM(6)
      C      BBB                  ICM(7)
```

```
      C       III                   ICM(8)
      C       CCC                   ICM(9)
      C      ************************************************************
      C
      C      Subarrays of "AAA"
      C
      C
      C      name   position  dimension            generating routine
      C
      C
      C      XCORD      I1         NMNOD                    DATA
      C      YCORD      I2         NMNOD                    DATA
      C      XPEBE      I3         NMEBE                    DATA
      C      YPEBE      I4         NMEBE                    DATA
      C      PDEBE      I5         NMEBE                    DATA
      C      STEBE      I6         NMEBE                    DATA
      C      ORNSE      I7         NMELM                    DATA
      C      THKSE      I8         NMELM                    DATA
      C      ARELR      I9       4*NMELM                    DATA
      C      POSLR      I10      4*NMELM                    DATA
      C      AREHR      I11      4*NMELM                    DATA
      C      POSHR      I12      4*NMELM                    DATA
      C      ARELP      I13      4*NMELM                    DATA
      C      POSLP      I14      4*NMELM                    DATA
      C      AREHP      I15      4*NMELM                    DATA
      C      POSHP      I16      4*NMELM                    DATA
      C      STSS       I17      9*(NCMAT+NSMAT)            INIT
      C      STNS       I18      9*(NCMAT+NSMAT)            INIT
      C      CB         I19        NMELM                    DATA
      C      ************************************************************
      C
      C      SUBARRAYS OF BBB
      C
      C
      C      EMP        K1       NMPAR*(NCMAT+NSMAT)        DATA
      C      FD         K2       2*NMNOD                    DATA
      C      FL         K3       2*NMNOD                    DATA
      C      PNORM      K4         NMNOD                    DATA
      C      PTANG      K5         NMNOD                    DATA
      C      TEMPV      K6         NMNOD*ITEMP              DATA
      C      PHYDR      K15        NMNOD                    DATA
      C      FT         K7       2*NMNOD                    LOAD
      C      TEMPI      K17        NMNOD                    LOAD
      C      PN         K8       2*NMNOD                    LOAD
      C      PT         K9       2*NMNOD                    LOAD
      C      DQ         K10      2*NMNOD                    LOAD
      C      DU         K14      2*NMNOD                    LOAD
      C      QT         K13      2*NMNOD                    LOAD
      C      PT         K11      2*NMNOD                    LOAD
      C      UT         K12      2*NMNOD                    LOAD
      C
      C      ************************************************************
      C
      C      SUBARRAYS OF CCC
      C
      C
      C      CCC                    NSTIF
      C
```

```
114     C     ***************************************************************
115     C
116     C     SUBARRAYS OF III
117     C
118     C
119     C     NPEBE      J1         NMEBE                    DATA
120     C     NDELM      J2         NMELM                    DATA
121     C     NGELM      J3         NMELM                    DATA
122     C     MATSE      J4         NMELM                    DATA
123     C     NPELM      J5      12*NMELM                    DATA
124     C     NMLLR      J6         NMELM                    DATA
125     C     MATLR      J13        NMELM                    DATA
126     C     NMLHR      J7         NMELM                    DATA
127     C     MATHR      J14        NMELM                    DATA
128     C     NMLLP      J8         NMELM                    DATA
129     C     MATLP      J15        NMELM                    DATA
130     C     NMLHP      J9         NMELM                    DATA
131     C     MATHP      J16        NMELM                    DATA
132     C     ID         J17      2*NMNOD                    DATA
133     C     MAXA       J10      2*NMNOD+1                  SOLV
134     C     MHT        J11      2*NMNOD                    SOLV
135     C     NMP        J12        NCMAT+NSMAT              INIT
136     C     NBELM      J18        NMELM                    DATA
137     C     ***************************************************************
138     C
139           EXTERNAL F6MAIN
140           LOGICAL*1 REGION (8)
141           LOGICAL ERRFLG /.TRUE./
142           CALL PAR (REGION,LEN,8,&1000,&1000)
143           NBYTES = CNVRT (REGION,LEN,ERRFLG)
144     1000  IF (ERRFLG) NBYTES = 1000000
145           CALL GETCOR (F6MAIN,NBYTES)
146           STOP
147           END
148     C
149           SUBROUTINE  F6MAIN (A,NBYTES)
150     C
151     C     MAIN SEGMENT OF JULY 1982 UPDATE OF PROGRAM NORCO
152     C
153     C     ***************************************************************
154           IMPLICIT REAL*8(A-H,O-Z)
155           REAL*8 NMS
156           DIMENSION A(1)
157           COMMON /DIMCOM/ NMS(150),L1,L2,L3,L4,L5,MX,IP(155),ICM(10)
158           COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
159          *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
160          *            NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
161          *            INCBL,IEIGN,IBOND,ILINK
162           COMMON /DATA1/ CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI
163           COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
164           EQUIVALENCE (IDRUN,ITRAT)
165     C     ***************************************************************
166     C
167           CALL TIME(0,0)
168     C     READ PHASE CONTROL PARAMETERS
169           READ(IN,1000) ISTEP,IPRST,NI,KI,RX,TU,TP,CD,CL,CT,CPN,CPT,
170          *              CPD
171           IF(ISTEP) 100,300,400
```

```
      C
      C     ************************************************************
      C
      C                        PROBLEM PREPARATION PHASE
      C
      C     ************************************************************
      C     READ CONTROL PARAMETERS AND COMPUTE STORAGE REQUIREMENTS *
  100 CALL CNTROL
            WRITE(IO,2100)
            IF(IDRUN.EQ.2) GO TO 200
      C
      C     READ PROBLEM DATA  * * * * * * * * * * * * * * * * * * * *
            CALL DATA (A(ICM(6)),A(ICM(7)),A(ICM(8)))
            WRITE(IO,2200)
            CALL TIME(3,3)
      C
      C     FORMULATE ELEMENT SHAPE FUNCTIONS AND DERIVATIVES* * * * *
            CALL ELMFNC (A(ICM(6)),A(ICM(8)))
            WRITE(IO,2300)
            CALL TIME(3,3)
      C
      C     FORM COLUMN HEIGHTS AND ADDRESSING ARRAYS* * * * * * * * *
            CALL SOLV (1,A(ICM(6)),A(ICM(7)),A(ICM(9)),A(ICM(8)))
            ICM(5) = ICM(5) + 8*NSTIF
            WRITE (IO,2000) ICM(5)
            WRITE(IO,2400)
            CALL TIME(3,3)
            IF(IDRUN.EQ.1) GO TO 200
      C
      C     INITIALISE STRESSES AND MATERIAL PROPERTIES* * * * * * * *
            REWIND 1
            CALL INIT (A(ICM(6)),A(ICM(7)),A(ICM(8)))
            WRITE(IO,2500)
            CALL TIME(3,3)
      C
      C     FORM BASIC LOAD VECTOR * * * * * * * * * * * * * * * * *
            REWIND 1
            CALL LOAD (A(ICM(6)),A(ICM(7)),A(ICM(8)))
            WRITE(IO,2600)
            CALL TIME(3,3)
      C
      C     STORE VARIABLES, ARRAYS AND POINTERS ON FILES IST AND ILD
            CALL STORE (0,A(ICM(6)),A(ICM(7)),A(ICM(8)))
            WRITE(IO,2700)
            CALL TIME(3,3)
      C
  200 STOP
      C
      C     ************************************************************
      C
      C              STIFFNESS FORMATION AND TRIANGULARIZATION
      C
      C     ************************************************************
      C
      C
      C     RESTORE VARIABLES, ARRAYS AND POINTERS FROM FILES IST, ILD
  300 CALL RSTORE (0,A(1),A(1),A(1))
            CALL RSTORE (1,A(ICM(6)),A(ICM(7)),A(ICM(8)))
```

```
      IPRST = 0
      WRITE(IO,2800)
      CALL TIME(3,3)
C
C     FORM STRUCTURE STIFFNESS MATRIX  * * * * * * * * * * * * * *
      REWIND 1
      CALL STIF (INS,A(ICM(6)),A(ICM(9)),A(ICM(8)))
      WRITE(IO,2900)
      CALL TIME(3,3)
C
      IF(NI.LT.0) STOP
C
C     TRIANGULARIZE STRUCTURE STIFFNESS MATRIX * * * * * * * * * *
      CALL SOLV (2,A(ICM(6)),A(ICM(7)),A(ICM(9)),A(ICM(8)))
      WRITE(IO,3000)
      CALL TIME(3,3)
C
C     STORE TRIANGULARIZED STIFFNESS MATRIX ON FILE 8 * * * * * *
      REWIND 8
      CALL BLKSTR (A(ICM(9)),NSTIF,8)
      WRITE(IO,3100)
      CALL TIME(3,3)
C
      STOP
C
C     ****************************************************************
C
C                       SOLUTION AND OUTPUT PHASE
C
C     ****************************************************************
C
400   IXS = INS
C
C     RESTORE VARIABLES, ARRAYS AND POINTERS FROM FILE * * * * * *
      CALL RSTORE (0,A(1),A(1),A(1))
      CALL RSTORE (1,A(ICM(6)),A(ICM(7)),A(ICM(8)))
      IECHO=IPRST
      WRITE(IO,2800)
      CALL TIME(3,3)
C
C     UPDATE LOAD VECTOR AND INITIALIZE PSUEDO-LOAD VECTOR * * *
      CALL LOADUP (ISTEP,A(ICM(6)),A(ICM(7)),A(ICM(8)))
      WRITE(IO,3200)
      CALL TIME(3,3)
C
C     PRESTRESS STRUCTURE  * * * * * * * * * * * * * * * * * * * *
      IF(IPRST.EQ.0) GO TO 500
      IOS = 9
      REWIND 1
      CALL PRESTS (A(ICM(6)),A(ICM(7)),A(ICM(8)))
      INS = 9
      IOS = 3
      WRITE(IO,3300)
      CALL TIME(3,3)
C
C     FORM STURCTURE STIFFNESS MATRIX  * * * * * * * * * * * * * *
500   IF(KI.NE.0) GO TO 550
      KI = NITRT + 1
```

Listing of NORCO.BOND at 19:54:28 on APR 4, 1989 for CCid=DWM. on UALTAMTS

```
      REWIND 8
      CALL BLKRTV (A(ICM(9)),NSTIF,8)
      WRITE(IO,3400)
      IF(IMTYP.NE.0) WRITE(IO,3600)
      GO TO 700
550   IF(IMTYP.NE.0) WRITE(IO,3600)
600   REWIND 1
      CALL STIF (IXS,A(ICM(6)),A(ICM(9)),A(ICM(8)))
      CALL TIME(3,3)
C
C     TRIANGULARIZE STIFFNESS MATRIX * * * * * * * * * * * * * * *
      CALL SOLV(2,A(ICM(6)),A(ICM(7)),A(ICM(9)),A(ICM(8)))
      CALL TIME(3,3)
C
C     SOLVE FOR AND ACCUMULATE AN INCREMENT OF DISPLACEMENT  * *
700   CALL SOLV(3,A(ICM(6)),A(ICM(7)),A(ICM(9)),A(ICM(8)))
      CALL TIME(3,3)
C
C     UPDATE STRESSES AND MATERIAL PROPERTIES  * * * * * * * * *
      REWIND 1
      CALL STRESS (A(ICM(6)),A(ICM(7)),A(ICM(8)))
      CALL TIME(3,3)
C
C     CHECK IF PROBLEM IS LINEAR * * * * * * * * * * * * * * * * *
      IF(IMTYP.EQ.0) GO TO 800
C
C     FORM PSUEDO-LOAD VECTOR  * * * * * * * * * * * * * * * * * *
      REWIND 1
      CALL SUDOLD (A(ICM(6)),A(ICM(7)),A(ICM(8)))
      CALL TIME(3,3)
C
C     TEST CONVERGENCE * * * * * * * * * * * * * * * * * * * * * *
      CALL TCONVG (K,A(ICM(7)))
      CALL TIME(3,3)
      IF(K.EQ.0.OR.K.EQ.4) GO TO 800
      IF(K.EQ.2) GO TO 700
      IXS = IOS
      GO TO 600
C
C     PRINT OUT DISPLACEMENTS AND STRESSES * * * * * * * * * * * *
800   REWIND 1
      CALL TOUT (A(ICM(6)),A(ICM(7)),A(ICM(8)),K)
      WRITE(IO,3500)
      CALL TIME(3,3)
      IF(K.EQ.4) GO TO 900
C
C     STORE VARIABLES, ARRAYS AND POINTERS ON FILE * * * * * * * *
      CALL STORE (1,A(ICM(6)),A(ICM(7)),A(ICM(8)))
      WRITE(IO,2700)
      CALL TIME(3,3)
C
900   STOP
C
1000  FORMAT(4I4,9F6.0)
2000  FORMAT(///'DYNAMIC STORAGE SIZE IN BYTES =  ',I11)
2100  FORMAT(//'CONTROL PARAMETERS READ AND STORAGE ',
     *         'REQUIREMENTS COMPUTED')
2200  FORMAT(//'PROBLEM DATA READ AND GENERATED')
```

```
      2300  FORMAT(//'ELEMENT SHAPE FUNCTIONS AND DERIVATIVES ',
     *         'FORMULATED AND STORED ON FILE 1')
      2400  FORMAT(//'COLUMN HEIGHTS AND ADDRESSING ARRAY CALCULATED')
      2500  FORMAT(//'STRESSES AND MATERIAL PARAMETERS INITIALIZED')
      2600  FORMAT(//'BASIC LOAD VECTORS FORMED')
      2700  FORMAT(//'VARIABLES AND ARRAYS STORED ON FILES IST , ILD')
      2800  FORMAT(//'VARIABLES AND ARRAYS RETRIEVED FROM FILES IST ',
     *         'AND ILD')
      2900  FORMAT(//'STIFFNESS MATRIX FORMED')
      3000  FORMAT(//'STIFFNESS MATRIX TRIANGULARIZED')
      3100  FORMAT(//'TRIANGULARIZED STIFFNESS MATRIX STORED ON ',
     *         'FILE 8')
      3200  FORMAT(//'LOAD VECTOR UPDATED AND PSUEDO-LOAD VECTOR ',
     *         'INTIALIZED')
      3300  FORMAT(//'PRESTRESSING EQUIVALENT LOADS FORMULATED')
      3400  FORMAT(//'STIFFNESS MATRIX RETRIEVED FROM FILE 8')
      3500  FORMAT(//'OUTPUT FOR THIS LOAD STEP COMPLETED')
      3600  FORMAT(///,'ITRATE NO.      FNU',12X,'FNP',9X,'PT/UT')
C
      RETURN
      END
      BLOCK DATA
C
C     THIS SEGMENT INITIALISES SOME VARIABLES AND ARRAY ELEMETS
C     AS WELL AS TOLERANCE LIMITS.                              NORCO
C     ***********************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      REAL*8 NMS
      COMMON /DATA1/ CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
      COMMON /DIMCOM/NMS(5,30),L1,L2,L3,L4,L5,MX,IP(5,31),ICM(10)
      COMMON /POINTR/ LLL(84)
      COMMON /DATA2/ EPSY,EDBR
      COMMON /DATA3/ BSTR1,BSTR2
C
      DATA EPSY/0.00208/,EDBR/.06/
      DATA EP/1.D-3/,MI/50/
      DATA L1,L2,L3,L4,L5,MX/5*0,30/,IP(1,1),IP(2,1),IP(3,1),
     *     IP(4,1),IP(5,1)/5*1/,ICM/10*1/
      DATA IN/5/,IO/6/,INS/3/,IST/7/,IOS/3/,ILD/4/
      DATA LLL/84*0/,NMS/150*'  '/
      DATA BSTR1/4.84D2/,BSTR2/13.48D2/
      END
      SUBROUTINE CNTROL
C
C     THIS SEGMENT READS THE PROBLEM CONTROL VARIABLES. NORCO
C     ***********************************************************
      REAL*8 NMS
      COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
     *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
     *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
     *           INCBL,IEIGN,IBOND,ILINK
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
      COMMON /DIMCOM/ NMS(150),L1,L2,L3,L4,L5,MX,IP(155),ICM(10)
      DIMENSION HED(20)
C
      READ(IN,1000) HED
      WRITE(IO,2000) HED
```

```
      C
            READ(IN,1100) IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,ILNGP,
           *              IHOPP,ICNLD,ITEMP,IDSLD,ISTRS,IGRLD,NMNOD,
           *              NMELM,NMEBE,NCMAT,NSMAT,NMPAR,NITRT
            READ(IN,1100) INCBL,IEIGN,IBOND,ILINK
            WRITE(IO,2100) IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,ILNGP,
           *               IHOPP
            WRITE(IO,2150) ICNLD,ITEMP,IDSLD,IGRLD,ISTRS
            WRITE(IO,2200) NMNOD,NMELM,NMEBE,NCMAT,NSMAT,NMPAR,NITRT
            WRITE(IO,2250) INCBL,IEIGN,IBOND,ILINK
      C
      C     CALCULATE ARRAY SIZES
            ICM(1) = 2*NMNOD + 4*NMEBE + NMELM*(2+8*(ILNGR+IHOPR+ILNGP
           *                + IHOPP)+IBOND) + 18*(NCMAT+NSMAT)
            ICM(2) = NMEBE + NMELM*(15 + 2*(ILNGR+IHOPR+ILNGP+IHOPP)
           *   +IBOND*16)  + NCMAT + NSMAT + 6*NMNOD + 1
            IDL = 0
            ILL = ICNLD
            ISL = 0
            IHL = 0
            IF(IDSLD.EQ.1.OR.IDSLD.EQ.11) IHL = 1
            IF(IDSLD.GE.10) ISL = 1
            IF(IHL.EQ.1.OR.IGRLD.EQ.1.OR.ICNLD.EQ.1) IDL = 1
            ICM(3) = NMPAR*(NCMAT+NSMAT) + NMNOD*(10+6*ISL+4*ITEMP+IHL
           *                                      +4*(IDL+ILL))
            ICM(5) = 8*(ICM(1)+ICM(3)) + 4*(ICM(2) + 1)
            WRITE(IO,2300) (ICM(I),I=1,3)
            ICM(6) = 1
            ICM(7) = ICM(6) + ICM(1)
            ICM(8) = ICM(7) + ICM(3)
            ICM(9) = ICM(8) + (ICM(2) + 1)/2
            IF (IDRUN.NE.2) GO TO 100
            WRITE(IO,2400) ICM(5)
            IF (IDRUN.EQ.2) STOP
      C
      100   RETURN
      C
      C   FORMAT STATEMENTS
      C   ******************
      1000  FORMAT(20A4)
      1100  FORMAT(20I4)
      2000  FORMAT('1',20A4)
      2100  FORMAT(//,'PROBLEM CONTROL VARIABLES'/,25(1H*)//,
           *'ECHO CHECK FLAG                                    =',I5,
           *5X,'WHERE 1 = PRINT COMPLETE DATA ,'/,66X,'0 = SUPRESS'//,
           *'AXISYMMETRY FLAG                                   =',I5,
           *5X,'WHERE 1 = AXISYMMETRIC,'/,66X,'0 = 2 DIMENSIONAL'//,
           *'NONLINEAR LOADING FLAG                             =',I5,
           *5X,'WHERE 1 = NONLINEAR PROBLEM,'/,66X,'0 = LINEAR '//,
           *'DRY RUN FLAG                                       =',I5,
           *5X,'WHERE 2 = READ CONTROL PARAMETERS ONLY,'/,
           *66X,'1 = READ AND GENERATE DATA ONLY,'/,
           *66X,'0 = RUN PROBLEM PREPARATION PHASE,'//,
           *'(IN THE NEXT 5 FLAGS 1 = PRESENT , 0 = NOT PRESENT)'//,
           *'LONGITUDINAL REINFORCEMENT FLAG                    =',I5//,
           *'HOOP REINFORCEMENT FLAG                            =',I5//,
           *'LONGITUDINAL PRESTRESSING FLAG                     =',I5//,
           *'HOOP PRESTRESSING FLAG                             =',I5)
```

```
      2150  FORMAT(/
     *'CONCENTRATED LOADS FLAG                                    =',I5//,
     *'TEMPRATURE LOADS FLAG                                      =',I5,
     *5X,'WHERE 0 = NO THERMAL DISTRIBUTION PRESENT,'/,
     *66X,'1 = THERMAL DISTRIBUTION FOR PRESTRESSING,'/,
     *66X,'2 = THERMAL DISTRIBUTION AS A LOAD CASE,'//,
     *'DISTRIBUTED SURFACE LOADS FLAG                              =',I5,
     *5X,'WHERE 0 = NO DISTRIBUTED SURFACE LOADS,'/,
     *66X,'1 = HYDROSTATIC LOADS ONLY,'/,
     *65X,'10 = SURFACE TRACTIONS ONLY,'/,
     *65X,'11 = SURFACE TRACTIONS AND HYDROSTATIC LOADS,'//,
     *'GRAVITY LOAD FLAG                                          =',I5,
     *5X,'WHERE 0 = NO GRAVITY LOADS,'/,
     *66X,'1 = GRAVITY LOADS PRESENT,'//,
     *'INITIAL STRESSES FLAG                                      =',I5,
     *5X,'WHERE 0 = NO INITIAL STRESSES,'/,
     *66X,'1 = INITIAL STRESSES PRESENT,')
      2200  FORMAT(/
     *'NUMBER OF NODAL POINTS                                     =',I5//,
     *'NUMBER OF ELEMENTS                                         =',I5//,
     *'NUMBER OF EXTERNAL BOUNDARY ELEMENTS                       =',I5//,
     *'NUMBER OF SOLID ELEMENT MATERIAL TYPES                     =',I5//,
     *'NUMBER OF REINFORCING ELEMENT MATERIAL TYPES               =',I5//,
     *'MAXIMUM NUMBER OF MATERIAL PARAMETERS                      =',I5//,
     *'NUMBER OF ITERATIONS PER LOAD STEP                         =',I5)
      2250  FORMAT(/
     *'FLAG FOR INCOMPATIBLE ELEMENTS (0=NO 1=YES)                =',I5//,
     *'FLAG FOR EIGENVALUE ANALYSIS (0=NO 1=YES)                  =',I5//,
     *'FLAG FOR BOND ELEMENTS (0=NO 1=YES)                        =',I5//,
     *'FLAG FOR LINK ELEMENTS (0=NO 1=YES)                        =',I5)
      2300  FORMAT('1','MASTER ARRAY SIZES'/,18('*')//,
     *       'AAA =',I11/,'III =',I11/,'BBB =',I11)
C
      2400  FORMAT(///'DYNAMIC STORAGE SIZE IN BYTES =  ',I11)
            END
            SUBROUTINE DATA (AAA,BBB,III)
C
C     THIS SEGMENT CONTROLS DATA INPUT AND GENERATION.  NORCO
C     ******************************************************************
            IMPLICIT REAL*8(A-H,O-Z)
            COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
     *                      ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
     *                NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
     *                INCBL,IEIGN,IBOND,ILINK
            DIMENSION AAA(1),BBB(1),III(1)
            COMMON /POINTR/
     *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
     *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
     *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
     *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
     *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
     *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
C
C     READ MATERIAL PARAMETERS
            K1 = ISPAC(3HEMP,(NCMAT+NSMAT)*NMPAR,3)
            J12 = ISPAC(3HNMP,(NCMAT+NSMAT),2)
            CALL DATA21 (BBB(1),III(J12))
C
```

```
      C     READ AND GENERATE NODAL GEOMETRY, EXTERNAL BOUNDARY
      C     ELEMENTS AND SOLID ELEMENT DATA.
            I1 = ISPAC(5HXCORD,NMNOD,1)
            I2 = ISPAC(5HYCORD,NMNOD,1)
            I3 = ISPAC(5HXPEBE,NMEBE,1)
            I4 = ISPAC(5HYPEBE,NMEBE,1)
            I5 = ISPAC(5HPDEBE,NMEBE,1)
            I6 = ISPAC(5HSTEBE,NMEBE,1)
            I7 = ISPAC(5HORNSE,NMELM,1)
            I8 = ISPAC(5HTHKSE,NMELM,1)
            J1 = ISPAC(5HNPEBE,NMEBE,2)
            J2 = ISPAC(5HNDELM,NMELM,2)
            J3 = ISPAC(5HNGELM,NMELM,2)
            J4 = ISPAC(5HMATSE,NMELM,2)
            J5 = ISPAC(5HNPELM,NMELM*12,2)
            J17= ISPAC(2HID,2*NMNOD,2)
            CALL DATA22(AAA(I1),AAA(I2),AAA(I3),AAA(I4),AAA(I5),AAA(I6)
           *           ,AAA(I7),AAA(I8),III(J1),III(J2),III(J3),III(J4)
           *           ,III(J5),0,III(J17))
      C
      C     READ AND GENERATE LONGITUDINAL REINFORCEMENT ELEMENT DATA
            IF(ILNGR.EQ.0) GO TO 100
            J6 = ISPAC(5HNMLLR,NMELM,2)
            J13= ISPAC(5HMATLR,NMELM,2)
            I9 = ISPAC(5HARELR,4*NMELM,1)
            I10 = ISPAC(5HPOSLR,4*NMELM,1)
            CALL DATA23 (III(J6),III(J13),AAA(I9),AAA(I10),1,0)
      C
      C     READ AND GENERATE BOND ELEMENT DATA
            IF(IBOND.EQ.0) GO TO 100
            J18 = ISPAC(5HNBELM,NMELM*16,2)
            I19 = ISPAC(2HCB,NMELM,1)
            CALL DATA28 (III(J18),AAA(I19),0)
      C
      C     READ AND GENERATE HOOP REINFORCEMENT ELEMENT DATA
      100   IF(IHOPR.EQ.0) GO TO 200
            J7  = ISPAC(5HNMLHR,NMELM,2)
            J14 = ISPAC(5HMATHR,NMELM,2)
            I11 = ISPAC(5HAREHR,4*NMELM,1)
            I12 = ISPAC(5HPOSHR,4*NMELM,1)
            CALL DATA23 (III(J7),III(J14),AAA(I11),AAA(I12),2,0)
      C
      C     READ AND GENERATE LONGITUDINAL PRESTRESSING ELEMENT DATA
      200   IF(ILNGP.EQ.0) GO TO 300
            J8 = ISPAC(5HNMLLP,NMELM,2)
            J15 = ISPAC(5HMATLP,NMELM,2)
            I13 = ISPAC(5HARELP,4*NMELM,1)
            I14 = ISPAC(5HPOSLP,4*NMELM,1)
            CALL DATA23 (III(J8),III(J15),AAA(I13),AAA(I14),3,0)
      C
      C     READ AND GENERATE HOOP PRESTRESSING ELEMENT DATA
      300   IF(IHOPP.EQ.0) GO TO 400
            J9 = ISPAC(5HNMLHP,NMELM,2)
            J16 = ISPAC(5HMATHP,NMELM,2)
            I15 = ISPAC(5HAREHP,4*NMELM,1)
            I16 = ISPAC(5HPOSHP,4*NMELM,1)
            CALL DATA23 (III(J9),III(J16),AAA(I15),AAA(I16),4,0)
      C
```

```
      C     READ CONCENTRATED NODAL LOADS
400   IF(IGRLD+ICNLD.EQ.0.AND.(IDSLD.EQ.0.OR.IDSLD.EQ.10))
     *                                                    GO TO 500
      K2 = ISPAC(2HFD,2*NMNOD,3)
      IF(ICNLD.EQ.0) GO TO 500
      K3 = ISPAC(2HFL,2*NMNOD,3)
      CALL DATA24 (BBB(K2),BBB(K3),AAA(I1),III(J17))
C
C     READ AND GENERATE NODAL PRESSURE INTENSITIES
500   IF(IDSLD.LT.10) GO TO 600
      K4 = ISPAC(5HPNORM,NMNOD,3)
      K5 = ISPAC(5HPTANG,NMNOD,3)
      CALL DATA25 (BBB(K4),BBB(K5),0)
C
C     READ AND GENERATE NODAL TEMPRATURE VALUES
600   IF(ITEMP.EQ.0) GO TO 700
      K6 = ISPAC(5HTEMPV,NMNOD*ITEMP,3)
      CALL DATA26 (BBB(K6),0)
C
C     READ AND GENERATE NODAL HYDROSTATIC PRESSURE INTENSITIES.
700   IF(IDSLD.EQ.0.OR.IDSLD.EQ.10) GO TO 800
      K15 = ISPAC(5HPHYDR,NMNOD,3)
      CALL DATA27 (BBB(K15),AAA(I2),NMNOD,0)
C
C     PRINT THE COMPLETED DATA SET
800   IF(IECHO.EQ.0) GO TO 1500
      CALL DATA22(AAA(I1),AAA(I2),AAA(I3),AAA(I4),AAA(I5),AAA(I6)
     *           ,AAA(I7),AAA(I8),III(J1),III(J2),III(J3),III(J4)
     *           ,III(J5),1,III(J17))
      IF(ILNGR.EQ.0) GO TO 900
      CALL DATA23 (III(J6),III(J13),AAA(I9),AAA(I10),1,1)
      IF(IBOND.EQ.0) GO TO 900
      CALL DATA28 (III(J18),AAA(I19),1)
900   IF(IHOPR.EQ.0) GO TO 1000
      CALL DATA23 (III(J7),III(J14),AAA(I11),AAA(I12),2,1)
1000  IF(ILNGP.EQ.0) GO TO 1100
      CALL DATA23 (III(J8),III(J15),AAA(I13),AAA(I14),3,1)
1100  IF(IHOPP.EQ.0) GO TO 1200
      CALL DATA23 (III(J9),III(J16),AAA(I15),AAA(I16),4,1)
1200  IF(IDSLD.LT.10) GO TO 1300
      CALL DATA25 (BBB(K4),BBB(K5),1)
1300  IF(ITEMP.EQ.0) GO TO 1400
      CALL DATA26 (BBB(K6),1)
1400  IF(IDSLD.EQ.0.OR.IDSLD.EQ.10) GO TO 1500
      CALL DATA27 (BBB(K15),AAA(I2),NMNOD,2)
1500  RETURN
      END
      SUBROUTINE DATA21 (EMP,NMP)
C
C     THIS SEGMENT READS MATERIAL PARAMETERS FOR SOLID ELEMENTS,
C     REINFORCING ELEMENTS AND PRESTRESSING TENDONS.    NORCO
C     ***************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
     *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
     *             NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
     *             INCBL,IEIGN,IBOND,ILINK
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
```

```
      DIMENSION EMP(NMPAR,1),NMP(1)
C
      N2 = NCMAT + NSMAT
      CALL CLEAR (EMP(1,1),N2*NMPAR)
C
      DO 100 N=1,N2
      READ(IN,1000) I,NMP(I)
      NP = NMP(I)
      READ(IN,1100) (EMP(K,I),K=1,NP)
100   CONTINUE
C
       WRITE(IO,2000)
      DO 200 I = 1,NCMAT
      WRITE(IO,2100) I,(EMP(N,I),N=1,11)
      IF (IMTYP.EQ.0) GO TO 200
      WRITE(IO,2200) (EMP(N,I),N=12,NMPAR)
200   CONTINUE
      IF(NSMAT.EQ.0) GO TO 300
      N3 = NCMAT + 1
      WRITE(IO,2300) (I,(EMP(N,I),N=1,9,2),(EMP(N,I),N=2,10,2),
     *                EMP(11,I),I=N3,N2)
300   RETURN
C
C
C     FORMAT STATEMENTS
1000  FORMAT(2I4)
1100  FORMAT(10F8.0)
2000  FORMAT ('1','MATERIAL PARAMETERS'/,19('*')//)
2100  FORMAT ('SOLID ELEMENT MATERIAL TYPE',I5//,
     *'E1   = ',D10.4,5X,'E2   = ',D10.4,5X,'E3   = ',D10.4,5X,
     *'G12  = ',D10.4/,  'NU1  = ',D10.4,5X,'NU2  = ',D10.4,5X,
     *'NU3  = ',D10.4,5X,'TEC1 = ',D10.4,5X,'TEC2 = ',D10.4,5X,
     *'TEC3 = ',D10.4/,'GAMA = ',D10.4//)
2200  FORMAT ('NONLINEAR STRENGTH PARAMETERS'//
     *'FCU  = ',D10.4,5X,'AC   = ',D10.4,5X,'AT   = ',D10.4/,
     *'SI1  = ',D10.4,5X,'RO1  = ',D10.4,5X,'SI2  = ',D10.4,5X,
     *'RO2  = ',D10.4////,'STRAIN PARAMETERS'//,
     *'ECU  = ',D10.4,5X,'AC   = ',D10.4,5X,'AT   = ',D10.4/,
     *'SI1  = ',D10.4,5X,'RO1  = ',D10.4,5X,'SI2  = ',D10.4,5X,
     *'RO2  = ',D10.4///)
2300  FORMAT ('REINFORCING OR PRESTRESSING MATERIAL TYPE',I5//,
     *'STRESS ',5D15.4/,'STRAIN ',5D15.4/,'TEC  = ',D10.4//)
C
      END
      SUBROUTINE DATA22    (XCORD,YCORD,XPEBE,YPEBE,PDEBE,STEBE,
     *                      ORNSE,THKSE,NPEBE,NDELM,NGELM,MATSE,
     *                      NPELM,NECHO,ID)
C
C     THIS SEGMENT READS AND GENERATES THE STRUCTURE DESCRIPTION
C     DATA.                                                  NORCO
C     ******************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
     *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
     *            NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
     *            INCBL,IEIGN,IBOND,ILINK
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
      DIMENSION XCORD(1),YCORD(1),XPEBE(1),YPEBE(1),PDEBE(1),
```

```
     *          STEBE(1),ORNSE(1),NPEBE(1),NDELM(1),NGELM(1),
     *  THKSE(1),MATSE(1),NPELM(12,1),MINC(12),ID(2,NMNOD)
      IF(NECHO.EQ.1) GO TO 800
C
C     READ NODAL GEOMETRY
      NERROR = 1
      WRITE(IO,2000)
      WRITE(IO,2100)
50    READ(IN,1300) NCARDS,ISPHER
      IF(NCARDS.EQ.0) GO TO 255
      IF(ISPHER.EQ.1) READ(IN,1100) X1,Y1
      DO 250 I=1,NCARDS
      READ (IN,1000) N,(ID(J,N),J=1,2),XCORD(N),YCORD(N),INC
      WRITE(IO,2200) N,(ID(J,N),J=1,2),XCORD(N),YCORD(N),INC
      IF(INC.EQ.0) GO TO 150
      NINT = (N-NOLD)/INC
      RN   = DABS(DFLOAT(NINT))
      IF(RN.LT.DFLOAT(N-NOLD)/DFLOAT(INC)-1.D-3) GO TO 999
      DX = (XCORD(N) - RAD)/RN
      DY = (YCORD(N) - THE)/RN
      L  = N
      M  = NINT - 1
      DO 100 J=1,M
      LL         = L - INC
      XCORD(LL) = XCORD(L) - DX
      YCORD(LL) = YCORD(L) - DY
      DO 90 K=1,2
      ID(K,LL)=ID(K,L)
 90   CONTINUE
100   L          = LL
150   RAD = XCORD(N)
      THE = YCORD(N)
      IF(ISPHER.EQ.0) GO TO 250
      IF(INC.EQ.0) NINT = 1
      L = N + INC
      DO 200 J=1,NINT
      LL = L -INC
      TH = YCORD(LL)*3.141592654D0/1.8D2
      X  = XCORD(LL)*DSIN(TH) + X1
      Y  = XCORD(LL)*DCOS(TH) + Y1
      XCORD(LL) = X
      YCORD(LL) = Y
200   L          = LL
250   NOLD       = N
      GO TO 50
C
255   NEQ=0
      DO 280 N=1,NMNOD
      DO 280 M=1,2
      IF(ID(M,N)) 270,260,270
260   NEQ=NEQ+1
      ID(M,N)=NEQ
      GO TO 280
270   ID(M,N)=0
280   CONTINUE
C
C
C     READ AND GENERATE EXTERNAL BOUNDARY ELEMENT DATA
```

```
  300   WRITE(IO,2300)
        WRITE(IO,2400)
        NERROR = 2
        READ(IN,1300) NCARDS
        IF(NCARDS.EQ.0) GO TO 500
        DO 400 J=1,NCARDS
        READ (IN,1200) N,NPEBE(N),INC,XPEBE(N),YPEBE(N),PDEBE(N),
       *                STEBE(N)
        IF(STEBE(N).EQ.0.D0) STEBE(N) = 1.D20
        WRITE(IO,2500) N,NPEBE(N),INC,XPEBE(N),YPEBE(N),PDEBE(N),
       *                STEBE(N)
        IF(INC.EQ.0) GO TO 400
        N1 = N - 1
        NO = NOLD + 1
        L  = NPEBE(NOLD)
        DO 350 I=NO,N1
        NPEBE(I) = L + INC
        XPEBE(I) = XPEBE(N)
        YPEBE(I) = YPEBE(N)
        PDEBE(I) = PDEBE(N)
        STEBE(I) = STEBE(N)
  350   L        = NPEBE(I)
        IF(L.NE.(NPEBE(N)-INC)) GO TO 999
  400   NOLD = N
  C
  C     MODIFY BOUNDARY CONDITIONS FOR AXISYMMETRIC PROBLEMS
        IF(ISTYP.EQ.0) GO TO 500
        DO 450 M=1,NMEBE
        N = NPEBE(M)
  450   STEBE(M) = STEBE(M)*(XCORD(N) + 1.D0)
  C
  C     READ AND GENERATE SOLID ELEMENT DATA
  500   WRITE(IO,2600)
        WRITE(IO,2700)
        NERROR = 3
        READ (IN,1300) NCARDS
        DO 700 J=1,NCARDS
        READ(IN,1300)  N,NDELM(N),NGELM(N),THKSE(N),MATSE(N),INC,
       *               (NPELM(I,N),I=1,12),ORNSE(N)
        WRITE(IO,2800) N,NDELM(N),NGELM(N),THKSE(N),MATSE(N),INC,
       *               (NPELM(I,N),I=1,12),ORNSE(N)
        IF(THKSE(N).LT.1.0E-6) THKSE(N) = 1.0
        IF(INC.EQ.0) GO TO 700
        NINC = (N-NOLD)/INC
        DO 550 I=1,12
  550   MINC(I) = (NPELM(I,N) - NPELM(I,NOLD))/NINC
        NINC = NINC - 1
        L    = NOLD
        DO 650 I=1,NINC
        LL         = L + INC
        NDELM(LL) = NDELM(N)
        NGELM(LL) = NGELM(N)
        THKSE(LL) = THKSE(N)
        MATSE(LL) = MATSE(N)
        ORNSE(LL) = ORNSE(N)
        DO 600 K=1,12
  600   NPELM(K,LL) = NPELM(K,L) + MINC(K)
  650   L    = LL
```

```
  700   NOLD = N
C
      RETURN
C
C     PRINTOUT COMPLETED DATA
800   INC = 0
      WRITE(IO,2900)
      WRITE(IO,2150)
      WRITE(IO,2200) (N,(ID(J,N),J=1,2),XCORD(N),YCORD(N),INC,N=1,
     *NMNOD)
      WRITE(IO,3000)
      WRITE(IO,2400)
      WRITE(IO,2500) (N,NPEBE(N),INC,XPEBE(N),YPEBE(N),PDEBE(N),
     *                STEBE(N),N=1,NMEBE)
      WRITE(IO,3100)
      WRITE(IO,2700)
      WRITE(IO,2800) (N,NDELM(N),NGELM(N),THKSE(N),MATSE(N),INC,
     *                (NPELM(I,N),I=1,12),ORNSE(N),N=1,NMELM)
C
      RETURN
C
999   WRITE(IO,1999) NERROR,N,NOLD,INC
      STOP
C
C     FORMAT STATEMENTS
1000  FORMAT(3I4,2F12.0,I4)
1100  FORMAT(2F12.0)
1200  FORMAT(3I4,4F12.0)
1300  FORMAT(3I4,F6.0,14I4,F6.0)
1999  FORMAT(//'PROGRAM DATA22 HAS DETECTED DATA ERROR',4I5)
2000  FORMAT('1','NODAL GEOMETRY AS INPUT'/,23(1H*)//)
2100  FORMAT(4X,'N',4X,'FIXED 1 OR FREE 0 ', 5X,
     *'XCORD',10X,'YCORD',7X,'INC'//)
2150  FORMAT(4X,'N',4X,'D O F',5X,'XCORD',10X,'YCORD',7X,'INC'//)
2200  FORMAT(3I5,2D15.6,I5)
2300  FORMAT(////,'BOUDARY ELEMENTS AS INPUT'/,26(1H*)//)
2400  FORMAT('NO.BE NODE  INC',4X,'X.PROJ.',8X,'Y.PROJ.',8X,
     *       'PRS.DSP.',7X,'STIFF.'//)
2500  FORMAT(3I5,4D15.6)
2600  FORMAT(////,'SOLID ELEMENT DATA AS INPUT'/,27(1H*)//)
2700  FORMAT('NO.SE.   DEG GAUSS  ELM.THICK. NO.MAT  INC   NP1',
     *       '   NP2   NP3   NP4   NP5   NP6   NP7   NP8   NP9',
     *       '  NP10  NP11  NP12 M.AXES ORN.'//)
2800  FORMAT(3I6,F12.4,14I6,F12.4)
2900  FORMAT('1','COMPLETE NODAL GEOMETRY'/,23(1H*)//)
3000  FORMAT('1','COMPLETE BOUNDARY ELEMENTS'/,26(1H*)//)
3100  FORMAT('1','COMPLETE SOLID ELEMENT DATA'/,27(1H*)//)
C
      END
      SUBROUTINE DATA23    (NMLYR,MATRE,AREA,POSN,J,NECHO)
C
C     THIS SEGMENT READS THE REINFORCING AND/OR PRESTRESSING
C     ELEMENT DATA.                                          NORCO
C     ******************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
     *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
     *            NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
```

```
      *             INCBL,IEIGN,IBOND,ILINK
       COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
       DIMENSION NMLYR(1),AREA(4,1),POSN(4,1),MATRE(1)
C
       IF(NECHO.EQ.1) GO TO 500
C
       CALL ICLEAR(NMLYR(1),2*NMELM)
       CALL  CLEAR(AREA(1,1),4*NMELM)
       CALL  CLEAR(POSN(1,1),4*NMELM)
C
       IF(J.EQ.1) WRITE(IO,2000)
       IF(J.EQ.2) WRITE(IO,2100)
       IF(J.EQ.3) WRITE(IO,2200)
       IF(J.EQ.4) WRITE(IO,2300)
       WRITE(IO,2400)
       READ (IN,1000) NCARDS
C
       DO 400 M=1,NCARDS
       READ(IN,1000) N,NMLYR(N),MATRE(N),INC,
      *              (AREA(I,N),POSN(I,N),I=1,4)
       IF(INC.EQ.0) GO TO300
       NINC = (N-NOLD)/INC - 1
       L    = NOLD
       DO 200 K =1,NINC
       LL    = L + INC
       NMLYR(LL) = NMLYR(N)
       MATRE(LL) = MATRE(N)
       DO 100 I=1,4
       AREA(I,LL)= AREA(I,N)
100    POSN(I,LL)= POSN(I,N)
200    L         = LL
300    WRITE(IO,2900) N,NMLYR(N),MATRE(N),INC,
      *               (AREA(I,N),POSN(I,N),I=1,4)
400    NOLD = N
C
       RETURN
C
500    INC = 0
       IF(J.EQ.1) WRITE(IO,2500)
       IF(J.EQ.2) WRITE(IO,2600)
       IF(J.EQ.3) WRITE(IO,2700)
       IF(J.EQ.4) WRITE(IO,2800)
       WRITE(IO,2400)
       WRITE(IO,2900)(N,NMLYR(N),MATRE(N),INC,
      *               (AREA(I,N),POSN(I,N),I=1,4),N=1,NMELM)
C
       RETURN
C
C   FORMAT STATEMENTS*********************************************
1000   FORMAT(4I4,8F8.0)
2000   FORMAT(//'LONGITUDINAL REINFORCEMENT AS INPUT'//)
2100   FORMAT(//'HOOP REINFORCEMENT AS INPUT'//)
2200   FORMAT(//'PRESTRESSING LONGITUDINAL TENDONS AS INPUT'//)
2300   FORMAT(//'PRESTRESSING HOOP TENDONS AS INPUT'//)
2400   FORMAT('      N   NML   NMT    INC',10X,'A1',8X,'POS.',10X,
      *'A2',8X,'POS.',10X,'A3',8X,'POS.',10X,'A4',8X,'POS.'//)
2500   FORMAT('1','COMPLETE LONG. REINF. DATA'//)
2600   FORMAT('1','COMPLETE HOOP REINF. DATA'//)
```

```
 2700  FORMAT('1','COMPLETE LONG. PRESTRESSING TENDON DATA'//)
 2800  FORMAT('1','COMPLETE HOOP PRESTRESSING TENDON DATA'//)
 2900  FORMAT(4I6,8D12.4)
C
       END
       SUBROUTINE DATA24 (FD,FL,XCORD,ID)
C
C      THIS SEGMENT READS CONCENTRATED NODAL LOADS.       NORCO
C      ************************************************************
       IMPLICIT REAL*8(A-H,O-Z)
       COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
      *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
      *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
      *            INCBL,IEIGN,IBOND,ILINK
       COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
       DIMENSION FD(1),FL(1),XCORD(1),ID(2,NMNOD)
C
       CALL CLEAR (FD(1),2*NMNOD)
       CALL CLEAR (FL(1),2*NMNOD)
       READ (IN,1000) NCARDS
       IF(NCARDS.EQ.0) GO TO 200
       WRITE(IO,2000)
C
       DO 100 I=1,NCARDS
       READ(IN,1000) N,FDX,FDY,FLX,FLY
       WRITE(IO,2100) N,FDX,FDY,FLX,FLY
       N2 = ID(2,N)
       N1 = ID(1,N)
       XN = 1.D0 + DFLOAT(ISTYP)*(XCORD(N)-1.D0)
       FD(N1) = FDX*XN
       FD(N2) = FDY*XN
       FL(N1) = FLX*XN
       FL(N2) = FLY*XN
 100   CONTINUE
C
 200   RETURN
C
C      FORMAT STATEMENTS
 1000  FORMAT(I4,4F12.0)
 2000  FORMAT('1','LOADS',/4('*')//,'CONCENTRATED NODAL LOADS'/,
     *       24('*')//,4X,'N   X-DEAD L.      Y-DEAD L.',
     *       '      X-LIVE L.      Y-LIVE L.'//)
 2100  FORMAT(I5,4D15.6)
C
       END
       SUBROUTINE DATA25 (PNORM,PTANG,NECHO)
C
C      THIS SEGMENT READS AND GENERATES NORMAL AND TANGENTIAL
C      NODAL PRESSURE INTENSITIES.                        NORCO
C      ************************************************************
       IMPLICIT REAL*8(A-H,O-Z)
       COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
      *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
      *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
      *            INCBL,IEIGN,IBOND,ILINK
       COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
       DIMENSION PNORM(1),PTANG(1)
       IF(NECHO.EQ.1) GO TO 300
```

```
 982            CALL CLEAR (PNORM(1),NMNOD)
 983            CALL CLEAR (PTANG(1),NMNOD)
 984            READ(IN,1000) NCARDS
 985            WRITE(IO,2000)
 986            WRITE(IO,2100)
 987            DO 200 I=1,NCARDS
 988            READ(IN,1000) N,INC,PNORM(N),PTANG(N)
 989            WRITE(IO,2200)N,INC,PNORM(N),PTANG(N)
 990            IF(INC.EQ.0) GO TO 200
 991            NINT = (N-NOLD)/INC
 992            RN = DFLOAT(NINT)
 993            IF(RN.LT.DFLOAT(N-NOLD)/DFLOAT(INC)-1.D-3) GO TO 998
 994            DNORM = (PNORM(N) - PNORM(NOLD))/RN
 995            DTANG = (PTANG(N) - PTANG(NOLD))/RN
 996            M = NINT - 1
 997            L = NOLD
 998            DO 100 J=1,M
 999            LL = L + INC
1000            PNORM(LL) = PNORM(L) + DNORM
1001            PTANG(LL) = PTANG(L) + DTANG
1002     100    L = LL
1003     200    NOLD = N
1004            RETURN
1005     C
1006     300    INC = 0
1007            WRITE(IO,2300)
1008            WRITE(IO,2100)
1009            WRITE(IO,2200) (N,INC,PNORM(N),PTANG(N),N=1,NMNOD)
1010            RETURN
1011     C
1012     998    WRITE(IO,999) N,INC,NOLD
1013     999    FORMAT('PROG. DATA25 HAS DETECTED PRESSURE DATA ERROR',3I5)
1014            STOP
1015     C
1016     C      FORMAT STATEMENTS
1017     1000   FORMAT(2I4,2F12.0)
1018     2000   FORMAT(//'NODAL PRESSURE INTENSITY INPUT',/30('*')//)
1019     2100   FORMAT(4X,'N  INC   NORM.P.I.      TANG.P.I.'//)
1020     2200   FORMAT(2I5,2D15.6)
1021     2300   FORMAT('1','COMPLETE NODAL PRESSURE INTENSITY DATA',
1022           *       /38('*')//)
1023            END
1024            SUBROUTINE DATA26 (TEMPV,NECHO)
1025     C
1026     C      THIS SEGMENT READS AND GENERATES NODAL TEMPRATURE VALUES.
1027     C                                                          NORCO
1028     C      ************************************************************
1029            IMPLICIT REAL*8(A-H,O-Z)
1030            COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
1031           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
1032           *            NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
1033           *            INCBL,IEIGN,IBOND,ILINK
1034            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
1035            DIMENSION TEMPV(NMNOD,1)
1036            IF(NECHO.EQ.1) GO TO 400
1037            CALL CLEAR (TEMPV(1,1),NMNOD*ITEMP)
1038            DO 300 LT=1,ITEMP
1039            READ(IN,1000) NCARDS
```

```
1040            IF(NCARDS.EQ.0) GO TO 300
1041            WRITE(IO,2000) LT
1042            WRITE(IO,2100)
1043            DO 200 I=1,NCARDS
1044            READ(IN,1000) N,INC,TEMPV(N,LT)
1045            WRITE(IO,2200)N,INC,TEMPV(N,LT)
1046            IF(INC.EQ.0) GO TO 200
1047            NINT = (N-NOLD)/INC
1048            RN = DFLOAT(NINT)
1049            IF(RN.LT.DFLOAT(N-NOLD)/DFLOAT(INC)-1.D-3) GO TO 998
1050            DTEMP = (TEMPV(N,LT)-TEMPV(NOLD,LT))/RN
1051            M = NINT - 1
1052            L = NOLD
1053            DO 100 J=1,M
1054            LL = L + INC
1055            TEMPV(LL,LT) = TEMPV(L,LT) + DTEMP
1056      100   L = LL
1057      200   NOLD = N
1058      300   CONTINUE
1059            RETURN
1060      400   WRITE(IO,2300)
1061            WRITE(IO,2400)
1062            DO 500 N=1,NMNOD
1063      500   WRITE(IO,2500) N,(TEMPV(N,LT),LT=1,ITEMP)
1064            RETURN
1065      C
1066      998   WRITE(IO,999)N,INC,NOLD
1067      999   FORMAT('PROG.DATA26 HAS DETECTED TEMP.DATA ERROR' ,3I5)
1068            STOP
1069      C
1070      C     FORMAT STATEMENTS
1071      1000  FORMAT(2I4,F12.0)
1072      2000  FORMAT(//'NODAL TEMPRATURE VALUES INPUT',I5/,29('*')//)
1073      2100  FORMAT(4X,'N  INC    TEMP.V.'//)
1074      2200  FORMAT(2I5,D15.6)
1075      2300  FORMAT('1','COMPLETE NODAL TEMPRATURE DATA'/,30('*')//)
1076      2400  FORMAT('    N    PRST.V.     TEMP.V.'//)
1077      2500  FORMAT(I5,2D15.6)
1078            END
1079            SUBROUTINE DATA27 (PHYDR,YCORD,NMNOD,NECHO)
1080      C
1081      C     THIS SEGMENT ASSIGNS HYDROSTATIC PRESSURE INTENSITIES TO
1082      C     SURFACE NODES.                                          NORCO
1083      C     ********************************************************
1084            IMPLICIT REAL*8(A-H,O-Z)
1085            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
1086            DIMENSION PHYDR(1),YCORD(1)
1087      C
1088            IF(NECHO.NE.0) GO TO 300
1089            CALL CLEAR (PHYDR(1),NMNOD)
1090            READ(IN,1000) NCARDS,HO,SWLIQ
1091            WRITE(IO,2000)
1092            WRITE(IO,2100)
1093      C
1094            DO 200 I=1,NCARDS
1095            READ(IN,1100) N,INC
1096            PHYDR(N) = (HO-YCORD(N))*SWLIQ
1097            WRITE(IO,2200) N,INC,PHYDR(N)
```

```
1098            IF(INC.EQ.0) GO TO 200
1099            NINT = (N-NOLD)/INC
1100            RN = DFLOAT(NINT)
1101            IF(RN.LT.DFLOAT(N-NOLD)/DFLOAT(INC)-1.D-3) GO TO 998
1102            DPHYDR = (PHYDR(N) - PHYDR(NOLD))/RN
1103            M = NINT - 1
1104            L = NOLD
1105            DO 100 J=1,M
1106            LL = L + INC
1107            PHYDR(LL) = PHYDR(L) + DPHYDR
1108      100   L = LL
1109      200   NOLD = N
1110            RETURN
1111      C
1112      300   INC = 0
1113            WRITE(IO,2300)
1114            WRITE(IO,2100)
1115            WRITE(IO,2200) (N,INC,PHYDR(N),N=1,NMNOD)
1116            RETURN
1117      C
1118      998   WRITE(IO,999) N,NOLD,INC
1119      999   FORMAT('PROGRAM DATA27 HAS DETECTED HYDROSTATIC PRESSURE',
1120           *       ' DATA ERROR',3I5)
1121            STOP
1122      C
1123      C     FORMAT STATAMENTS
1124      1000  FORMAT(I4,2F12.0)
1125      1100  FORMAT(2I4,F12.0)
1126      2000  FORMAT(//'HYDROSTATIC NODAL PRESSURE INPUT'/,32('*')//)
1127      2100  FORMAT('     N  INC    HYD.PRES.V.'//)
1128      2200  FORMAT(2I5,D15.6)
1129      2300  FORMAT('1','COMPLETE HYDROSTATIC PRES. DATA'/,31('*')//)
1130      C
1131            END
1132            SUBROUTINE DATA28 (NBELM,CB,NECHO)
1133      C
1134      C     THIS SEGMENT READS AND GENERATES BOND ELEMENT DATA
1135      C     ******************************************************
1136            IMPLICIT REAL*8(A-H,O-Z)
1137            COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
1138           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
1139           *            NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
1140           *            INCBL,IEIGN,IBOND,ILINK
1141            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
1142            DIMENSION NBELM(16,1),CB(1),MINC(16)
1143      C
1144            IF(NECHO.EQ.1) GO TO 900
1145      C
1146            CALL ICLEAR(NBELM(1,1),16*NMELM)
1147            CALL  CLEAR(CB(1),NMELM)
1148            WRITE(IO,3200)
1149            WRITE(IO,3300)
1150            READ(IN,1300) NCARDS
1151            DO 700 J=1,NCARDS
1152            READ(IN,1300) N,INC,CB(N),(NBELM(I,N),I=1,16)
1153            WRITE(IO,1400) N,INC,CB(N),(NBELM(I,N),I=1,16)
1154            IF(INC.EQ.0) GO TO 700
1155            NINC = (N-NOLD)/INC
```

```
      DO 550 I=1,16
550   MINC(I) = (NBELM(I,N) - NBELM(I,NOLD))/NINC
      NINC = NINC - 1
      L    = NOLD
      DO 650 I=1,NINC
      LL         = L + INC
      CB(LL) = CB(N)
      DO 600 K=1,16
600   NBELM(K,LL) = NBELM(K,L) + MINC(K)
650   L    = LL
700   NOLD = N
      RETURN
C
900   INC = 0
      WRITE(IO,3250)
      WRITE(IO,3300)
      WRITE(IO,1400) (N,INC,CB(N),(NBELM(I,N),I=1,16),
     *    N=1,NMELM)
C
      RETURN
C
1300  FORMAT(2I4,F8.0,16I4)
1400  FORMAT(2I6,F12.4,16I6)
3200  FORMAT(////,'BOND NODES AS INPUT'/,27(1H*)//)
3250  FORMAT('1','COMPLETE BOND ELEMENT DATA'/,27(1H*)//)
3300  FORMAT('NO.SE  INC    BOND STIFF    NB1    NB2    NB3    ',
     *   'NB4  NB5    NB6    NB7    NB8    NB9    NB10  NB11  ',
     *   'NB12  NB13  NB14  NB15  NB16 '//)
C
      END
      SUBROUTINE    ELMFNC (AAA,III)
C
C     THIS SEGMENT CONTROLS EVALUATION OF SHAPE FUNCTIONS AND
C     DERIVATIVES FOR DIFFERENT TYPES OF ELEMENTS.      NORCO
C     ***************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
     *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
     *            NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
     *            INCBL,IEIGN,IBOND,ILINK
      DIMENSION AAA(1),III(1),XEL(16),YEL(16),NEL(12)
      COMMON /POINTR/
     *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
     *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
     *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
     *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
     *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
     *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
C
      REWIND 1
      DO 1000 ME = 1,NMELM
      CALL ELMDT4 (ME,THK,NS,NGL,NG,III(J2),III(J3),AAA(I8),
     *III(J5),NDEG)
      CALL ELMDT1 (ME,NS,XEL(1),YEL(1),III(J5),AAA(I1),AAA(I2),NEL,
     *NDEG)
      ME1 = ME - 1
C
C     FORM AND STORE SHAPE FUNCTIONS AND DERIVATIVES FOR SOLID
```

```
1214      C     ELEMENT
1215            CALL ELMSE (ME,NS,NGL,NG,THK,ISTYP,XEL(1),YEL(1),NEL,NDEG,
1216           *   INCBL)
1217      C
1218      C     FORM AND STORE SHAPE FUNCTIONS AND DERIVATIVES FOR LONGIT
1219      C     UDINAL REINFORCING ELEMENT.
1220      200   IF(ILNGR.EQ.0) GO TO 400
1221            NL = III(J6+ME1)
1222            IF(NL.EQ.0) GO TO 400
1223            CALL ELMLE (ME,NL,NS,NG,THK,XEL(1),YEL(1),AAA(I9),
1224           *            AAA(I10),NEL,NDEG)
1225      C
1226      C     FORM AND STORE SHAPE FUNCTIONS AND DERIVATIVES FOR HOOP
1227      C     REINFORCING ELEMENT.
1228      400   IF(IHOPR.EQ.0) GO TO 600
1229            NL = III(J7+ME1)
1230            IF(NL.EQ.0) GO TO 600
1231            CALL ELMHE (ME,NL,NS,NG,XEL(1),YEL(1),AAA(I11),AAA(I12),
1232           *NEL,NDEG,INCBL)
1233      C     FORM AND STORE SHAPE FUNCTIONS AND DERIVATIVES FOR LONGIT
1234      C     UDINAL PRESTRESSING ELEMENT.
1235      600   IF(ILNGP.EQ.0) GO TO 800
1236            NL = III(J8+ME1)
1237            IF(NL.EQ.0) GO TO 800
1238            CALL ELMLE (ME,NL,NS,NG,THK,XEL(1),YEL(1),AAA(I13),
1239           *            AAA(I14),NEL,NDEG)
1240      C
1241      C     FORM AND STORE SHAPE FUNCTIONS AND DERIVATIVES FOR HOOP
1242      C     PRESTRESSING ELEMENT.
1243      800   IF(IHOPP.EQ.0) GO TO 1000
1244            NL = III(J9+ME1)
1245            IF(NL.EQ.0) GO TO 1000
1246            CALL ELMHE (ME,NL,NS,NG,XEL(1),YEL(1),AAA(I15),AAA(I16),
1247           *NEL,NDEG,INCBL)
1248      1000  CONTINUE
1249      C
1250            RETURN
1251      C
1252            END
1253            SUBROUTINE ELMHE (ME,NL,NS,NG,XEL,YEL,AREHE,POSHE,NEL,NDEG,
1254           *        INCBL)
1255      C
1256      C     THIS SEGMENT FORMS AND STORES SHAPE FUNCTIONS AND DERIVAT
1257      C     IVES FOR HOOP REINFORCING(PRESTRESSING) ELEMENT.  NORCO
1258      C     ************************************************************
1259            IMPLICIT REAL*8(A-H,O-Z)
1260            INTEGER*2 LEN/384/
1261            DIMENSION XEL(1),YEL(1),AREHE(4,1),POSHE(4,1),PHIY(16),
1262           *  NEL(1),G(48),XGAUS(3,3),WGAUS(3,3),PHI(16),PHIX(16)
1263            EQUIVALENCE (PHI(1),G(1)),(PHIX(1),G(17)),(PHIY(1),G(33))
1264            DATA XGAUS/3*0.D0,-5.7735026919D-1,5.7735026919D-1,0.D0,
1265           *           -7.7459666924D-1,0.D0,7.7459666924D-1/,
1266           *     WGAUS/2.D0,2*0.D0,2*1.D0,0.D0,5.5555555556D-1,
1267           *           8.8888888889D-1,5.5555555556D-1/
1268      C
1269      C   LOOP OVER THE ELEMENT HOOPS
1270            DO 500 MHP=1,NL
1271            AB = AREHE(MHP,ME)
```

```
1272            WRITE(1) AB
1273            IF(AB.LT.1.D-10) GO TO 500
1274            XI = POSHE(MHP,ME)
1275      C
1276      C     LOOP OVER GAUSS POINTS
1277            DO 400 JG=1,NG
1278            ZI = XGAUS(JG,NG)
1279            WG = WGAUS(JG,NG)
1280            IF(MHP.GT.2) GO TO 100
1281            CALL SHAPE2(XI,ZI,NEL,NDEG,PHI(1),PHIX(1),PHIY(1),INCBL)
1282            GO TO 200
1283      100   CALL SHAPE2(ZI,XI,NEL,NDEG,PHI(1),PHIX(1),PHIY(1),INCBL)
1284      200   T11 = 0.D0
1285            T12 = 0.D0
1286            T21 = 0.D0
1287            T22 = 0.D0
1288            XG  = 0.D0
1289            YG  = 0.D0
1290            DO 300 I=1,NS
1291            T11 = T11 + PHIX(I)*XEL(I)
1292            T12 = T12 + PHIX(I)*YEL(I)
1293            T21 = T21 + PHIY(I)*XEL(I)
1294            T22 = T22 + PHIY(I)*YEL(I)
1295            XG  = XG  + PHI(I)*XEL(I)
1296      300   YG  = YG  + PHI(I)*YEL(I)
1297            GACOB = DSQRT(T21**2+T22**2)
1298            IF(MHP.GT.2) GACOB = DSQRT(T11**2+T12**2)
1299            W = GACOB*WG*AB
1300            WRITE(1) XG,YG,XEL(1),YEL(1),W
1301      400   CALL WRITE(G(1),LEN,0,LNUM,1)
1302      500   CONTINUE
1303            RETURN
1304            END
1305            SUBROUTINE ELMLE(ME,NL,NS,NG,THK,XEL,YEL,ARELE,POSLE,
1306           *NEL,NDEG)
1307      C     THIS SEGMENT FORMS AND STORES SHAPE FUNCTIONS AND DERIVAT
1308      C     IVES FOR LONGITUDINAL REINFORCING(PRESTRESSING) ELEMENT.
1309      C                                                          NORCO
1310      C     ************************************************************
1311            IMPLICIT REAL*8(A-H,O-Z)
1312            INTEGER*2 LEN/704/
1313            COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
1314           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
1315           *             NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
1316           *             INCBL,IEIGN,IBOND,ILINK
1317            DIMENSION XEL(1),YEL(1),ARELE(4,1),POSLE(4,1),PHIY(16),
1318           *NEL(1),SG(72),Q(88),XGAUS(3,3),WGAUS(3,3),PHI(16),PHIX(16)
1319           *,BPHI(4),BPHX(4),BPHY(4),BPXX(4),BPYY(4),PHXX(16),PHYY(16)
1320            EQUIVALENCE (PHI(1),Q(1)),(SG(1),Q(17))
1321            DATA XGAUS/3*0.D0,-5.7735026919D-1,5.7735026919D-1,0.D0,
1322           *          -7.7459666924D-1,0.D0,7.7459666924D-1/,
1323           *     WGAUS/2.D0,2*0.D0,2*1.D0,0.D0,5.5555555556D-1,
1324           *          8.8888888889D-1,5.5555555556D-1/
1325      C
1326      C     LOOP OVER  THE ELEMENT BARS
1327            DO 900 MRB=1,NL
1328            AB = ARELE(MRB,ME)
1329            WRITE(1) AB
```

```
1330            IF(AB.LT.1.D-10) GO TO 900
1331            XI = POSLE(MRB,ME)
1332      C
1333      C     LOOP OVER GAUSS POINTS
1334            DO 800 JG=1,NG
1335            ZI = XGAUS(JG,NG)
1336            WG = WGAUS(JG,NG)
1337            IF(MRB.GT.2) GO TO 100
1338            CALL SHAPE2(XI,ZI,NEL,NDEG,PHI(1),PHIX(1),PHIY(1),INCBL)
1339            GO TO 200
1340      100   CALL SHAPE2(ZI,XI,NEL,NDEG,PHI(1),PHIX(1),PHIY(1),INCBL)
1341      200   T11 = 0.D0
1342            T12 = 0.D0
1343            T21 = 0.D0
1344            T22 = 0.D0
1345            XG  = 0.D0
1346            YG  = 0.D0
1347      C
1348            DO 300 I=1,NS
1349            T11 = T11 + PHIX(I)*XEL(I)
1350            T12 = T12 + PHIX(I)*YEL(I)
1351            T21 = T21 + PHIY(I)*XEL(I)
1352            T22 = T22 + PHIY(I)*YEL(I)
1353            XG  = XG  + PHI(I)*XEL(I)
1354      300   YG  = YG  + PHI(I)*YEL(I)
1355      C
1356            IF(MRB.GT.2) GO TO 400
1357            GACOB = T21**2 + T22**2
1358            SI    = T21/GACOB
1359            CO    = T22/GACOB
1360            GO TO 500
1361      400   GACOB = T11**2 + T12**2
1362            SI    = T11/GACOB
1363            CO    = T12/GACOB
1364      500   W     =WG*AB*DSQRT(GACOB)*THK
1365            IF(ISTYP.EQ.1) W = W*XG
1366            DO 700 I=1,NS
1367            I2 = I*2
1368            I1 = I2 - 1
1369            IF(MRB.GT.2) GO TO 600
1370            SG(I1) = PHIY(I)*SI
1371            SG(I2) = PHIY(I)*CO
1372            GO TO 700
1373      600   SG(I1) = PHIX(I)*SI
1374            SG(I2) = PHIX(I)*CO
1375      700   CONTINUE
1376      C
1377      C
1378            IF(IBOND.EQ.0) GO TO 790
1379            IF(MRB.GT.2) GO TO 710
1380            CALL SHAPE4 (ZI,NDEG,BPHI,BPHY,BPYY)
1381            IF(IBOND.EQ.1) GO TO 715
1382            CALL SHAPE3 (XI,ZI,PHXX,PHYY)
1383            GO TO 715
1384      710   CALL SHAPE4 (ZI,NDEG,BPHI,BPHX,BPXX)
1385            IF(IBOND.EQ.1) GO TO 715
1386            CALL SHAPE3 (ZI,XI,PHXX,PHYY)
1387      715   IF(NDEG.EQ.2.OR.NDEG.EQ.4) NB=3
```

```
1388            IF(NDEG.EQ.3.OR.NDEG.EQ.5) NB=4
1389            DO 725 I=1,NB
1390            NM = 2*NS + I
1391            IF(MRB.GT.2) GO TO 720
1392            SG(NM)=BPHY(I)/DSQRT(GACOB)
1393            GO TO 725
1394     720    SG(NM)=BPHX(I)/DSQRT(GACOB)
1395     725    CONTINUE
1396     C
1397            IF(IBOND.NE.1) GO TO 750
1398     C      DISPLACEMENT BASED BOND ELEMENT
1399            DO 730 I=1,NS
1400            I2=I*2+NB+2*NS
1401            I1=I2-1
1402            SG(I2)=0.D0
1403            SG(I1)=0.D0
1404     730    CONTINUE
1405            DO 740 I=1,NB
1406            MNB=I+4*NS+NB
1407            SG(MNB)=BPHI(I)
1408     740    CONTINUE
1409     C
1410            IF(IBOND.EQ.1) GO TO 790
1411     C
1412     750    DO 770 I=1,NS
1413            I2=I*2+NB+2*NS
1414            I1=I2-1
1415            IF(MRB.GT.2) GO TO 760
1416            SG(I1)=PHYY(I)*SI/DSQRT(GACOB)
1417            SG(I2)=PHYY(I)*CO/DSQRT(GACOB)
1418            GO TO 770
1419     760    SG(I1)=PHXX(I)*SI/DSQRT(GACOB)
1420            SG(I2)=PHXX(I)*CO/DSQRT(GACOB)
1421     770    CONTINUE
1422     C
1423            DO 780 I=1,NB
1424            MN=4*NS+NB+I
1425            IF(MRB.GT.2) GO TO 775
1426            SG(MN)=BPYY(I)/GACOB
1427            GO TO 780
1428     775    SG(MN)=BPXX(I)/GACOB
1429     780    CONTINUE
1430     C
1431     C
1432     C      WRITE GAUSS POINT INFORMATION ON FILE(1).
1433     790    WRITE(1) XG,YG,XEL(1),YEL(1),W
1434            CALL WRITE(Q(1),LEN,0,LNUM,1)
1435     800    CONTINUE
1436     900    CONTINUE
1437     C
1438            RETURN
1439     C
1440            END
1441            SUBROUTINE ELMSE (ME,NS,NGL,NG,THK,ISTYP,XEL,YEL,NEL,NDEG,
1442           *   INCBL)
1443     C
1444     C      THIS SEGMENT FORMS AND STORES SHAPE FUNCTIONS AND DERIVAT
1445     C      IVES FOR SOLID ELEMENT.                                  NORCO
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      C     ************************************************************
            IMPLICIT REAL*8(A-H,O-Z)
            INTEGER*2 LEN
            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
            DIMENSION XEL(1),YEL(1),PHI(16),PHIX(16),PHIY(16),G(48),
           *          XGAUS(7,5),WGAUS(7,5),NEL(1)
            EQUIVALENCE (PHI(1),G(1)),(PHIX(1),G(17)),(PHIY(1),G(33))
            DATA XGAUS/7*0.D0,-5.7735026919D-1,5.7735026919D-1,5*0.D0,
           *           -7.7459666924D-1,0.D0,7.7459666924D-1;4*0.D0,
           *           -1.D0,-.65465370708D0,0.D0,.65465370708D0,1.D0,
           *           2*0.D0,-1.D0,-.83022389628D0,-.46884879347D0,
           *           0.D0,.46884879347D0,.83022389628D0,1.D0/,
           *    WGAUS/2.D0,6*0.D0,2*1.D0,5*0.D0,5.5555555556D-1,
           *           8.8888888889D-1,5.5555555556D-1,4*0.D0,.1D0,
           *           .54444444444D0,.71111111111D0,.54444444444D0,
           *           .1D0,2*0.D0,.47619047619D-1,.27682604736D0,
           *           .43174538121D0,.48761904762D0,.43174538121D0,
           *           .27682604736D0,.47619047619D-1/
      C
            LEN= 384
            YY = YEL(1)
            XX = XEL(1)
            NGX = NGL
            IF(NGL.EQ.5) NGX = 4
            IF(NGL.EQ.7) NGX = 5
      C
      C     LOOP OVER GAUSSIAN POINTS
            DO 900 JG = 1,NG
            ETA = XGAUS(JG,NG)
            WG  = WGAUS(JG,NG)
            DO 900 IG = 1,NGL
            XI = XGAUS(IG,NGX)
            CALL SHAPE2(XI,ETA,NEL,NDEG,PHI(1),PHIX(1),PHIY(1),INCBL)
      C
      C     FORM JACOBIAN FOR GAUSS POINT; IG,JG
            T11 = 0.D0
            T12 = 0.D0
            T21 = 0.D0
            T22 = 0.D0
            XG  = 0.D0
            YG  = 0.D0
      C
            DO 100 I=1,NS
            T11 = T11 + PHIX(I)*XEL(I)
            T12 = T12 + PHIX(I)*YEL(I)
            T21 = T21 + PHIY(I)*XEL(I)
            T22 = T22 + PHIY(I)*YEL(I)
            XG  = XG + PHI(I)*XEL(I)
      100   YG  = YG + PHI(I)*YEL(I)
            ANGLE = DATAN2(-T21,T22)
      C
      C     INVERT JACOBIAN
            GACOB = (T11*T22-T12*T21)
            IF(GACOB.GE.0.D0)  GO TO 300
            WRITE(IO,3000) ME,IG,JG
            GO TO 900
      300   GI=1.D0/GACOB
            R11 =  GI*T22
```

```
1504            R12 = -GI*T12
1505            R21 = -GI*T21
1506            R22 =  GI*T11
1507      C
1508      C     FORM SHAPE FUNCTION DERIVATIVES WITH RESPECT TO GLOBAL
1509      C     COORDINATES.
1510      400   DO 800 J=1,NS
1511            T1 = R11*PHIX(J) + R12*PHIY(J)
1512            T2 = R21*PHIX(J) + R22*PHIY(J)
1513            PHIX(J) = T1
1514      800   PHIY(J) = T2
1515      C
1516            W = GACOB*WG*WGAUS(IG,NGX)*THK
1517            IF(ISTYP.EQ.1) W = W*XG
1518      C
1519      C     WRITE(INVARIENT GAUSS POINT INFORMATION ON FILE(1).
1520            WRITE(1) XG,YG,XX,YY,ANGLE,W
1521            CALL WRITE(G(1),LEN,0,LNUM,1)
1522      C
1523      900   CONTINUE
1524      C
1525            RETURN
1526      C
1527      3000  FORMAT(//' JACOBIAN DETERMINANT IS LESS THAN 0 FOR ELEMENT'
1528           *,I4/' AT GAUSS POINT (',I1,',',I1,')')
1529      C
1530            END
1531            SUBROUTINE      INIT (AAA,BBB,III)
1532      C
1533      C     THIS SEGMENT CONTROLS INITIALIZATION OF STRESSES, EQUIVAL
1534      C     ENT UNIAXIAL STRAINS AND MATERIAL PROPERTIES.      NORCO
1535      C     ************************************************************
1536            IMPLICIT REAL*8(A-H,O-Z)
1537            COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
1538           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
1539           *            NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
1540           *            INCBL,IEIGN,IBOND,ILINK
1541            COMMON /POINTR/
1542           *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
1543           *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
1544           *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
1545           *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
1546           *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
1547           *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
1548            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
1549            DIMENSION XEL(12),YEL(12),AAA(1),BBB(1),III(1)
1550      C
1551            REWIND INS
1552      C     REWIND IOS
1553            I17 = ISPAC(4HSTSS,9*(NCMAT+NSMAT),1)
1554            I18 = ISPAC(4HSTNS,9*(NCMAT+NSMAT),1)
1555      C
1556      C     INITIALIZE FAILURE SURFACES
1557            CALL INITSF (BBB(K1),III(J12),AAA(I17),AAA(I18))
1558      C
1559      C     LOOP OVER ALL ELEMENTS
1560            DO 400 ME = 1,NMELM
1561            CALL ELMDT4 (ME,THK,NS,NGL,NG,III(J2),III(J3),AAA(I8),
```

```
1562           *III(J5),NDEG)
1563            ME1 = ME - 1
1564      C
1565      C      INITIALIZE STRESSES, STRAINS AND MATERIAL PROPERTIES FOR
1566      C      SOLID ELEMENT
1567            CALL INITSE (ME,NGL,NG,III(J4),AAA(I7),AAA(I17),
1568           * AAA(I18),BBB(K1),III(J12),ISTYP,ISTRS,NMPAR,ITEMP)
1569      C
1570      C      INITIALIZE STRESSES, STRAINS AND MATERIAL PROPERTIES FOR
1571      C      LONGITUDINAL REINFORCING ELEMENT.
1572            IF(ILNGR.EQ.0) GO TO 100
1573            NL = III(J6+ME1)
1574            IF(NL.EQ.0) GO TO 100
1575            CALL INITRP (ME,NG,NL,BBB(K1),III(J12),III(J13),
1576           *             AAA(I17),AAA(I18))
1577      C
1578      C      INITIALIZE STRESSES, STRAINS AND MATERIAL PROPERTIES FOR
1579      C      HOOP REINFORCING ELEMENT
1580      100   IF(IHOPR.EQ.0) GO TO 200
1581            NL = III(J7+ME1)
1582            IF(NL.EQ.0) GO TO 200
1583            CALL INITRP (ME,NG,NL,BBB(K1),III(J12),III(J14),
1584           *             AAA(I17),AAA(I18))
1585      C
1586      C      INITIALIZE STRESSES, STRAINS AND MATERIAL PROPERTIES FOR
1587      C      LONGITUDINAL PRESTRESSING ELEMENT
1588      200   IF(ILNGP.EQ.0) GO TO 300
1589            NL = III(J8+ME1)
1590            IF(NL.EQ.0) GO TO 300
1591            CALL INITRP(ME,NG,NL,BBB(K1),III(J12),III(J15),
1592           *            AAA(I17),AAA(I18))
1593      C
1594      C      INITIALIZE STRESSES, STRAINS AND MATERIAL PROPERTIES FOR
1595      C      HOOP PRESTRESSING ELEMENT
1596      300   IF(IHOPP.EQ.0) GO TO 400
1597            NL = III(J9+ME1)
1598            IF(NL.EQ.0) GO TO 400
1599            CALL INITRP(ME,NG,NL,BBB(K1),III(J12),III(J16),
1600           *            AAA(I17),AAA(I18))
1601      400   CONTINUE
1602      C
1603            RETURN
1604      C
1605            END
1606            SUBROUTINE INITSE (ME,NGL,NG,MATSE,ORNSE,STSS,STNS,
1607           *  EMP,NMP,ISTYP,ISTRS,NMPAR,ITEMP)
1608      C
1609      C      SEGMENT TO INITIALISE STRESSES, STRAINS AND MATERIAL PROP.
1610      C      AT THE GAUSSIAN POINTS FOR THE SOLID ELEMENT.   NORCO
1611      C      ************************************************************
1612            IMPLICIT REAL*8(A-H,O-Z)
1613            INTEGER*2 LEN
1614            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
1615            DIMENSION EMP(NMPAR,1),STSS(9,1),STNS(9,1),Q(48),ORNSE(1),
1616           *          MATSE(1),NMP(1)
1617            DATA CPI/1.745329252D-2/
1618      C
1619            ORNS = ORNSE(ME)*CPI
```

```
      NM    = MATSE(ME)
      LS    = NMP(NM)
      IF(LS.LE.11) MS=1
      IF(LS.EQ.25) MS=2
      IF(LS.EQ.18) MS=3
      IF(LS.EQ.14) MS=4
C
C     LOOP OVER GAUSSIAN POINTS
150   DO 900 JG=1,NG
      DO 900 IG=1,NGL
C
      READ (1) XG,YG,XX,YY,ANGLE,W
      CALL READ (Q(1),LEN,0,LNUM,1)
      ZETA = ANGLE + ORNS
C
C     BRANCH TO MATERIAL MODEL
      GO TO (500,600,700,800),MS
C
C     ELASTIC ISOTROPIC AND ORTHOTROPIC MODELS
500   CALL INITSG (XG,YG,EMP(1,NM),ZETA,ISTYP,ISTRS)
      GO TO 900
C
C     HYPOELASTIC MODEL
600   CALL INITSH (XG,YG,EMP(1,NM),STSS(1,NM),STNS(1,NM),ZETA,
     *             ISTYP,ISTRS)
      GO TO 900
C
C     PLASTIC MODEL
700   CALL INITSP (XG,YG,EMP(1,NM),STSS(1,NM),ZETA,ISTYP,ISTRS)
      GO TO 900
C
C     PSEUDO-ELASTIC CRACKING TENSION SOFTENING MODEL
800   CALL INITCR (XG,YG,EMP(1,NM),ZETA,ISTYP,ISTRS)
C
900   CONTINUE
C
      RETURN
C
      END
      SUBROUTINE INITSG (XG1,YG1,EMP,ZETA1,ISTYP,ISTRS)
C
C     SEGMENT TO INITIALIZE STRESSES AND CONST. MATRIX FOR THE
C     LINEAR ELASTIC MODEL AT THE GAUSSIAN POINTS.    NORCO
C     ************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      INTEGER*2 LEN/416/
      DIMENSION EPSI(4),SIGP(3),SIGT(4),SIGL(4),CM(4,4),ISFT(4),
     *          P(52),EMP(1)
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
      EQUIVALENCE (SIGP(1),P(1)),(SIGL(1),P(4)),(SIGT(1),P(8)),
     *            (GAMA,P(12)),(XG,P(14)),(ZETA,P(13)),
     *            (CM(1,1),P(16)),(YG,P(15)),(ISFT(1),P(32))
C
      CALL CLEAR(P(1),52)
      CALL ICLEAR(ISFT(1),4)
      XG = XG1
      YG = YG1
      ZETA = ZETA1
```

```
      IF (ISTRS.EQ.0) GO TO 100
      CALL READ (P(1),LEN,0,LNUM,INS)
100   CALL CONSTM(EMP(1),EMP(5),CM(1,1))
      CALL WRITE (P,LEN,0,LNUM,IOS)
C
      RETURN
C
      END
      SUBROUTINE INITSH(XG1,YG1,EMP,STSS,STNS,ZETA1,ISTYP,ISTRS)
C
C     SEGMENT TO INITIALIZE THE STRESSES, EQIUVALENT UNIAXIAL
C     STRAINS AND MATERIAL PROPERTIES FOR THE HYPOELASTIC MODEL
C     AT THE INTEGRATION POINTS.                              NORCO
C     ***********************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      INTEGER*2 LEN/416/
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
      COMMON /DATA1/CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI
      COMMON /DATA2/ EPSY,EDBR
      DIMENSION SIGT(4),SIGL(4),SIGP(3),SIGC(4),EPSQ(4),EPSL(4),
     *          EPSC(4),EMDC(4),EMDI(4),PRTC(3),PRTI(3),SIGD(4),
     *          EPSI(4),ISFT(4),SIGQ(4),CM(4,4),EMP(1),
     *          DEL(1),TEL(1),P(52),Q(48),STSS(1),STNS(1)
      EQUIVALENCE  (SIGP(1),P(1)),(SIGL(1),P(4)),(SIGT(1),P(8)),
     *          (GAMA,P(12)),(ZETA,P(13)),(XG,P(14)),(YG,P(15)),
     *          (CM(1,1),P(16)),(ISFT(1),P(32)),(EPSQ(1),P(34)),
     *          (EPSC(1),P(38)),(SIGC(1),P(42)),(EMDC(1),P(46)),
     *          (PRTC(1),P(50))
C
      FCU = EMP(12)
      ECU = EMP(19)
      FTU = -FCU*EMP(14)
      ETU = -ECU*EMP(21)
      DO 100 I=1,3
      EMDI(I) = EMP(I)
      PRTI(I) = EMP(4+I)
100   CONTINUE
      EMDI(4) = EMP(4)
C
      CALL CLEAR(P(1),52)
      CALL ICLEAR(ISFT(1),4)
      IF(ISTYP.EQ.0) ISFT(3) = 2
      XG = XG1
      YG = YG1
      ZETA = ZETA1
C
C     READ INITIAL STRESSES
      IF(ISTRS.EQ.0) GO TO 200
      CALL READ (P(1),LEN,0,LNUM,INS)
C
C     INITIALIZE ELASTIC MODULI AND POISON'S RATIOS
200   DO 300 I=1,3
      EMDC(I) = EMDI(I)
      PRTC(I) = PRTI(I)
300   CONTINUE
      EMDC(4) = EMDI(4)
C
      IF(ISTRS.EQ.0) GO TO 800
```

```
1736            CALL STREN(SIGL(1),SIGL(1),STSS(1),SIGC(1),FCU,FCU,FTU)
1737            CALL STREN(SIGL(1),EPSQ(1),STNS(1),EPSC(1),FCU,ECU,ETU)
1738      C
1739      C     INITIALIZE EQUIVQLENT UNIAXIAL STRAINS
1740      400   DO 500 I=1,4
1741            SIGD(I)   = SIGL(I)
1742            IF (ISFT(I).NE.1) GO TO 500
1743            EPSQ(I) = EPSC(I)
1744            SIGD(I) = SIGL(I) - SIGC(I)
1745            EMDC(I) = -EDBR*SIGC(I)/EPSC(I)
1746      500   CONTINUE
1747      C
1748      C     UPDATE EQUIVALENT UNIAXIAL STARINS(POTENTIAL INFINITE LOOP)
1749            K = 0
1750      550   IF(K.GT.MI) GO TO 999
1751            II = 0
1752            DO 600 I=1,4
1753            IF(ISFT(I).EQ.2) GO TO 600
1754            IF(DABS(SIGC(I)).LT.EP) GO TO 600
1755            EPSQ(I) = EPSQ(I) +  SIGD(I)/EMDC(I)
1756            IF(EPSQ(I)*SIGL(I).LT.0.D0) EPSQ(I) = SIGL(I)/EMDC(I)
1757            CALL SAENZ(SIGQ(I),EPSQ(I),SIGC(I),EPSC(I),EMDC(I),
1758           *           EMDI(I),ISFT(I),I,ISTYP)
1759            SIGD(I) = SIGL(I) - SIGQ(I)
1760            IF(DABS(SIGD(I)).GT.EP) II = 1
1761      600   CONTINUE
1762            K = K + 1
1763            IF(II.EQ.1) GO TO 550
1764      C
1765      C     UPDATE POISSON'S RATIO
1766            DO 700 I=1,3
1767      700   PRTC(I) = POISN (PRTI(I),EPSQ(I),EPSC(I))
1768      C
1769      C     FORM CONSTITUTIVE MATRIX
1770      800   CALL CONSTM(EMDC(1),PRTC(1),CM(1,1))
1771            CALL TRANSF(CM(1,1),ZETA,ISTYP)
1772      C
1773      C     WRITE UPDATED INFORMATION ON FILE.
1774            CALL WRITE (P(1),LEN,0,LNUM,IOS)
1775      C
1776            RETURN
1777      C
1778      999   WRITE(IO,1000) MI,XG,YG
1779      1000  FORMAT (///'NO. OF ITERATES EXCEEDED',I5,' AT G.POINT XG='
1780           *,D15.6,'  AND YG =',D15.6,'IN ROUTINE INITSH')
1781            STOP
1782      C
1783            END
1784            SUBROUTINE INITSP (XG1,YG1,EMP,STSS,ANGLE,ISTYP,ISTRS)
1785      C
1786      C     SEGMENT TO INITIALIZE STRESSES AND MATERIAL PROPERTIES FOR
1787      C     THE PLASTIC MODEL AT THE GAUSSIAN POINTS.       NORCO
1788      C     ************************************************************
1789            IMPLICIT REAL*8(A-H,O-Z)
1790            INTEGER*2 LEN/416/
1791            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
1792            DIMENSION EPSI(1),SIGI(4),SIGT(4),CM(4,4),SIGQ(4),SIGP(3),
1793           *          EPSD(4),DFDSG(4),DLM(4),DM(4,4),P(52),STSS(1),
```

```
1794           *          EMP(1),EMDI(4),PRTI(3),ISFT(4),SIGL(4)
1795            EQUIVALENCE (SIGP(1),P(1)),(SIGL(1),P(4)),(SIGT(1),P(8)),(
1796           *            GAMA,P(12)),(BETA,P(13)),(XG,P(14)),(YG,P(15))
1797           *            ,(DM(1,1),P(16)),(CM(1,1),P(34)),(FO,P(50)),
1798           *            (HVGO,P(51)),(ISFT(1),P(32))
1799      C
1800      C     INITIALIZE MATERIAL PROPERTIES
1801            FCU = EMP(12)
1802            DO 100 I=1,3
1803            EMDI(I) = EMP(I)
1804            PRTI(I) = EMP(4+I)
1805      100   CONTINUE
1806            EMDI(4) = EMP(4)
1807      C
1808            CALL CLEAR  (P(1),51)
1809            CALL ICLEAR (ISFT(1),4)
1810            XG = XG1
1811            YG = YG1
1812      C
1813      C     FORM THE INITIAL CONSTITUTIVE MATRIX
1814            IF(ISTRS.EQ.0) GO TO 200
1815            CALL READ (P(1),LEN,0,LNUM,INS)
1816      200   CALL CONSTM (EMDI(1),PRTI(1),CM(1,1))
1817            DO 300 I=1,4
1818            DO 300 J=1,4
1819      300   DM(I,J) = CM(I,J)
1820      C
1821      C     STORE INITIAL GAUSS POINT INFORMATION ON FILE
1822            CALL WRITE (P(1),LEN,0,LNUM,IOS)
1823      C
1824            RETURN
1825      C
1826            END
1827            SUBROUTINE INITRP (ME,NG,NL,EMP,NMP,MATRE,STSS,STNS)
1828      C
1829      C     THIS SEGMENT INITIALIZES STRESSES, STRAINS AND MATERIAL
1830      C     PROPERTIES FOR REINFORCING/PRESTRESSING ELEMENT.NORCO
1831      C     ************************************************************
1832            IMPLICIT REAL*8(A-H,O-Z)
1833            INTEGER*2 LEN1,LEN2/80/
1834            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
1835            COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
1836           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
1837           *                NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,
1838           *                NEQ,
1839           *              INCBL,IEIGN,IBOND,ILINK
1840            DIMENSION STSS(9,1),STNS(9,1),EMP(NMPAR,1),P(10),
1841           *          Q(88),NMP(1),MATRE(1)
1842            EQUIVALENCE (SIGT,P(1)),(EPST,P(2)),(YI,P(3)),(YC,P(4)),
1843           *          (SIGP,P(5)),(EPSP,P(6)),(BTAU,P(7)),(XG,P(8)),
1844           *            (YG,P(9)),(ISFT,P(10))
1845      C
1846            NM = MATRE(ME)
1847            LS = NMP(NM)
1848            KS = (LS-1)/2 + 1
1849      C
1850      C     LOOP OVER ELEMENT LAYERS
1851            DO 500 MRB=1,NL
```

```
1852            READ (1) AREA
1853            IF(AREA.LT.1.D-10) GO TO 500
1854      C
1855      C     LOOP OVER GAUSSIAN POINTS
1856            DO 400 JG=1,NG
1857            K = 2
1858            SIGE = 0.D0
1859            ISFT = 0
1860            CALL CLEAR (P(1),9)
1861            READ (1) XG,YG,XX,YY,W
1862            CALL READ (Q(1),LEN1,0,LNUM,1)
1863            IF(ISTRS.EQ.0) GO TO 200
1864            CALL READ (P(1),LEN2,0,LNUM,INS)
1865            IF(ISFT.EQ.1) GO TO 300
1866            SIGE = SIGT
1867            IF(DABS(SIGT).LT.SIGP) SIGE = SIGP*DSIGN(1.D0,SIGT)
1868            DO 100 I=2,KS
1869            K = I
1870            IF(DABS(SIGE).GT.STSS(I,NM)) GO TO 100
1871            GO TO 200
1872      100   CONTINUE
1873      C
1874      200   YC    = (STSS(K,NM)-STSS(K-1,NM))/(STNS(K,NM)-STNS(K-1,NM))
1875            YI    = (STSS(2,NM)-STSS(1,NM))/(STNS(2,NM)-STNS(1,NM))
1876            TC    = EMP(LS,NM)
1877            EPST = DSIGN(1.D0,SIGT)*(STNS(K-1,NM)+(DABS(SIGE)-STSS(K-1
1878           *        ,NM))/YC)
1879            EPSP = EPST - SIGE/YI
1880            IF(DABS(SIGT).LT.SIGP) EPST = EPSP + SIGT/YI
1881            SIGP = DABS(SIGE)
1882      300   CALL WRITE(P(1),LEN2,0,LNUM,IOS)
1883      400   CONTINUE
1884      500   CONTINUE
1885      C
1886            RETURN
1887      C
1888            END
1889            SUBROUTINE INITCR (XG1,YG1,EMP,ZETA1,ISTYP,ISTRS)
1890      C
1891            IMPLICIT REAL*8(A-H,O-Z)
1892            INTEGER*2 LEN/328/
1893      C     THIS SUBROUTINE INITIALIZES WA ARRAY FOR PSEUDO-ELASTIC
1894      C     CRACKING CONCRETE MODEL
1895      C     ********************************************************
1896            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
1897            DIMENSION EMP(1),CM(4,4),SIGP(3),SIGT(4),SIGL(4),P(41),
1898           *    IWA(4),WA(4)
1899            EQUIVALENCE (SIGP(1),P(1)),(SIGL(1),P(4)),(SIGT(1),P(8)),
1900           *            (GAMA,P(12)),(ZETA,P(13)),(XG,P(14)),(YG,P(15)),
1901           *            (CM(1,1),P(16)),(IWA(1),P(32)),(WA(1),P(34))
1902      C     INITIALIZE MATERIAL PROPERTIES
1903            CALL CLEAR (P(1),41)
1904            FCU = EMP(12)
1905            WA(1) = EMP(13)
1906            EC = EMP(1)
1907            WA(2) = EMP(13)/EMP(1)
1908            WA(3) = EMP(13)
1909            WA(4) = EMP(13)/EMP(2)
```

```
1910            IWA(1)=0
1911            IWA(2)=0
1912            IF(ISTYP.EQ.0) IWA(3)=2
1913            IWA(4)=0
1914            PREQ = DSQRT(EMP(5)*EMP(6))
1915            XG = XG1
1916            YG = YG1
1917            ZETA = ZETA1
1918            IF(ISTRS.EQ.0) GO TO 100
1919            CALL READ (P(1),LEN,0,LNUM,INS)
1920            GO TO 200
1921      C     FORM INITIAL CONSTITUTIVE MATRIX
1922       100  C = 1.0D0/(1.0D0-PREQ**2)
1923            CM(1,1) = EC*C
1924            CM(2,2) = EC*C
1925            CM(1,2) = PREQ*C*EC
1926            CM(2,1) = PREQ*C*EC
1927            CM(4,4) = EMP(4)
1928      C     STORE GAUSS POINT INFORMATION ON FILE
1929       200  CALL WRITE (P(1),LEN,0,LNUM,IOS)
1930            RETURN
1931            END
1932            SUBROUTINE INITSF (EMP,NMP,STSS,STNS)
1933      C
1934      C     THIS SEGMENT CALCULATES  CONTROL PARAMETERS FOR STRENGTH
1935      C     AND CORRESPONDING EQUIVALENT UNIAXIAL STRAIN SURFACES.
1936      C                                                        NORCO
1937      C     ************************************************************
1938            IMPLICIT REAL*8(A-H,O-Z)
1939            COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
1940           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
1941           *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
1942           *            INCBL,IEIGN,IBOND,ILINK
1943            DIMENSION EMP(NMPAR,1),STSS(9,1),STNS(9,1),NMP(1)
1944      C
1945      C     SOLID ELEMENT MATERIAL STRENGTH AND DEFORMATION SURFACES'
1946      C     PARAMETERS.
1947            DO 100 I=1,NCMAT
1948            IF(NMP(I).LE.11) GO TO 100
1949            CALL ARGYRS(EMP(13,I),STSS(1,I),NMP(I))
1950            IF (NMP(I).LE.18) GO TO 100
1951            CALL ARGYRS(EMP(20,I),STNS(1,I),NMP(I))
1952       100  CONTINUE
1953      C
1954      C     REINFORCING AND PRESTRESSING ELEMENT MATERIAL PARAMETERS
1955            IF(NSMAT.EQ.0) GO TO 500
1956            N1 = NCMAT + 1
1957            N2 = NCMAT + NSMAT
1958            DO 300 N= N1,N2
1959            STSS(1,N) =0.D0
1960            STNS(1,N) = 0.D0
1961            LS = NMP(N)
1962            KS = (LS-1)/2 + 1
1963            DO 200 I=2,KS
1964            I2 = (I-1)*2
1965            I1 = I2 -1
1966            STSS(I,N) = EMP(I1,N)
1967            STNS(I,N) = EMP(I2,N)
```

```
1968      200   CONTINUE
1969      300   CONTINUE
1970      C
1971      500   RETURN
1972      C
1973            END
1974            SUBROUTINE LOAD (AAA,BBB,III)
1975      C
1976      C     THIS SEGMENT CONTROLS CONVERSION OF NODAL PRESSURE INTENS
1977      C     ITIES, NODAL TEMPRATURES AND GRAVITY LOADS INTO WORK EQUI
1978      C     VALENT NODAL FORCES.                                  NORCO
1979      C     ************************************************************
1980            IMPLICIT REAL*8(A-H,O-Z)
1981            COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
1982           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
1983           *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
1984           *            INCBL,IEIGN,IBOND,ILINK
1985            COMMON /POINTR/
1986           *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
1987           *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
1988           *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
1989           *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
1990           *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
1991           *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
1992            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
1993            DIMENSION NOD(4),INC(4),NOLD(4),BTCAN(288),AAA(1),BBB(1),
1994           *          III(1)
1995      C
1996            ND = 2*NMNOD
1997            REWIND IOS
1998      C
1999      C     CONVERT SPECIFIC WEIGHT AND/OR TEMP.DISTRIBUTION INTO WORK
2000      C     EQUIVALENT NODAL FORCES.
2001            IF(IGRLD.EQ.0.AND.ITEMP.LE.1) GO TO 500
2002            IF(ITEMP.LE.1) GO TO 100
2003            K7 = ISPAC(2HFT,ND,3)
2004            CALL CLEAR (BBB(K7),ND)
2005            K17= ISPAC(5HTEMPI,NMNOD,3)
2006      C
2007      C     LOOP OVER ALL ELEMENTS
2008      100   DO 450 ME=1,NMELM
2009            CALL ELMDT4 (ME,THK,NS,NGL,NG,III(J2),III(J3),AAA(I8),
2010           *III(J5),NDEG)
2011            ME1 = ME - 1
2012            CALL LOADGT (ME,NS,NGL,NG,NMPAR,IGRLD,ITEMP,III(J4),III(J5
2013           *            ),BBB(K1),BBB(K2),BTCAN(1))
2014      C
2015            IF(ILNGR.EQ.0) GO TO 250
2016            NL = III(J6+ME1)
2017            IF(NL.EQ.0) GO TO 250
2018            CALL LOADTL (NS,NG,NL,BTCAN(1))
2019      C
2020      250   IF(IHOPR.EQ.0) GO TO 300
2021            NL = III(J7+ME1)
2022            IF(NL.EQ.0) GO TO 300
2023            CALL LOADTH (NS,NG,NL,BTCAN(1))
2024      C
2025      300   IF(ILNGP.EQ.0) GO TO 350
```

```
2026            NL = III(J8+ME1)
2027            IF(NL.EQ.0) GO TO 350
2028            CALL LOADTL (NS,NG,NL,BTCAN(1))
2029      C
2030      350   IF(IHOPP.EQ.0) GO TO 400
2031            NL = III(J9+ME1)
2032            IF(NL.EQ.0) GO TO 400
2033            CALL LOADTH (NS,NG,NL,BTCAN(1))
2034      C
2035      400   CALL LOADTM   (ME,NS,III(J5),BBB(K7),BBB(K6),BTCAN(1))
2036      450   CONTINUE
2037      C
2038      C     CONVERT NODAL PRESSURE INTENSITIES INTO WORK EQUIVALENT
2039      C     NODAL FORCES AND UPDATE LOAD VECTOR
2040      500   IF(IDSLD.LT.10) GO TO 750
2041            K8 = ISPAC(3HFPN,ND,3)
2042            K9 = ISPAC(3HFPT,ND,3)
2043            CALL CLEAR (BBB(K8),2*ND)
2044            CALL ICLEAR(NOLD(1),4)
2045      550   READ(IN,1300) NR,NI,NG,(NOD(I),I=1,4)
2046            IF(NR.EQ.0) GO TO 750
2047            DO 600 I=1,NR
2048      600   INC(I) = (NOD(I) - NOLD(I))/NI
2049            DO 700 I=1,NI
2050            DO 650 J=1,NR
2051      650   NOLD(J) = NOLD(J) + INC(J)
2052            CALL LOADPR (NR,NG,ISTYP,NOLD(1),AAA(I1),AAA(I2),BBB(K4),
2053           *             BBB(K5),BBB(K8),BBB(K9),III(J17),NMNOD)
2054      700   CONTINUE
2055            GO TO 550
2056      C
2057      C     CONVERT NODAL HYDROSTATIC PRESSURE INTENSITIES INTO WORK
2058      C     EQUIVALENT NODAL FORCES.
2059      750   IF(IDSLD.EQ.0.OR.IDSLD.EQ.10) GO TO 1000
2060            CALL ICLEAR (NOLD(1),4)
2061      800   READ(IN,1300) NR,NI,NG,(NOD(I),I=1,4)
2062            IF(NR.EQ.0) GO TO 1000
2063            DO 850 I=1,NR
2064      850   INC(I) = (NOD(I) - NOLD(I))/NI
2065            DO 950 I=1,NI
2066            DO 900 J=1,NR
2067      900   NOLD(J) = NOLD(J) + INC(J)
2068            CALL LOADHD (NR,NG,ISTYP,NOLD(1),AAA(I1),AAA(I2),BBB(K15),
2069           *             BBB(K2))
2070      950   CONTINUE
2071            GO TO 800
2072      C
2073      C     INITIALIZE TOTAL LOAD, TOTAL DISPLACEMENT AND TOTAL PSUEDO
2074      C     LOAD VECTORS.
2075      1000  K10 = ISPAC(2HDQ,ND,3)
2076            K14 = ISPAC(2HDU,ND,3)
2077            K13 = ISPAC(2HQT,ND,3)
2078            K11 = ISPAC(2HPT,ND,3)
2079            K12 = ISPAC(2HUT,ND,3)
2080            IF(ISTRS.EQ.0) GO TO 1100
2081            REWIND ILD
2082            CALL READ (BBB(K11),LEN,0,LNUM,ILD)
2083            CALL CLEAR (BBB(K12),ND)
```

```
      GO TO 1200
1100  CALL CLEAR (BBB(K11),2*ND)
C
1200  IF(ITEMP.GT.0) ITEMP = ITEMP - 1
      RETURN
C
1300  FORMAT(7I4)
C
      END
      SUBROUTINE LOADGT   (ME,NS,NGL,NG,NMPAR,IGRLD,ITEMP,MATSE,
     *                     NPELM,EMP,FD,BTCAN)
C
C     THIS SEGMENT FORMS ELEMENT GRAVITY LOAD VECTOR AND ADDS IT TO
C     DEAD LOAD VECTOR. ALSO FORMS THE BT-C-A-N MATRIX FOR SOLID
C     ELEMENTS.                                                NORCO
C     ***************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      INTEGER*2 LEN
C     THIS SUBROUTINE HAS NOT YET BEEN MADE CONSISTENT WITH
C     THE USE OF LAGRANGIAN ELEMENTS
C
      DIMENSION NPELM(12,1),EMP(NMPAR,1),FD(1),MATSE(1),PHI(16),
     *          BTCAN(16,1),CAN(4,12),GLOAD(12),PHIY(16),P(52),
     *          PHIX(16),CM(4,4),Q(48),TECC(4),TECL(4)
      EQUIVALENCE (PHI(1),Q(1)),(PHIX(1),Q(17)),
     *            (CM(1,1),P(16)),(XG,P(14)),(PHIY(1),Q(33))
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
C
      NM = MATSE(ME)
      SW = EMP(11,NM)
      CALL CLEAR (GLOAD(1),12)
      CALL CLEAR (BTCAN(1,1),384)
C
      DO 700 JG=1,NG
      DO 700 IG=1,NGL
      READ(1) XG,YG,XX,YY,ANGLE,W
      CALL READ(Q(1),LEN,0,LNUM,1)
C
C     FORM ELEMENT GRAVITY LOAD VECTOR
      IF(IGRLD.EQ.0) GO TO 200
      WT = W*SW
      DO 100 J=1,NS
100   GLOAD(J) = GLOAD(J) + WT*PHI(J)
C
C     FORM BT-C-A-N MATRIX FOR TEMPERATURE LOADING
200   IF(ITEMP.LE.1) GO TO 700
      CALL READ (P(1),LEN,0,LNUM,IOS)
      DO 400 I=1,3
      C = 0.D0
      DO 300 J=1,3
300   C = C + CM(J,I)*EMP(7+J,NM)
400   TECL(I) = C
      CALL TRANSS (TECL(1),TECC(1),-ZETA)
C
C     FORM THE C-ALPHA-N MATRIX AT THE GAUSSIAN POINTS
      DO 500 J=1,NS
      PHJ      = PHI(J)
      DO 500 I=1,4
```

```
2142      500   CAN(I,J) = TECC(I)*PHJ
2143            C
2144            C     FORM AND ACCUMULATE CONTRIBUTIONS TO BT-C-A-N MATRIX
2145                  DO 600 I=1,NS
2146                  I2 = 2*I
2147                  I1 = I2 - 1
2148                  PX = W*PHIX(I)
2149                  PY = W*PHIY(I)
2150                  PZ = W*PHI(I)/XG
2151                  DO 600 J=1,NS
2152                  BTCAN(J,I1)=PX*CAN(1,J)+PZ*CAN(3,J)+PY*CAN(4,J)+BTCAN(J,I1)
2153                  BTCAN(J,I2)=PY*CAN(2,J)+PX*CAN(4,J)+BTCAN(J,I2)
2154      600   CONTINUE
2155      700   CONTINUE
2156            C
2157            C     ADD GRAVITY LOAD TO DEAD LOAD VECTOR
2158                  IF (IGRLD.EQ.0) GO TO 900
2159                  DO 800 J=1,12
2160                  IF(NPELM(J,ME).EQ.0) GO TO 800
2161            C     MODIFY THE FOLLOWING STATEMENT FOR ID ARRAY
2162                  ND = 2*NPELM(J,ME)
2163                  FD(ND) = FD(ND) - GLOAD(J)
2164      800   CONTINUE
2165            C
2166      900   RETURN
2167            C
2168                  END
2169                  SUBROUTINE LOADHD  (NR,NG,ISTYP,NOLD,XCORD,YCORD,PHYDR,FD)
2170            C
2171            C     THIS SEGEMNT CALCULATES NODAL FORCES EQUIVALENT TO HYDROS
2172            C     TATIC SURAFCE PRESSURE INTENSITIES.                NORCO
2173            C     ****************************************************************
2174                  IMPLICIT REAL*8(A-H,O-Z)
2175                  DIMENSION XCORD(1),YCORD(1),WGAUS(3,3),PHYDR(1),XGAUS(3,3)
2176                 *          ,NOLD(4),XEL(4),YEL(4),PHI(4),PHIY(4),FD(1)
2177                  DATA XGAUS/3*0.D0,-5.7735026919D-1,5.7735026919D-1,0.D0,
2178                 *           -7.7459666924D-1,0.D0,7.7459666924D-1/,
2179                 *     WGAUS/2.D0,2*0.D0,2*1.D0,0.D0,5.5555555556D-1,
2180                 *           8.8888888889D-1,5.5555555556D-1/
2181                  NSDG = NR - 1
2182                  DO 100 I=1,NR
2183                  NODE = NOLD(I)
2184                  XEL(I) = XCORD(NODE)
2185      100   YEL(I) = YCORD(NODE)
2186                  DO 500 IG=1,NG
2187                  ETA = XGAUS(IG,NG)
2188                  WG  = WGAUS(IG,NG)
2189                  CALL SHAPE1(ETA,NSDG,PHI(1),PHIY(1))
2190                  T11 = 0.D0
2191                  T22 = 0.D0
2192                  XG  = 0.D0
2193                  PXN = 0.D0
2194                  PYN = 0.D0
2195                  DO 200 I =1,NR
2196                  T11 = T11 + PHIY(I)*YEL(I)
2197                  T22 = T22 + PHIY(I)*XEL(I)
2198      200   XG  = XG  + PHI(I)*XEL(I)
2199                  IF(ISTYP.EQ.1) WG = WG*XG
```

```
      DO 300 J=1,NR
      NODE = NOLD(J)
      PHJ = PHI(J)
      PXN = PXN + PHJ*PHYDR(NODE)*T11
  300 PYN = PYN - PHJ*PHYDR(NODE)*T22
C
      DO 400 J=1,NR
      NODE    =  NOLD(J)
      PP      = PHI(J)*WG
      N2      = NODE*2
      N1      = N2 - 1
      FD(N1)  = FD(N1) + PP*PXN
  400 FD(N2)  = FD(N2) + PP*PYN
  500 CONTINUE
C
      RETURN
C
      END
      SUBROUTINE LOADPR     (NR,NG,ISTYP,NOLD,XCORD,YCORD,PNORM,
     *                        PTANG,FPN,FPT,ID,NMNOD)
C
C     THIS SEGMENT CALCULATES NODAL FORCES EQUIVALENT TO NORMAL
C     AND TANGENTIAL NODAL PRESSURE INTENSITIES.        NORCO
C     ***************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      DIMENSION XCORD(1),YCORD(1),WGAUS(3,3) ,PNORM(1),PTANG(1),
     *          NOLD(4),XEL(4),YEL(4),PHI(4),PHIY(4),XGAUS(3,3),
     *          FPN(1),FPT(1),ID(2,NMNOD)
      DATA XGAUS/3*0.D0,-5.7735026919D-1,5.7735026919D-1,0.D0,
     *           -7.7459666924D-1,0.D0,7.7459666924D-1/,
     *     WGAUS/2.D0,2*0.D0,2*1.D0,0.D0,5.5555555556D-1,
     *           8.8888888889D-1,5.5555555556D-1/
      NSDG = NR - 1
      DO 100 I=1,NR
      NODE = NOLD(I)
      XEL(I) = XCORD(NODE)
  100 YEL(I) = YCORD(NODE)
      DO 500 IG=1,NG
      ETA = XGAUS(IG,NG)
      WG  = WGAUS(IG,NG)
      CALL SHAPE1(ETA,NSDG,PHI(1),PHIY(1))
      T11 = 0.D0
      T22 = 0.D0
      XG  = 0.D0
      PXN = 0.D0
      PYN = 0.D0
      PXT = 0.D0
      PYT = 0.D0
      DO 200 I =1,NR
      T11 = T11 + PHIY(I)*YEL(I)
      T22 = T22 + PHIY(I)*XEL(I)
  200 XG  = XG  + PHI(I)*XEL(I)
      IF(ISTYP.EQ.1) WG = WG*XG
      DO 300 J=1,NR
      NODE = NOLD(J)
      PHJ = PHI(J)
      PXN = PXN + PHJ*PNORM(NODE)*T11
      PYN = PYN - PHJ*PNORM(NODE)*T22
```

```
      PXT = PXT + PHJ*PTANG(NODE)*T22
  300 PYT = PYT + PHJ*PTANG(NODE)*T11
      DO 400 J=1,NR
      NODE    =  NOLD(J)
      PP      = PHI(J)*WG
C     N2=2*NODE
C     N1=2*NODE-1
      N1      = ID(1,NODE)
      IF(N1.EQ.0) GO TO 350
      FPN(N1) = FPN(N1) + PP*PXN
      FPT(N1) = FPT(N1) + PP*PXT
  350 N2      = ID(2,NODE)
      IF(N2.EQ.0) GO TO 400
      FPN(N2) = FPN(N2) + PP*PYN
      FPT(N2) = FPT(N2) + PP*PYT
  400 CONTINUE
  500 CONTINUE
      RETURN
      END
      SUBROUTINE LOADTL   (NS,NG,NL,BTCAN)
C
C     THIS SEGMENT EVALUATES BT-C-ALPHA-N MATRIX FOR LONGITUDIN
C     AL REINFORCING(PRESTRESSING) ELEMENTS.              NORCO
C     ***************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      INTEGER*2 LEN1,LEN2
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
      DIMENSION P(10),Q(48),PHI(16),SG(32),BTCAN(12,1)
      EQUIVALENCE (YM,P(4)),(TX,P(7)),(XG,P(8)),(PHI(1),Q(1)),
     *            (SG(1),Q(17))
C
C     LOOP OVER ELEMENT LAYERS
      DO 400 MRB=1,NL
      READ(1) AREA
      IF(AREA.LT.1.D-10) GO TO 400
C
C     LOOP OVER GAUSSIAN POINTS
      DO 300 JG = 1,NG
      READ (1) XG1,YG1,XX,YY,W
      CALL READ(Q(1),LEN1,0,LNUM,1)
      CALL READ (P(1),LEN2,0,LNUM,IOS)
      W  = W*YM*TX
C
C     FORM BT-E-A-N MATRIX
      DO 200 I=1,NS
      I2 = 2*I
      I1 = I2 -1
      P1 = W*SG(I1)
      P2 = W*SG(I2)
      DO 200 J=1,NS
      BTCAN(J,I1) = P1*PHI(J) + BTCAN(J,I1)
      BTCAN(J,I2) = P2*PHI(J) + BTCAN(J,I2)
  200 CONTINUE
  300 CONTINUE
  400 CONTINUE
C
      RETURN
C
```

```
      END
      SUBROUTINE LOADTH   (NS,NG,NL,BTCAN)
C
C     THIS SEGMENT EVALUATES BT-C-ALPHA-N MATRIX FOR HOOP REINF
C     ORCING(PRESTRESSING) ELEMENTS.                        NORCO
C     ******************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      INTEGER*2 LEN1,LEN2
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
      DIMENSION P(10),Q(48),PHI(16),BTCAN(16,1)
      EQUIVALENCE (YM,P(4)),(TX,P(7)),(XG,P(8)),(PHI(1),Q(1))
C
C     LOOP OVER ELEMENT LAYERS
      DO 400 MRB=1,NL
      READ(1) AREA
      IF(AREA.LT.1.D-10) GO TO 400
C
C     LOOP OVER GAUSSIAN POINTS
      DO 300 JG = 1,NG
      READ(1) XG1,YG1,XX,YY,W
      CALL READ(Q(1),LEN1,0,LNUM,1)
      CALL READ (P(1),LEN2,0,LNUM,IOS)
C
C     FORM BT-E-A-N MATRIX
      PT = YM*TX*W
      DO 200 I=1,NS
      I1 = I*2 - 1
      PTPHI = PT*PHI(I)
      DO 200 J=1,NS
      BTCAN(J,I1) = BTCAN(J,I1) + PTPHI*PHI(J)
  200 CONTINUE
  300 CONTINUE
  400 CONTINUE
C
      RETURN
C
      END
      SUBROUTINE LOADTM (ME,NS,NPELM,FT,TEMPV,BTCAN)
C
C     THIS SEGMENT CALCULATES WORK EQUIVALENT TEMPRATURE LOADS
C     AND ADDS THEM TO LOAD VECTOR.                         NORCO
C     ******************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      DIMENSION NPELM(12,1),TEMPV(1),BTCAN(12,1),TEL(12),TLD(24)
     *         ,FT(1)
C
      K=0
      DO 100 I=1,12
      IF(NPELM(I,ME).EQ.0) GO TO 100
      K=K+1
      NODE = NPELM(I,ME)
      TEL(K) = TEMPV(NODE)
  100 CONTINUE
C
      ND = NS*2
      DO 300 I=1,ND
      CC = 0.D0
      DO 200 J=1,NS
```

```
2374     200   CC = CC + TEL(J)*BTCAN(J,I)
2375     300   TLD(I) = CC
2376     C
2377           K=0
2378           DO 400 I=1,12
2379           IF(NPELM(I,ME).EQ.0) GO TO 400
2380           K=K+1
2381           NODE = NPELM(I,ME)
2382           I2   = K*2
2383           I1   = I2 - 1
2384           N2 = NODE*2
2385           N1 = N2 - 1
2386           FT(N1) = FT(N1) + TLD(I1)
2387           FT(N2) = FT(N2) + TLD(I2)
2388     400   CONTINUE
2389     C
2390           RETURN
2391     C
2392           END
2393           SUBROUTINE    LOADUP (ISTEP,AAA,BBB,III)
2394     C
2395     C     THIS SEGMENT UPDATES TOTAL LOAD VECTOR, AND INITIALIZES
2396     C     PSUEDO-LOAD INCREMENT AND DISPLACEMENT VECTORS.   NORCO
2397     C     ************************************************************
2398           IMPLICIT REAL*8(A-H,O-Z)
2399           COMMON /PROBCV/ NSTIF,IPRST,ISTYP,IMTYP,ITRAT,ILNGR,IHOPR,
2400          *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
2401          *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
2402          *            INCBL,IEIGN,IBOND,ILINK
2403           DIMENSION AAA(1),III(1),BBB(1)
2404           COMMON /POINTR/
2405          *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
2406          *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
2407          *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
2408          *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
2409          *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
2410          *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
2411           COMMON /DATA1/ CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI
2412           COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
2413           COMMON /TOLER/ PT,FNUO,FNPO,KDIV
2414           ITRAT = 0
2415           ND    = 2*NMNOD
2416           WRITE(IO,1500)ISTEP,IPRST,NI,KI,RX,TU,TP,CD,CL,CT,CPN,CPT,
2417          *               CPD
2418     C
2419     C     INITIALIZE LOAD INCREMENT AND TOTAL DISPLACEMENT INCREMENT
2420           CALL CLEAR (BBB(K10),2*ND)
2421           IF(IPRST.EQ.1) GO TO 1300
2422     C
2423     C     FORM LOAD INCREMENT VECTOR
2424     C     DEAD LOADS(GRAVITY, CONCENTRATED AND/OR HYDROSTATIC)
2425           IF(DABS(CD).LT.1.D-6) GO TO 200
2426           DO 100 I=1,ND
2427     100   BBB(K10+I-1) = CD*BBB(K2+I-1)
2428     C
2429     C     LIVE LOADS(CONCENTRATED)
2430     200   IF(DABS(CL).LT.1.D-6) GO TO 350
2431           K=0
```

```
2432            DO 300 I=1,ND
2433            IK=I-1
2434            KK=III(J17+IK)
2435            IF(KK.EQ.0) GO TO 300
2436            K=K+1
2437      C
2438            BBB(K10+K-1) = BBB(K10+K-1) + CL*BBB(K3+K-1)
2439      300   CONTINUE
2440      C     PRESCRIBED DISPLACEMENTS
2441      350   IF(DABS(CPD).LT.1.D-6) GO TO 400
2442            DO 375 I=1,NMEBE
2443            II = I - 1
2444            N  = III(J1+II)
2445            N1 = N*2 - 1
2446            PP = CPD*AAA(I5+II)*AAA(I6+II)
2447            KN1 = III(J17+N1-1)
2448            IF(KN1.EQ.0) GO TO 355
2449            BBB(K10+KN1-1) = BBB(K10+KN1-1) + PP*AAA(I3+II)
2450       355  KN2 = III(J17+N1)
2451            IF(KN2.EQ.0) GO TO 375
2452            BBB(K10+KN2-1)   = BBB(K10+KN2-1) + PP*AAA(I4+II)
2453       375  CONTINUE
2454      C
2455      C     NORMAL SURFACE PRESSURE
2456      400   IF(DABS(CPN).LT.1.D-6) GO TO 600
2457            K=0
2458            DO 500 I=1,ND
2459            II=I-1
2460            KK=III(J17+II)
2461            IF(KK.EQ.0) GO TO 500
2462            K=K+1
2463            BBB(K10+K-1) = BBB(K10+K-1) + CPN*BBB(K8+K-1)
2464      500   CONTINUE
2465      C     TANGENTIAL SURFACE PRESSURES
2466      600   IF(DABS(CPT).LT.1.D-6) GO TO 800
2467            K=0
2468            DO 700 I=1,ND
2469            II=I-1
2470            KK=III(J17+II)
2471            IF(KK.EQ.0) GO TO 700
2472            K=K+1
2473            BBB(K10+K-1) = BBB(K10+K-1) + CPT*BBB(K9+K-1)
2474      700   CONTINUE
2475      C     TEMPRATURE LOADS
2476      800   IF(DABS(CT).LT.1.D-6) GO TO 1100
2477            DO 900 I=1,ND
2478      900   BBB(K10+I-1) = BBB(K10+I-1) + CT*BBB(K7+I-1)
2479            DO 1000 I=1,NMNOD
2480      1000  BBB(K17+I-1) = CT*BBB(K6+NMNOD+I-1)
2481      C
2482      C     UPDATE TOTAL LOAD VECTOR
2483      1100  DO 1200 I=1,ND
2484            BBB(K11+I-1) = BBB(K11+I-1) + BBB(K10+I-1)
2485      1200  CONTINUE
2486            CALL VCMLT (BBB(K11),BBB(K11),PT,ND)
2487      C
2488      1300  RETURN
2489      C
```

```
2490      C     FORMAT STATEMENTS
2491      1500  FORMAT(///,51X,28('*'),//,51X,'OUTPUT OF LOAD STEP NO.',
2492           *       I5,//,51X,28('*')///,'    IP   NI   KI',5X,'RX',10X,
2493           *       'TU',10X,'TP',10X,'CD',10X,'CL',10X,'CT',
2494           *       9X,'CPN',9X,'CPT'//,3I5,9D12.6//)
2495      C
2496            END
2497            SUBROUTINE   PRESTS (AAA,BBB,III)
2498      C
2499      C     THIS SEGMENT CONTROLS THE PRESTRESSING PROCESS.   NORCO
2500      C     ************************************************************
2501            IMPLICIT REAL*8(A-H,O-Z)
2502            COMMON /PROBCV/ NSTIF,IPRST,ISTYP,IMTYP,ITRAT,ILNGR,IHOPR,
2503           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
2504           *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
2505           *            INCBL,IEIGN,IBOND,ILINK
2506            COMMON /POINTR/
2507           *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
2508           *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
2509           *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
2510           *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
2511           *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
2512           *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
2513            COMMON /TOLER/ PT,FNUO,FNPO,KDIV
2514            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
2515            DIMENSION PRSLD(24),TEL(12),AAA(1),BBB(1),III(1)
2516      C
2517            REWIND INS
2518            REWIND IOS
2519      C
2520      C     LOOP OVER ALL ELEMENTS
2521            DO 500 ME=1,NMELM
2522            CALL ELMDT4 (ME,THK,NS,NGL,NG,III(J2),III(J3),AAA(I8),
2523           *III(J5),NDEG)
2524            CALL ELMDT3 (ME,NS,III(J5),BBB(K6),TEL(1))
2525            ME1 = ME - 1
2526            CALL CLEAR (PRSLD(1),NS*2)
2527      C
2528      C     BYPASS SOLID ELEMENT INFORMATION
2529            CALL PRSTSE (ME,NGL,NG)
2530      C
2531      C     BYPASS LONGITUDINAL REINFORCING ELEMENT INFORMATION
2532            IF(ILNGR.EQ.0) GO TO 100
2533            NL = III(J6+ME1)
2534            IF(NL.EQ.0) GO TO 100
2535            NM = III(J13+ME1)
2536            LS = III(J12+NM-1)
2537            CALL PRSTLH (NG,NS,NL,0,0,LS,NM,TEL(1),
2538           *             AAA(I17),AAA(I18),PRSLD(1))
2539      C
2540      C     BYPASS HOOP REINFORCING ELEMENT INFORMATION
2541      100   IF(IHOPR.EQ.0) GO TO 200
2542            NL = III(J7+ME1)
2543            IF(NL.EQ.0) GO TO 200
2544            NM = III(J14+ME1)
2545            LS = III(J12+NM-1)
2546            CALL PRSTLH (NG,NS,NL,1,0,LS,NM,TEL(1),
2547           *             AAA(I17),AAA(I18),PRSLD(1))
```

```
2548      C
2549      C     PRESTRESS LONG. TENDONS AND OBTAIN CORRESPONDING LOADS
2550      200   IF(ILNGP.EQ.0) GO TO 300
2551            NL = III(J8+ME1)
2552            IF(NL.EQ.0) GO TO 300
2553            NM = III(J15+ME1)
2554            LS = III(J12+NM-1)
2555            CALL PRSTLH (NG,NS,NL,0,1,LS,NM,TEL(1),
2556           *             AAA(I17),AAA(I18),PRSLD(1))
2557      C
2558      C     PRESTRESS HOOP TENDONS AND OBTAIN CORRESPONDING LOADS.
2559      300   IF(IHOPP.EQ.0) GO TO 400
2560            NL = III(J9+ME1)
2561            IF(NL.EQ.0) GO TO 400
2562            NM = III(J16+ME1)
2563            LS = III(J12+NM-1)
2564            CALL PRSTLH (NG,NS,NL,1,1,LS,NM,TEL(1),
2565           *             AAA(I17),AAA(I18),PRSLD(1))
2566      C
2567      C     FORM ICREMENT OF LOAD VECTOR
2568      400   CALL PRSTLV (ME,NS,PRSLD(1),BBB(K10),III(J5))
2569      500   CONTINUE
2570      C
2571      C     FORM TOTAL LOAD VECTOR
2572            ND = NMNOD*2
2573            DO 600 I=1,ND
2574            KC10 = K10 + I - 1
2575            BBB(KC10) = -BBB(KC10)
2576      600   BBB(K11+I-1) = BBB(KC10)
2577            CALL VCMLT (BBB(K11),BBB(K11),PT,ND)
2578      C
2579            RETURN
2580      C
2581            END
2582            SUBROUTINE PRSTLH(NG,NS,NL,IH,IP,LS,NM,TEL,STSS,STNS,PRSLD)
2583      C
2584      C     THIS SEGEMNT PRESTRESSES LOGITUDINAL OR HOOP TENDONS AND
2585      C     CALCULATES THE CORRESPONDING LOADS.                    NORCO
2586      C     ***************************************************************
2587            IMPLICIT REAL*8(A-H,O-Z)
2588            INTEGER*2 LEN1,LEN2,LEN3
2589            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
2590            DIMENSION Q(48),PHI(16),SG(32),TEL(1),PRSLD(1),
2591           *          P(10),STSS(9,1),STNS(9,1)
2592            EQUIVALENCE (SIGT,P(1)),(EPST,P(2)),(YI,P(3)),(YC,P(4)),
2593           *            (SIGP,P(5)),(EPSP,P(6)),(TC,P(7)),(XG,P(8)),
2594           *            (PHI(1),Q(1)),(SG(1),Q(17))
2595            ND = NS*2
2596            KS = (LS-1)/2 + 1
2597      C
2598      C     LOOP OVER ELEMENT LAYERS
2599            DO 700 MRB=1,NL
2600            READ(1) AREA
2601            IF(AREA.LT.1.D-10) GO TO 700
2602      C
2603      C     LOOPPOVER GAUSSIAN POINTS
2604            DO 600 JG=1,NG
2605            T    = 0.D0
```

```
      READ (1) XG1,YG1,XX,YY,W
      CALL READ (Q(1),LEN1,0,LNUM,1)
      CALL READ(P(1),LEN2,0,LNUM,INS)
C
C     PRESTRESS TENDON AT GAUSSIAN POINT
      IF(IP.EQ.0) GO TO 500
      DO 100 J=1,NS
100   T = T + PHI(J)*TEL(J)
      EPST = EPST - T*TC
      CALL STRSST (EPST,EPSP,SIGT,SIGP,YC,YI,KS,STSS(1,NM),STNS(
     *             1,NM))
C
C     FORM CORRESPONDING LOAD VECTOR
      W = W*SIGT
      IF(IH.EQ.0) GO TO 300
      DO 200 I=1,NS
      I1 = I*2 - 1
200   PRSLD(I1) = PRSLD(I1) + PHI(I)*W
      GO TO 500
300   DO 400 I=1,ND
400   PRSLD(I) = PRSLD(I) + SG(I)*W
500   CALL WRITE(P(1),LEN2,0,LNUM,IOS)
600   CONTINUE
700   CONTINUE
C
      RETURN
C
      END
      SUBROUTINE PRSTSE (ME,NGL,NG)
C
C     THIS SEGMNT BYPASSES SOLID ELEMENT INFORMATON AS PART OF
C     THE PRESTRESSING PROCESS.                                NORCO
C     ********************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      INTEGER*2 LEN1,LEN2
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
      DIMENSION Q(48),P(52)
C
      DO 200 JG=1,NG
      DO 200 IG=1,NGL
      READ(1) XG,YG,XX,YY,ANGLE,W
      CALL READ(Q(1),LEN1,0,LNUM,1)
      CALL READ(P(1),LEN2,0,LNUM,INS)
      CALL WRITE(P(1),LEN2,0,LNUM,IOS)
200   CONTINUE
C
      RETURN
C
      END
      SUBROUTINE PRSTLV (ME,NS,PRSLD,DP,NPELM)
C
C     THIS SEGMENT FORMS THE PRESTRESSING LOAD INCREMENT VECTOR.
C                                                          NORCO
C     ************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      DIMENSION PRSLD(1),DP(1),NPELM(12,1)
C
      K=0
```

```
      DO 100 I=1,12
      NODE = NPELM(I,ME)
      IF(NODE.EQ.0) GO TO 100
      K=K+1
      N2 = NODE*2
      N1 = N2 - 1
      I2 = K*2
      I1 = I2 - 1
      DP(N1) = DP(N1) + PRSLD(I1)
      DP(N2) = DP(N2) + PRSLD(I2)
  100 CONTINUE
C
      RETURN
C
      END
      SUBROUTINE STIF (IXS,AAA,CCC,III)
C
C     THIS SEGEMNT CONTROLS FORMULATION OF ELEMENT STIFFNESS AND
C     STRESS MATRICES, AS WELL AS ASSEMBLY OF STRUCTURE STIFFNE
C     SS MATRIX.                                              NORCO
C     ************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      COMMON /PROBCV/ NSTIF,IPRST,ISTYP,IMTYP,ITRAT,ILNGR,IHOPR,
     *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
     *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
     *            INCBL,IEIGN,IBOND,ILINK
      COMMON /POINTR/
     *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
     *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
     *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
     *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
     *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
     *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
      DIMENSION STIFF(2304),AAA(1),CCC(1),III(1)
C
      REWIND IXS
      CALL CLEAR(CCC(1),NSTIF)
C
C     LOOP OVER ALL ELEMENTS
      DO 500 ME=1,NMELM
      CALL ELMDT4 (ME,THK,NS,NGL,NG,III(J2),III(J3),AAA(I8),
     *III(J5),NDEG)
      ME1 = ME - 1
C
C     FORM ELEMENT STIFFNESS FOR SOLID ELEMENT
      CALL STIFSE (NS,NGL,NG,IXS,STIFF)
C
C     FORM ELEMENT STIFFNESS FOR LONGITUDINAL REINFORCING ELEM.
      IF(ILNGR.EQ.0) GO TO 100
      IF(IBOND.EQ.0) GO TO 50
      CB = AAA(I19+ME1)
      CALL ELMDT5 (ME,III(J18),NBD)
   50 NL = III(J6+ME1)
      IF(NL.EQ.0) GO TO 100
      CALL STIFLE (NS,NG,NL,IXS,0,STIFF,INCBL,IBOND,CB,THK,NDEG)
C
C     FORM ELEMENT STIFFNESS FOR HOOP REINFORCING ELEMENT
  100 IF(IHOPR.EQ.0) GO TO 200
```

```
      NL = III(J7+ME1)
      IF(NL.EQ.0) GO TO 200
      CALL STIFHE (NS,NG,NL,IXS,0,STIFF,INCBL)
C
C     FORM ELEMENT STIFFNESS FOR LONGITUDINAL PRESTRESSING ELEM.
200   IF(ILNGP.EQ.0) GO TO 300
      NL = III(J8+ME1)
      IF(NL.EQ.0) GO TO 300
      CALL STIFLE (NS,NG,NL,IXS,IPRST,STIFF,INCBL,IBOND,CB,THK,NDEG)
C
C     FORM ELEMENT STIFFNESS FOR HOOP PRESTRESSING ELEMENT
300   IF(IHOPP.EQ.0) GO TO 400
      NL = III(J9+ME1)
      IF(NL.EQ.0) GO TO 400
      CALL STIFHE (NS,NG,NL,IXS,IPRST,STIFF,INCBL)
C
C     ASSEMBLE ELEMENT STIFNESS INTO STRUCTURE STIFFNESS MATRIX
400   CALL STIFAS (ME,NS,III(J5),III(J10),CCC(1),STIFF,III(J17),
     *NMNOD,NDEG,INCBL,IBOND,NBD,III(J18))
C     PERFORM EIGEN-ANALYSIS OF EACH ELEMENT
C     IF(IEIGN.NE.0) CALL EIGEN (III(J10),CCC(1),NEQ)
500   CONTINUE
C
C     ADD BOUNDARY CONDITIONS TO STRUCTURE STIFFNESS MATRIX
      CALL STIFBC (NMEBE,III(J1),III(J10),AAA(I3),AAA(I4),AAA(I6
     *            ),CCC(1),III(J17),NMNOD)
C
C     PERFORM EIGEN-ANALYSIS OF STRUCTURE
C     IF(IEIGN.NE.0) CALL EIGEN (III(J10),CCC(1),NEQ)
      RETURN
C
      END
      SUBROUTINE STIFAS (ME,NS,NPELM,MAXA,A,ST,ID,NMNOD,NDEG,INCBL,
     * IBOND,NBD,NBELM)
C
C     THIS SEGMENT ASSEMBLES STRUCTURE STIFFNESS MATRIX.NORCO
C     ******************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      DIMENSION NPELM(12,1),MAXA(1),A(1),STVEC(820),ST(48,1),
     *SM(8,48),LM(40),ID(2,NMNOD),NBELM(16,1),SLC(8,48),SBS(16,48)
C
C     IF LAGRANGIAN ELEMENT OR INCOMPATIBLE ELEMENTS,PERFORM
C     STATIC CONDENSATION USING GAUSSIAN ELIMINATION
C
      IF(INCBL.EQ.0) GO TO 20
      LNCM = 4
      LNS  = NS*2 + 4
      GO TO 21
 20   IF(NDEG.LE.3) GO TO 70
      LNS=2*NS
      IF(NDEG.EQ.4) NUM=1
      IF(NDEG.EQ.5) NUM=4
      LNCM=2*NUM
 21   WRITE(14) ME,LNS,LNCM
      IF(INCBL.NE.0) GO TO 26
      DO 25 I=1,LNS
      DO 25 J=I,LNS
 25   WRITE(15) ST(J,I)
```

```
      26    DO 50 K=1,LNCM
            LL=LNS-K
            KK=LL+1
            DO 50 L=1,LL
            IF(ST(KK,L).EQ.0) GO TO 50
            DUM=ST(KK,L)/ST(KK,KK)
            DO 50 M=1,L
            ST(L,M)=ST(L,M)-ST(KK,M)*DUM
      50    CONTINUE
            DO 55 I=1,LNS
            DO 55 J=I,LNS
      55    ST(I,J)=ST(J,I)
C           STORE CONDENSATION DATA FOR EACH ELEMENT
            DO 65 I=1,LNCM
            K=LNS-LNCM+I
            DO 60 J=1,LNS
            SM(I,J)=ST(K,J)
      60    WRITE(14) SM(I,J)
      65    CONTINUE
            IF(INCBL.NE.0) GO TO 70
C
            NC=NS-NUM
            GO TO 75
      70    NC=NS
      75    ND=NC*2
            IF(IBOND.NE.0) ND=NC*2 + NBD
C
C           SPREAD LOWER HALF OF STIFNESS MATRIX INTO A VECTOR
            L = 0
            DO 100 I=1,ND
            DO 100 J=I,ND
            L = L  +  1
     100    STVEC(L) = ST(J,I)
C
            K=0
            DO 200 I=1,12
            IF(NPELM(I,ME).EQ.0) GO TO 200
            K=K+1
            I2 = 2*K
            LM(I2)   = ID(2,NPELM(I,ME))
            LM(I2-1) = ID(1,NPELM(I,ME))
     200    CONTINUE
C
            IF(IBOND.EQ.0) GO TO 230
            M=0
            DO 210 I=1,16
            IF(NBELM(I,ME).EQ.0) GO TO 210
            M=M+1
            K=M+NC*2
            LM(K)=ID(1,NBELM(I,ME))
      210   CONTINUE
C           ASSEMBLE ELEMENT STIFFNESS VECTOR INTO STRUCTURE
C           STIFFNESS MATRIX USING SKYLINE STORAGE ADDRESSES.
      230   NDL = 0
            DO 400 L=1,ND
            LL = LM(L)
            IF(LL) 400,400,250
      250   ML = MAXA(LL)
```

```
2838            KS = L
2839            DO 300 N=1,ND
2840            NN = LM(N)
2841            IF(NN.LE.0) GO TO 300
2842            LN = LL - NN
2843            IF(LN.LT.0) GO TO 300
2844            KK  = ML +LN
2845            KSS = KS
2846            IF(N.GE.L) KSS = N + NDL
2847            A(KK) = A(KK) + STVEC(KSS)
2848       300  KS  = KS + ND - N
2849       C
2850       400  NDL = NDL + ND - L
2851       C
2852       C
2853            RETURN
2854       C
2855            END
2856            SUBROUTINE EIGEN (MAXA,A,NEQ)
2857       C
2858       C    THIS SUBROUTINE CALCULATES EIGENVALUES,EIGENVECTORS
2859       C    AND PERFORMANCE INDEX FOR A SYMMETRIC MATRIX STORED
2860       C    TRIANGLE-WISE IN AN ARRAY OF ORDER NEQ
2861       C    ************************************************************
2862            IMPLICIT REAL*8(A-H,O-Z)
2863            DIMENSION A(1),DLAMDA(32),EIVEC(32,32),WK(560),
2864           * B(528),C(528),MAXA(1)
2865            KK = 0
2866            DO 100 I=1,NEQ
2867            ML = MAXA(I)
2868            MHT= MAXA(I+1)-MAXA(I)-1
2869            NN = I-MHT-1
2870            MLL= ML+MHT+NN
2871            L  = MLL-ML
2872            DO 100 J=ML,MLL
2873            KK = KK+1
2874            JJ = J-ML
2875            IF(J.GT.(ML+MHT)) GO TO 50
2876            B(KK) = A(JJ+ML)
2877            GO TO 75
2878         50 B(KK) = 0.D0
2879         75 LL = KK -JJ +L
2880            C(LL) = B(KK)
2881            L = L - 1
2882        100 CONTINUE
2883       C    CALL EIGRS (C,NEQ,2,DLAMDA,EIVEC,NEQ,WK,IER)
2884            DO 200 I = 1,NEQ
2885            WRITE(6,1000) DLAMDA(I)
2886            DO 200 J = 1,NEQ
2887            WRITE(6,1000) EIVEC(J,I)
2888        200 CONTINUE
2889            NSS = NEQ*(NEQ+1)/2
2890            DO 300 K = 1,NSS
2891            WRITE(6,1000) B(K),C(K)
2892        300 CONTINUE
2893            WRITE(6,4000) IER,WK(1)
2894       1000 FORMAT(1X,4D16.4)
2895       4000 FORMAT(1X,I6,4D16.4)
```

```
2896      C
2897            RETURN
2898      C
2899            END
2900            SUBROUTINE STIFBC   (NMEBE,NPEBE,MAXA,XPEBE,YPEBE,STEBE,A,
2901           *ID,NMNOD)
2902      C
2903      C     THIS SEGMENT ADDS BOUNDARY CONDITIONS TO STRUCTURE STIFFN
2904      C     ESS MATRIX IN THE FORM OF HIGH STIFFNESS SPRINGS. NORCO
2905      C     ************************************************************
2906            IMPLICIT REAL*8(A-H,O-Z)
2907            DIMENSION NPEBE(1),MAXA(1),STEBE(1),A(1),XPEBE(1),YPEBE(1),
2908           *ID(2,NMNOD)
2909      C
2910            DO 200 M=1,NMEBE
2911            N   = NPEBE(M)
2912            N2  = ID(2,N)
2913            N1  = ID(1,N)
2914            CO  = XPEBE(M)
2915            SI  = YPEBE(M)
2916            BS  = STEBE(M)
2917            IF(N2.EQ.0) GO TO 100
2918            K22 = MAXA(N2)
2919            K12 = K22 + 1
2920            A(K22) = A(K22) + BS*SI*SI
2921            A(K12) = A(K12) + BS*CO*SI
2922      100   IF(N1.EQ.0) GO TO 200
2923            K11 = MAXA(N1)
2924            A(K11) = A(K11) + BS*CO*CO
2925      200   CONTINUE
2926      C
2927            RETURN
2928      C
2929            END
2930            SUBROUTINE STIFHE (NS,NG,NL,IXS,IPRST,STIFF,INCBL)
2931      C
2932      C     THIS SEGMENT EVALUATES STIFFNESS AND STRESS MATRICES FOR
2933      C     HOOP REINFORCING(PRESTRESSING) ELEMENT.            NORCO
2934      C     ************************************************************
2935            IMPLICIT REAL*8(A-H,O-Z)
2936            INTEGER*2 LEN,LEN1,LEN2,LEN3
2937            DIMENSION PHI(16),Q(48),STIFF(32,1),P(10)
2938            EQUIVALENCE (YM,P(4)),(XG,P(8)),(PHI(1),Q(1))
2939      C
2940            ND      = 2*NS
2941      C
2942      C     LOOP OVER ELEMENT LAYERS
2943            DO 400 MRB=1,NL
2944            READ(1) AREA
2945            IF(AREA.LT.1.D-10) GO TO 400
2946      C
2947      C     LOOP OVER GAUSSIAN POINTS
2948            DO 300 JG = 1,NG
2949            READ(1) XG1,YG1,XX,YY,W
2950            CALL READ (Q(1),LEN1,0,LNUM,1)
2951            CALL READ (P(1),LEN2,0,LNUM,IXS)
2952            IF(IPRST.EQ.1) GO TO 300
2953      C
```

```
      C     FORM LOWER HALF OF STIFFNESS MATRIX.
            S = YM*W/XG
            DO 200 I=1,NS
            I1 = 2*I-1
            PPHI = S*PHI(I)
            DO 200 J=I,NS
            J1 = 2*J-1
            STIFF(J1,I1) = PHI(J)*PPHI + STIFF(J1,I1)
  200       CONTINUE
  300       CONTINUE
  400       CONTINUE
      C
            RETURN
      C
            END
            SUBROUTINE STIFLE(NS,NG,NL,IXS,IPRST,STIFF,INCBL,IBOND,
           * CB,THK,NDEG)
      C
      C     THIS SEGMENT EVALUATES STIFFNESS AND STRESS MATRICES FOR
      C     LONGITUDINAL REINFORCING(PRESTRESSING) ELEMENT.   NORCO
      C     ***************************************************************
            IMPLICIT REAL*8(A-H,O-Z)
            INTEGER*2 LEN,LEN1,LEN2,LEN3
            COMMON/DATA3/ BSTR1,BSTR2
            DIMENSION PHI(16),SG(72),STIFF(48,1),Q(88),P(10)
            EQUIVALENCE (YM,P(4)),(XG,P(8)),(PHI(1),Q(1)),(SG(1),Q(17))
           * ,(BTAU,P(7))
            ND      = 2*NS
      C
      C     LOOP OVER ELEMENT LAYERS
            MBB = 0
            DO 400 MRB=1,NL
            READ(1) AREA
            IF(AREA.LT.1.D-10) GO TO 400
            MBB = MBB+1
      C
      C     LOOP OVER GAUSSIAN POINTS
            DO 300 JG = 1,NG
            READ(1) XG1,YG1,XX,YY,W
            CALL READ (Q(1),LEN1,0,LNUM,1)
            CALL READ (P(1),LEN2,0,LNUM,IXS)
            IF(IPRST.EQ.1) GO TO 300
      C
            IF(IBOND.EQ.0) GO TO 100
      C
            W1 = CB*W/AREA
            IF(DABS(BTAU).GE.BSTR1) W1=W1*0.2D0
            IF(DABS(BTAU).GE.BSTR2) W1=W1*0.05D0
            W  = W*YM
            W2 = W*YM*AREA/CB
            IF(DABS(BTAU).GE.BSTR1) W2=W2*5.0D0
            IF(DABS(BTAU).GE.BSTR2) W2=W2*2.0D1
            IF(NDEG.EQ.2.OR.NDEG.EQ.4) NB = 3
            IF(NDEG.EQ.3.OR.NDEG.EQ.5) NB = 4
            NM = 2*NS + NB
      C
            DO 20  I=1,NM
            L = I+NM
```

```
3006            P1 = SG(I)*W
3007            II = I
3008            IF(I.GT.2*NS) II = I+NB*(MBB-1)
3009            IF(IBOND.EQ.1) GO TO 10
3010            P2 = SG(L)*W2
3011            GO TO 15
3012      10    P2 = SG(L)*W1
3013      C
3014      15    DO 20  J=I,NM
3015            JJ = J
3016            IF(J.GT.2*NS) JJ = J+NB*(MBB-1)
3017            K = J+NM
3018      C     WRITE(IO,1000) I,J,K,SG(I),SG(J),SG(K),SG(L)
3019      C     WRITE(IO,1100) W,W1,W2
3020      C1000 FORMAT(3I4,4D16.6)
3021      C1100 FORMAT(3D16.6)
3022       20   STIFF(JJ,II) = P1*SG(J)+P2*SG(K)+STIFF(JJ,II)
3023      C200  WRITE(IO,1000) I,J,K,STIFF(JJ,II)
3024      C
3025            GO TO 300
3026      C
3027      C     FORM LOWER HALF OF STIFFNESS MATRIX.
3028      C     IF INCOMPATIBLE ELEMENT USE NODELESS D.O.F
3029      100   NSS = NS
3030            IF(INCBL.NE.0) NSS = NS+2
3031            W  = W*YM
3032            DO 200 I=1,NSS
3033            I2 =  I*2
3034            I1 = I2 - 1
3035            P1 = SG(I1)*W
3036            P2 = SG(I2)*W
3037            DO 200 J=I,NSS
3038            J2 = 2*J
3039            J1 = J2-1
3040            STIFF(J1,I1) = P1*SG(J1) + STIFF(J1,I1)
3041            STIFF(J1,I2) = P2*SG(J1) + STIFF(J1,I2)
3042            STIFF(J2,I1) = P1*SG(J2) + STIFF(J2,I1)
3043      200   STIFF(J2,I2) = P2*SG(J2) + STIFF(J2,I2)
3044      300   CONTINUE
3045      C     WRITE(6,1001) STIFF(J1,I1),STIFF(J1,I2),STIFF(J2,I1),
3046      C    *  STIFF(J2,I2)
3047      C1001 FORMAT(1X,4D16.4)
3048      400   CONTINUE
3049      C
3050            RETURN
3051      C
3052            END
3053            SUBROUTINE STIFSE (NS,NGL,NG,IXS,ST)
3054      C
3055      C     THIS SEGMENT EVALUATES STIFFNESS AND STRESS MATRICES FOR
3056      C     SOLID ELEMENT.                                          NORCO
3057      C     ********************************************************
3058            IMPLICIT REAL*8(A-H,O-Z)
3059            COMMON /PROBCV/ NSTIF,IPRST,ISTYP,IMTYP,ITRAT,ILNGR,IHOPR,
3060           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
3061           *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
3062           *            INCBL,IEIGN,IBOND,ILINK
3063            INTEGER*2 LEN,LEN1,LEN2,LEN3
```

```
3064            DIMENSION PHI(16),PHIX(16),PHIY(16),Q(48),SG(4,32),
3065           *ST(48,48),CM(4,4),P(52)
3066            EQUIVALENCE (CM(1,1),P(16)),(PHI(1),Q(1)),(PHIX(1),Q(17)),
3067           *            (PHIY(1),Q(33)),(XG,P(14)),(ZETA,P(13))
3068      C
3069            ND   = 2*NS
3070            CALL CLEAR (ST(1,1),2304)
3071      C
3072      C     LOOP OVER GAUSSIAN POINTS
3073            DO 400 JG=1,NG
3074            DO 400 IG=1,NGL
3075      C
3076            READ (1) XG1,YG1,XX,YY,ANGLE,W
3077            CALL READ (Q(1),LEN1,0,LNUM,1)
3078            CALL READ(P(1),LEN3,0,LNUM,IXS)
3079      C     CALL TRANSF (CM(1,1),-ZETA,ISTYP)
3080      C
3081      C     FORM C-B MATRIX FOR GAUSS POINT
3082      C     IF INCOMPATIBLE ELEMENT INCLUDE NODELESS D.O.F
3083            NSS = NS
3084            IF(INCBL.NE.0) NSS = NS+2
3085            DO 100 J=1,NSS
3086            J2 = 2*J
3087            J1 = J2-1
3088            PX = PHIX(J)
3089            PY = PHIY(J)
3090            IF(ISTYP.EQ.0) GO TO 70
3091            PZ = PHI(J)/XG
3092            GO TO 80
3093         70 PZ = 0.D0
3094         80 SG(1,J1) = CM(1,1)*PX + CM(1,3)*PZ + CM(1,4)*PY
3095            SG(2,J1) = CM(2,1)*PX + CM(2,3)*PZ + CM(2,4)*PY
3096            SG(3,J1) = CM(3,1)*PX + CM(3,3)*PZ + CM(3,4)*PY
3097            SG(4,J1) = CM(4,1)*PX + CM(4,3)*PZ + CM(4,4)*PY
3098      C
3099            SG(1,J2) = CM(1,2)*PY + CM(1,4)*PX
3100            SG(2,J2) = CM(2,2)*PY + CM(2,4)*PX
3101            SG(3,J2) = CM(3,2)*PY + CM(3,4)*PX
3102            SG(4,J2) = CM(4,2)*PY + CM(4,4)*PX
3103      100   CONTINUE
3104      C
3105      C     FORM LOWER HALF OF ELEMENT STIFFNESS(SUMMATION OF BT-C-B)
3106            DO 300 I=1,NSS
3107            I2 = 2*I
3108            I1 = I2-1
3109            PX = W*PHIX(I)
3110            PY = W*PHIY(I)
3111            IF(ISTYP.EQ.0) GO TO 170
3112            PZ = W*PHI(I)/XG
3113            GO TO 180
3114         170 PZ = 0.0D0
3115         180 DO 300 J = I,NSS
3116            J2 = 2*J
3117            J1 = J2-1
3118            ST(J1,I1) = ST(J1,I1)+SG(1,J1)*PX+SG(3,J1)*PZ+SG(4,J1)*PY
3119            ST(J2,I1) = ST(J2,I1)+SG(1,J2)*PX+SG(3,J2)*PZ+SG(4,J2)*PY
3120            ST(J1,I2) = ST(J1,I2)+SG(2,J1)*PY+SG(4,J1)*PX
3121            ST(J2,I2) = ST(J2,I2)+SG(2,J2)*PY+SG(4,J2)*PX
```

```
 3122      300   CONTINUE
 3123      C
 3124      C     WRITE(6,1001) ST(J1,I1),ST(J1,I2),ST(J2,I1),
 3125      C    *  ST(J2,I2)
 3126      C1001 FORMAT(1X,4D16.4)
 3127      400   CONTINUE
 3128      C
 3129      600   RETURN
 3130      C
 3131            END
 3132            SUBROUTINE STRESS (AAA,BBB,III)
 3133      C
 3134      C     THIS SEGMENT CONTROLS EVALUATION OF STRESSES AND UPDATING
 3135      C     OF STRAINS AND MATERIAL PROPERTIES.                  FEAPRCS6
 3136      C     ************************************************************
 3137            IMPLICIT REAL*8(A-H,O-Z)
 3138            COMMON /PROBCV/ NSTIF,IPRST,ISTYP,IMTYP,ITRAT,ILNGR,IHOPR,
 3139           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
 3140           *          NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
 3141           *            INCBL,IEIGN,IBOND,ILINK
 3142            COMMON /POINTR/
 3143           *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
 3144           *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
 3145           *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
 3146           *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
 3147           *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
 3148           *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
 3149            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
 3150            DIMENSION DEL(48),TEL(12),AAA(1),BBB(1),III(1),SM(8,48),RM(8)
 3151      C
 3152            REWIND INS
 3153      C     REWIND IOS
 3154      C
 3155            IWIND=0
 3156      C     LOOP OVER ALL ELEMENTS
 3157            DO 500 ME=1,NMELM
 3158            CALL ELMDT4 (ME,THK,NS,NGL,NG,III(J2),III(J3),AAA(I8),
 3159           *III(J5),NDEG)
 3160            IF(NDEG.GT.3.OR.INCBL.NE.0)IWIND=IWIND+1
 3161            IF(IWIND.EQ.1) REWIND 14
 3162            IF(IWIND.EQ.1.AND.ITRAT.GE.1.AND.INCBL.EQ.0) REWIND 16
 3163            IF(IBOND.EQ.0) GO TO 5
 3164            CB = AAA(I19+ME-1)
 3165            CALL ELMDT5 (ME,III(J18),NBD)
 3166            CALL ELMDT6 (ME,NS,DEL(1),III(J5),BBB(K10),NMNOD,III(J17),
 3167           *   III(J18),NBD)
 3168            GO TO 6
 3169        5   CALL ELMDT2 (ME,NS,DEL(1),III(J5),BBB(K10),NMNOD,III(J17))
 3170            IF(INCBL.EQ.0) GO TO 6
 3171            GO TO 7
 3172        6   IF(NDEG.LE.3) GO TO 50
 3173        7   READ(14) ME,LNS,LNUM
 3174            DO 20 I=1,LNUM
 3175            DO 10 J=1,LNS
 3176       10   READ(14) SM(I,J)
 3177       20   CONTINUE
 3178       25   DO 40 J=1,LNUM
 3179            JJ=LNS-LNUM+J
```

```
3180            DUM=0.0D0
3181            K=JJ-1
3182            DO 30 I=1,K
3183         30 DUM=DUM+SM(J,I)*DEL(I)
3184            IF(ITRAT.LT.1.OR.INCBL.NE.0) GO TO 35
3185            READ(16) RM(J)
3186            DEL(JJ)=(RM(J)-DUM)/SM(J,JJ)
3187            GO TO 40
3188         35 DEL(JJ)=-DUM/SM(J,JJ)
3189         40 CONTINUE
3190         50 ME1 = ME - 1
3191            IF(ITEMP.EQ.0) GO TO 100
3192            CALL CLEAR (TEL(1),12)
3193            CALL ELMDT3 (ME,NS,III(J5),BBB(K17),TEL(1))
3194      C
3195      C     UPDATE STRESSES AND MATERIAL PROPERTIES FOR SOLID ELEMENT
3196      100   NM = III(J4+ME1)
3197            LS = III(J12+NM-1)
3197.08        ITENS = 0
3197.5         IF(ILNGR.EQ.0) GO TO 110
3197.7         NL = III(J6+ME1)
3197.8         IF(NL.EQ.0) GO TO 110
3197.83        ITENS = 1
3198      110   CALL STRSSE (ME,NS,NGL,NG,DEL(1),TEL(1),III(J4),III(J12),
3199           * BBB(K1),AAA(I17),AAA(I18),ISTYP,NMPAR,ITEMP,INCBL,ITENS)
3200      C
3201      C     UPDATE STRESSES AND MATERIAL PROPERTIES FOR LONGITUDINAL
3202      C     REINFORCING ELEMENT
3203       150  IF(ILNGR.EQ.0) GO TO 200
3204            NL = III(J6+ME1)
3205            IF(NL.EQ.0) GO TO 200
3206            NM = III(J13+ME1)
3207            LS = III(J12+NM-1)
3208            CALL STRSLH (NS,NG,NL,0,LS,NM,DEL(1),TEL(1),AAA(I17),
3209           * AAA(I18),0,ITEMP,INCBL,BBB(K1),NMPAR,IBOND,NBD,CB,NDEG)
3210      C
3211      C     UPDATE STRESSES AND MATERIAL PROPERTIES FOR HOOP
3212      C     REINFORCING ELEMENT
3213      200   IF(IHOPR.EQ.0) GO TO 300
3214            NL = III(J7+ME1)
3215            IF(NL.EQ.0) GO TO 300
3216            NM = III(J14+ME1)
3217            LS = III(J12+NM-1)
3218            CALL STRSLH (NS,NG,NL,1,LS,NM,DEL(1),TEL(1),AAA(I17),
3219           * AAA(I18),0,ITEMP,INCBL,BBB(K1),NMPAR,IBOND,NBD,CB,NDEG)
3220      C
3221      C     UPDATE STRESSES AND MATERIAL PROPERTIES FOR LONGITUDINAL
3222      C     PRESTRESSING ELEMENT
3223      300   IF(ILNGP.EQ.0) GO TO 400
3224            NL = III(J8+ME1)
3225            IF(NL.EQ.0) GO TO 400
3226            NM = III(J15+ME1)
3227            LS = III(J12+NM-1)
3228            CALL STRSLH (NS,NG,NL,0,LS,NM,DEL(1),TEL(1),AAA(I17),
3229           *AAA(I18),IPRST,ITEMP,INCBL,BBB(K1),NMPAR,IBOND,NBD,CB,NDEG)
3230      C
3231      C     UPDATE STRESSES AND MATERIAL PROPERTIES FOR HOOP
3232      C     PRESTRESSING ELEMENT
```

```
 3233      400   IF(IHOPP.EQ.0) GO TO 500
 3234            NL = III(J9+ME1)
 3235            IF(NL.EQ.0) GO TO 500
 3236            NM = III(J16+ME1)
 3237            LS = III(J12+NM-1)
 3238            CALL STRSLH (NS,NG,NL,1,LS,NM,DEL(1),TEL(1),AAA(I17),
 3239           *AAA(I18),IPRST,ITEMP,INCBL,BBB(K1),NMPAR,IBOND,NBD,CB,NDEG)
 3240      C
 3241      500   CONTINUE
 3242      C
 3243            RETURN
 3244      C
 3245            END
 3246            SUBROUTINE STRSLH (NS,NG,NL,IH,LS,NM,DEL,TEL,STSS
 3247           *,STNS,IPRST,ITEMP,INCBL,EMP,NMPAR,IBOND,NBD,CB,NDEG)
 3248      C
 3249      C     THIS SEGMENT CALCULATES STRESSES AND UPDATES STRAINS AND
 3250      C     MATERIAL PROPERTIES FOR LONGITUDINAL(HOOP)ELEMENT.NORCO
 3251      C     ***************************************************************
 3252            IMPLICIT REAL*8(A-H,O-Z)
 3253            INTEGER*2 LEN1,LEN2,LEN3
 3254            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
 3254.1          COMMON /DATA3/ BSTR1,BSTR2
 3255            DIMENSION Q(88),PHI(16),SG(72),DEL(1),EMP(NMPAR,1),
 3256           *          TEL(1),P(10),STSS(9,1),STNS(9,1)
 3257            EQUIVALENCE (SIGT,P(1)),(EPST,P(2)),(YI,P(3)),(YC,P(4)),
 3258           *          (SIGP,P(5)),(EPSP,P(6)),(BTAU,P(7)),(XG,P(8)),
 3259           *            (PHI(1),Q(1)),(SG(1),Q(17))
 3260            KS = (LS-1)/2 + 1
 3261      C
 3262      C     LOOPPOVER ELEMENT LAYERS
 3263            MBB = 0
 3264            DO 900 MRB=1,NL
 3265            READ(1) AREA
 3266            IF(AREA.LT.1.D-10) GO TO 900
 3267            MBB = MBB+1
 3268      C
 3269      C     LOOPPOVER GAUSSIAN POINTS
 3270            DO 800 JG=1,NG
 3271            READ (1) XG1,YG1,XX,YY,W
 3272            CALL READ (Q(1),LEN1,0,LNUM,1)
 3273            CALL READ(P(1),LEN2,0,LNUM,INS)
 3274            IF(IPRST.EQ.1) GO TO 700
 3275            IF(IH.EQ.1) GO TO 200
 3276      C
 3277      C     OBTAIN STRAIN INCREMENT FOR LONGITUDINAL ELEMENT
 3278      C     IF INCOMPATIBLE ELEMENTS INCLUDE TERMS CORRESPONDING
 3279      C     TO NODELESS D.O.F
 3280            NSS = NS
 3281            IF(INCBL.NE.0) NSS = NS+2
 3282            DO 100 J=1,NSS
 3283            J2 = 2*J
 3284            J1 = J2 - 1
 3285      100   EPST = EPST + SG(J1)*DEL(J1) + SG(J2)*DEL(J2)
 3286            IF(IBOND.EQ.0) GO TO 400
 3287            IF(NDEG.EQ.2.OR.NDEG.EQ.4) NB=3
 3288            IF(NDEG.EQ.3.OR.NDEG.EQ.5) NB=4
 3289            DO 150 I = 1,NB
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3290            NSI = 2*NS  + I
3291            NS4 = NSI + NB*(MBB-1)
3292       150  EPST = EPST + SG(NSI)*DEL(NS4)
3293            GO TO 400
3294       C
3295       C    OBTAIN STRAIN INCREMENT FOR HOOP ELEMENT
3296       C    NOTE: NODELESS D.O.F FOR INCOMPATIBLE ELEMENTS ARE
3297       C    NOT USED FOR HOOP ELEMENT
3298       200  DO 300 J=1,NS
3299       300  EPST = EPST + PHI(J)*DEL(J*2-1)/XG
3300       400  IF(ITEMP.EQ.0) GO TO 600
3301            T = 0.D0
3302            DO 500 I=1,NS
3303       500  T = T + PHI(J)*TEL(J)
3304            TC = EMP(LS,NM)
3305            EPST = EPST - T*TC
3306       C
3307       600  CALL STRSST (EPST,EPSP,SIGT,SIGP,YC,YI,KS,STSS(1,NM),STNS(
3308           *                1,NM))
3309            IF(IBOND.EQ.0) GO TO 700
3310            IF(IBOND.NE.1) GO TO 645
3310.1          OLBTAU = BTAU
3311            DO 640 I=1,NB
3312            MNB=I+4*NS+NB
3313            K=2*NS+I+NB*(MBB-1)
3314       640  BTAU=BTAU+SG(MNB)*DEL(K)*CB
3314.1          IF(DABS(BTAU).LT.BSTR1) GO TO 700
3314.108        IF(DABS(BTAU).LT.DABS(OLBTAU)) GO TO 700
3314.15         SBTAU = BTAU/DABS(BTAU)
3314.4          BTAU = SBTAU*(BSTR1+(DABS(BTAU)-BSTR1)*0.2D0)
3314.7          IF(DABS(BTAU).GT.BSTR2) GO TO 641
3315            GO TO 700
3315.1     641  BTAU = SBTAU*(BSTR2+(DABS(BTAU)-BSTR2)*0.05D0)
3315.2          GO TO 700
3316       645  WBS=YC*AREA
3317            DO 650 I=1,NS
3318            J2=I*2+2*NS+NB
3319            J1=J2-1
3320            I2=2*I
3321            I1=I2-1
3322       650  BTAU=BTAU+SG(J2)*DEL(I2)+SG(J1)*DEL(I1)
3323            DO 660 I=1,NB
3324            J=4*NS+NB+I
3325            K=2*NS+I+NB*(MBB-1)
3326       660  BTAU=BTAU+SG(J)*DEL(K)
3327            BTAU=BTAU*WBS
3328       700  CALL BSRF(IOS,1)
3329            CALL WRITE(P(1),LEN2,0,LNUM,IOS)
3330       800  CONTINUE
3331       900  CONTINUE
3332            RETURN
3333            END
3334            SUBROUTINE STRSSE (ME,NS,NGL,NG,DEL,TEL,MATSE,NMP,EMP,
3335           *            STSS,STNS,ISTYP,NMPAR,ITEMP,INCBL,ITENS)
3336       C
3337       C     SEGMENT TO CONTROL STRESS, STRAIN AND MATERIAL PROPERTIES
3338       C     CALCULATIONS AT THE GAUSSIAN POINTS FOR A SOLID ELEMENT
3339       C                                                      NORCO
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3340      C     ************************************************************
3341            IMPLICIT REAL*8(A-H,O-Z)
3342            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
3343            COMMON /DATA1/CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI
3344            DIMENSION DEL(1),TEL(1),EMP(NMPAR,1),STSS(9,1),STNS(9,1),
3345           *          PHI(16),PHIX(16),PHIY(16),EPSI(4),Q(48),NMP(1)
3346           *          ,MATSE(1)
3347            EQUIVALENCE (PHI(1),Q(1)),(PHIX(1),Q(17)),(PHIY(1),Q(33))
3348      C
3349            NM = MATSE(ME)
3350            LS = NMP(NM)
3351            IF(LS.LE.11) MS=1
3352            IF(LS.EQ.25) MS=2
3353            IF(LS.EQ.18) MS=3
3354            IF(LS.EQ.14) MS=4
3355      C     LOOP OVER GAUSSIAN POINTS
3356      150   DO 900 JG=1,NG
3357            DO 900 IG=1,NGL
3358      C
3359            READ (1) XG,YG,XX,YY,ANGLE,W
3360            CALL READ (Q(1),LEN1,0,LNUM,1)
3361      C
3362      C     CALCULATE TOTAL STRAIN INCREMENT AND SUBINCREMENT
3363      C     INCLUDE NODELESS D.O.F IF INCOMPATIBLE ELEMENT
3364            NSS = NS
3365            IF(INCBL.NE.0) NSS = NS+2
3366            CALL CLEAR (EPSI(1),4)
3367            DO 200 J=1,NSS
3368            VJ = DEL(2*J)
3369            UJ = DEL(2*J-1)
3370            EPSI(1) = EPSI(1) + PHIX(J)*UJ
3371            EPSI(2) = EPSI(2) + PHIY(J)*VJ
3372            IF(ISTYP.EQ.0) GO TO 200
3373            EPSI(3) = EPSI(3) + PHI(J)*UJ*DFLOAT(ISTYP)/XG
3374      200   EPSI(4) = EPSI(4) + PHIY(J)*UJ + PHIX(J)*VJ
3375      C
3376            IF(ITEMP.EQ.0) GO TO 350
3377            T = 0.D0
3378            DO 250 I=1,NS
3379      250   T = T + PHI(I)*TEL(I)
3380            DO 300 I=1,3
3381      300   EPSI(I) = EPSI(I) - T*EMP(7+I,NM)
3382      C
3383      350   DO 400 I=1,4
3384      400   EPSI(I) = EPSI(I)/DFLOAT(NI)
3385      C
3386      C     BRANCH TO MATERIAL MODEL
3387            GO TO (500,600,700,800),MS
3388      C
3389      C     ELASTIC ISOTROPIC AND ORTHOTROPIC MODELS
3390      500   CALL STRSSG (EPSI,ISTYP)
3391            GO TO 900
3392      C
3393      C     HYPOELASTIC MODEL
3394      600   CALL STRSSH (EMP(1,NM),STSS(1,NM),STNS(1,NM),EPSI,
3395           *             ISTYP)
3396            GO TO 900
3397      C
```

```
3398      C     PLASTIC MODEL
3399      700   CALL STRSSP (EMP(1,NM),STSS(1,NM),EPSI,ISTYP,ANGLE)
3400            GO TO 900
3401      C
3402      C     PSEUDO-ELASTIC CRACKING TENSION SOFTENING MODEL
3403      800   CALL STRSCR (EMP(1,NM),EPSI,ISTYP,ITENS)
3404      C
3405      900   CONTINUE
3406      C
3407            RETURN
3408      C
3409            END
3410            SUBROUTINE STRSSG (EPSI,ISTYP)
3411      C
3412      C     SEGMENT TO CONTROL STRESS CALCULATIONS OF ELASTIC MATRIALS
3413      C                                                        NORCO
3414      C     ************************************************************
3415            IMPLICIT REAL*8(A-H,O-Z)
3416            INTEGER*2 LEN
3417            DIMENSION EPSI(4),SIGP(3),SIGT(4),SIGL(4),CM(4,4),ISFT(4),
3418           *          P(52)
3419            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
3420            EQUIVALENCE (SIGP(1),P(1)),(SIGL(1),P(4)),(SIGT(1),P(8)),
3421           *           (GAMA,P(12)),(XG,P(14)),(ZETA,P(13)),
3422           *           (CM(1,1),P(16)),(ISFT(1),P(32))
3423      C
3424            CALL READ (P,LEN,0,LNUM,INS)
3425      C
3426            DO 100 I=1,4
3427            DO 100 J=1,4
3428      100   SIGL(I)= SIGL(I) + CM(J,I)*EPSI(J)
3429      C
3430            CALL TRANSS (SIGL,SIGT,-ZETA)
3431            CALL TRANSP (SIGT,SIGP,GAMA)
3432            CALL BSRF (IOS,1)
3433            CALL WRITE (P,LEN,0,LNUM,IOS)
3434      C
3435            RETURN
3436      C
3437            END
3438            SUBROUTINE STRSSH (EMP,STSS,STNS,EPSI,ISTYP)
3439      C
3440      C     SEGMENT TO CONTROL STRESS CALCULATIONS FOR HYPOELASTIC
3441      C     MATERIAL MODEL.                                    NORCO
3442      C     ************************************************************
3443            IMPLICIT REAL*8(A-H,O-Z)
3444            INTEGER*2 LEN
3445            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
3446            COMMON /DATA1/CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI,KX
3447            DIMENSION SIGT(4),SIGL(4),SIGP(3),SIGC(4),EPSQ(4),EPSL(4),
3448           *          EPSC(4),EMDC(4),EMDI(4),PRTC(3),PRTI(3),SIGD(4),
3449           *          EPSI(4),ISFT(4),SIGQ(4),CM(4,4),EMP(1),
3450           *          DEL(1),TEL(1),P(52),Q(48),STSS(1),STNS(1)
3451            EQUIVALENCE  (SIGP(1),P(1)),(SIGL(1),P(4)),(SIGT(1),P(8)),
3452           *          (GAMA,P(12)),(ZETA,P(13)),(XG,P(14)),
3453           *          (CM(1,1),P(16)),(ISFT(1),P(32)),
3454           *          (EPSQ(1),P(34)),(EPSC(1),P(38)),(SIGC(1),P(42)),
3455           *          (EMDC(1),P(46)),(PRTC(1),P(50))
```

```
3456      C
3457            FCU = EMP(12)
3458            ECU = EMP(19)
3459            FTU = -FCU*EMP(14)
3460            ETU = -ECU*EMP(21)
3461            DO 100 I=1,3
3462            EMDI(I) = EMP(I)
3463            PRTI(I) = EMP(4+I)
3464      100   CONTINUE
3465            EMDI(4) = EMP(4)
3466      C
3467            CALL READ (P(1),LEN,0,LNUM,INS)
3468      C
3469      C     TRANSFORM STRAIN SUBINCREMENT INTO LOCAL COORDINATE SYSTEM
3470            CALL TRANSE (EPSI(1),EPSL(1),ZETA)
3471      C
3472      C     LOOP OVER STARIN SUBINCREMENTS
3473            DO 800 N=1,NI
3474      C
3475      C     UPDATE LOCAL STRESSES
3476            DO 300 I=1,4
3477            SIGQ(I)   = SIGL(I)
3478            DO 200 J=1,4
3479      200   SIGL(I)    = SIGL(I) + CM(J,I)*EPSL(J)
3480      300   CONTINUE
3481      C
3482      C     UPDATE EQUIVALENT UNIAXIAL STARINS
3483            DO 400 I=1,4
3484            IF(ISFT(I).EQ.2) GO TO 400
3485            IF(SIGQ(I)*SIGL(I).LT.0.D0) EMDC(I) = EMDI(I)
3486            EPSQ(I) = EPSQ(I) + (SIGL(I) - SIGQ(I))/EMDC(I)
3487            IF(EPSQ(I)*SIGL(I).LT.0.D0) EPSQ(I) = SIGL(I)/EMDC(I)
3488      400   CONTINUE
3489      C
3490      C     UPDATE STRENGTH AND DEFORMATION PARAMETERS
3491            CALL STREN(SIGL(1),SIGL(1),STSS(1),SIGC(1),FCU,FCU,FTU)
3492            CALL STREN(SIGL(1),EPSQ(1),STNS(1),EPSC(1),FCU,ECU,ETU)
3493      C      CALL STREN(SIGL(1),SIGC(1),STSS(1,NM),FCU,FTU,0)
3494      C      CALL STREN(EPSQ(1),EPSC(1),STNS(1,NM),ECU,ETU,1)
3495      C
3496            DO 500 I=1,4
3497            IF(ISFT(I).EQ.2) GO TO 500
3498            IF(DABS(SIGC(I)).GT.DABS(EMDI(I)*EPSC(I))) EPSC(I)=SIGC(I)
3499           *                                                    /EMDI(I)
3500      500   CONTINUE
3501      C
3502      C     UPDATE STRESSES AND MATERIAL PROPERTIES
3503            DO 600 I=1,4
3504            IF(ISFT(I).EQ.2) GO TO 600
3505            CALL SAENZ (SIGL(I),EPSQ(I),SIGC(I),EPSC(I),EMDC(I),
3506           *            EMDI(I),ISFT(I),I,ISTYP)
3507      600   CONTINUE
3508            DO 700 I=1,3
3509      700   PRTC(I) = POISN (PRTI(I),EPSQ(I),EPSC(I))
3510      C
3511      C     FORM CONSTITUTIVE MATRIX
3512            CALL CONSTM(EMDC(1),PRTC(1),CM(1,1))
3513      800   CONTINUE
```

```
      C
      C     TRANSFORM LOCAL STRESSES INTO GLOBAL COORDINATE SYSTEM AND
      C     OBTAIN PRINCIPAL STRESSES.
            CALL TRANSS (SIGL(1),SIGT(1),-ZETA)
            CALL TRANSP (SIGT(1),SIGP(1),GAMA)
      C
      C     WRITE UPDATED INFORMATION ON FILE.
            CALL WRITE (P(1),LEN,0,LNUM,IOS)
      C
            RETURN
      C
            END
            SUBROUTINE STRSSP (EMP,STSS,EPSI,ISTYP,ANGLE)
      C
      C     SEGMENT TO CONTROL STRESS CALCULATIONS FOR ELASTIC PLASTIC
      C     MATERIAL MODEL
      C     ***************************************************************
            IMPLICIT REAL*8(A-H,O-Z)
            INTEGER*2 LEN
            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
            COMMON /DATA1/CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI,KX
            DIMENSION EPSI(1),SIGI(4),SIGT(4),CM(4,4),SIGQ(4),SIGP(3),
           *          EPSD(4),DFDSG(4),DLM(4),DM(4,4),P(52),STSS(1),
           *          EMP(1),ISFT(4),SIGL(4)
            EQUIVALENCE (SIGP(1),P(1)),(SIGL(1),P(4)),(SIGT(1),P(8)),
           *            (GAMA,P(12)),(BETA,P(13)),(XG,P(14)),
           *            (DM(1,1),P(16)),(CM(1,1),P(34)),(FO,P(50)),
           *            (HVGO,P(51)),(ISFT(1),P(32))
            FCU = EMP(12)
            FTU =-EMP(14)*FCU
            CALL READ (P(1),LEN,0,LNUM,INS)
            DO 50 I =1,4
            SIGI(I) = 0.D0
            DO 50 J =1,4
            SIGI(I) = SIGI(I) + CM(J,I)*EPSI(J)
     50     CONTINUE
      C
      C     LOOP OVER STRAIN SUBINCREMENTS
            DO 950 N=1,NI
      C
      C     UPDATE TOTAL STRESSES
            DO 100 I=1,4
            EPSD(I) = EPSI(I)
            SIGQ(I) = SIGT(I) + SIGI(I)
     100    CONTINUE
      C
            CALL TRANSP(SIGQ,SIGP,GAMA)
            CALL WILAMG (SIGP,STSS,FCU,SIGQ,DFDSG,FN,HVG)
            IF(FN.GT.0.D0) GO TO 150
      C
      C     ELASTIC STRAIN INCREMENT.
            ISFT(1) = 0
            GO TO 850
      C
      C     INELASTIC STRAIN INCREMENT
     150    IF (ISFT(1).NE.0) GO TO 400
            ISFT(1) = 1
      C
```

```
3572      C     SCALE ELASTIC STRESS INCREMENT TO INTERSECT YIELD SURFACE
3573            XI = -FO/(FN - FO)
3574            DO 200 I=1,4
3575            SIGQ(I) = SIGT(I) + XI*SIGI(I)
3576      200   CONTINUE
3577            CALL TRANSP (SIGQ,SIGP,GAMA)
3578            CALL WILAMG (SIGP,STSS,FCU,SIGQ,DFDSG,FN,HVG)
3579      C
3580      C     CORRECT THE ELATIC STRESS INCREMENT
3581            IF(FN.LT.1.D-6) GO TO 300
3582            DFDSDS = 0.D0
3583            DO 250 I=1,4
3584      250   DFDSDS = DFDSDS + DFDSG(I)*SIGI(I)
3585            XI = XI - FN/DFDSDS
3586      300   DO 350 I=1,4
3587            SIGQ(I) = SIGT(I) + XI*SIGI(I)
3588      350   EPSD(I) = EPSI(I)*(1.D0-XI)
3589            CALL TRANSP(SIGQ,SIGP,GAMA)
3590            CALL WILAMG (SIGP,STSS,FCU,SIGQ,DFDSG,FN,HVG)
3591      C
3592      C     CHECK FOR CRACKING
3593      400   II      = 0
3594      C      DO 450 I=1,3
3595      C      IF(SIGP(I).GE.0.D0.AND.ISFT(1).NE.0) II = 1
3596      C450   CONTINUE
3597      C      IF(II.EQ.0.OR.HVG.LT.HVGO) GO TO 500
3598      C      CALL WILAMC (SIGP,SIGQ,EPSD,GAMA,BETA,ISFT,CM)
3599      C      GO TO 850
3600      C
3601      C     FORM PLASTIC STRAIN INCREMENT AND UPDATE STRESS VECTOR
3602      500   DO 550 I=1,4
3603            DLM(I)  = 0.D0
3604            DO 550 J=1,4
3605            DLM(I)  = DLM(I) + DFDSG(J)*CM(J,I)
3606      550   CONTINUE
3607      C
3608            DETA    = 0.D0
3609            DO 600 I=1,4
3610            DETA    = DETA + DFDSG(I)*DLM(I)
3611            DO 600 J=1,4
3612            DM(I,J) = DLM(I)*DLM(J)
3613      600   CONTINUE
3614      C
3615            DO 650 I=1,4
3616            DO 650 J=1,4
3617            DM(I,J) = CM(I,J) - DM(I,J)/DETA
3618      650   CONTINUE
3619      C
3620            DO 700 I=1,4
3621            DO 700 J=1,4
3622            SIGQ(I) = SIGQ(I) + DM(I,J)*EPSD(J)
3623      700   CONTINUE
3624      C
3625      C     SCALE THE STRESSES BACK TO THE YIELD SURFACE
3626            CALL TRANSP (SIGQ,SIGP,GAMA)
3627            CALL WILAMG (SIGP,STSS,FCU,SIGQ,DFDSG,FN,HVG)
3628            DFDSG2  = 0.0
3629            DO 750 I=1,4
```

```
      750   DFDSG2  = DFDSG2 + DFDSG(I)**2
            DFDSG2  = FN/DFDSG2
            DO 800 I=1,4
      800   SIGQ(I) = SIGQ(I) - DFDSG2*DFDSG(I)
      C
      850   CALL TRANSP (SIGQ,SIGP,GAMA)
            CALL WILAMG (SIGP,STSS,FCU,SIGQ,DFDSG,FN,HVG)
      C
            DO 900 I=1,4
            SIGT(I) = SIGQ(I)
      900   CONTINUE
            HVGO = HVG
            FO   = FN
      950   CONTINUE
      C
      C     TRANSFER TO LOCAL STRESSES AND STORE GAUSS POINT DATA
            CALL TRANSS (SIGT,SIGL,ANGLE)
            CALL WRITE (P,LEN,0,LNUM,IOS)
      C
            RETURN
      C
      1000  FORMAT(//,'NUMBER OF ITERATES (',I3,' ) EXCEEDED ',I3,
           *      ' IN ROUTINE WILAMF. FN = ',E12.6,'  FO = ',E12.6)
      C
            END
            SUBROUTINE STRSCR(EMP,EPSI,ISTYP)
      C
      C     THIS SEGMENT CONTROLS STRESS CALCULATIONS,
      C     UPDATES THE CONSTITUTIVE MATRIX AND
      C     STORES UPDATED INFORMATION FOR PSEUDO-ELASTIC
      C     CRACKING TENSION-SOFTENING CONCRETE MODEL
      C     ************************************************************
      C     ********************** ELCRAC.24 ***********************
      C     THIS ASSUMES AXES OF ORTHOTROPY ALONG AND NORMAL TO CRACK
      C     ************************************************************
            IMPLICIT REAL*8(A-H,O-Z)
            INTEGER*2 LEN
            COMMON /DATA1/CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI
            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
            DIMENSION EPSI(4),EPSP(3),SIGP(3),SIGT(4),SIGL(4),EPSL(4),
           * CM(4,4),DM(4,4),P(41),IWA(4),WA(4),EMP(1),EPST(4),SIGQ(4)
           *        ,EPSQ(4)
            EQUIVALENCE (SIGP(1),P(1)),(SIGL(1),P(4)),(SIGT(1),P(8)),
           *  (GAMA,P(12)),(ZETA,P(13)),(XG,P(14)),(YG,P(15)),
           *  (CM(1,1),P(16)),(IWA(1),P(32)),(WA(1),P(34)),
           *  (EPST(1),P(38))
      C
            CALL READ (P(1),LEN,0,LNUM,INS)
      C     DETERMINE PRINCIPAL STRAINS AND ASSUME AXES OF
      C     ORTHOTROPY ALONG DIRECTIONS OF PRINCIPAL STRAINS
      C     ONCE CRACKED,FIX DIRECTION OF ORTHOTROPY ALONG
      C     AND PERPENDICULAR TO THE CRACK
            EC  = EMP(1)
            PR  = EMP(5)
            FCU = EMP(12)
            FTU = EMP(13)
            EUT = EMP(14)
            PEAKS = EMP(13)/EMP(1)
```

```
3688            C = 1.0D0/(1.0D0-PR**2)
3689            IF(IWA(1).GE.1.OR.IWA(2).GE.1) GO TO 20
3690      C
3691            IF(DABS(EPST(1)).LT.1.D-10.AND.DABS(EPST(2)).LT.1.D-10)
3692           *       GO TO 25
3693            EPST(4) = EPST(4)/2.D0
3694            CALL TRANSP (EPST(1),EPSP(1),ZETA)
3695            EPST(4) = EPST(4)*2.D0
3696         20 CALL TRANSE (EPSI(1),EPSQ(1),ZETA)
3697      C
3698            CALL TRANSS (SIGT(1),SIGQ(1),ZETA)
3699            IF(IWA(1).GE.1.OR.IWA(2).GE.1) GO TO 75
3700      C
3701         25 DO 30 I = 1,4
3702            DO 30 J = 1,4
3703         30 SIGT(I) = SIGT(I)+EPSI(J)*CM(I,J)
3704            CALL TRANSP (SIGT(1),SIGP(1),GAMA)
3705            IF(SIGP(1)*SIGP(2).LT.0.D0) GO TO 40
3706            GO TO 45
3707         40 FTU  = EMP(12)/(SIGP(2)/SIGP(1)+EMP(12)/EMP(13))
3708            IF(FTU/EMP(13).LT.0.5D0) FTU = 0.5D0*EMP(13)
3709            IF(FTU.GT.EMP(13)) FTU = EMP(13)
3710         45 IF(SIGP(1).LE.FTU.AND.SIGP(2).LE.FTU) GO TO 90
3711      C
3712            WA(1) = FTU
3713            CALL TRANSS (SIGT(1),SIGL(1),ZETA)
3714            IF(SIGP(1).GT.FTU) IWA(1) =1
3715            IF(SIGP(2).GT.FTU) IWA(2) =1
3716      C
3717            IF(SIGP(1).GT.FTU) SIGL(1) = (EUT-EPSP(1))/(EUT-PEAKS)*FTU
3718            IF(SIGP(2).GT.FTU) SIGL(2) = (EUT-EPSP(2))/(EUT-PEAKS)*FTU
3719      C
3720         75 CALL TRANSE (EPSI(1),EPSL(1),ZETA)
3721            FTU  = WA(1)
3722            E1 = EMP(1)
3723            E2 = EMP(1)
3724            GMOD = EMP(4)*SIGQ(1)/FTU/4.D0
3725            IF(GMOD.LT.0.05D0*EMP(4)) GMOD = 0.05D0*EMP(4)
3726            IF(IWA(4).GE.2) GMOD = 0.D0
3727      C
3728            IF(IWA(1).LT.0.AND.EPSL(1).LT.0.D0) EC= 0.05D0*EMP(1)
3729            IF(IWA(2).LT.0.AND.EPSL(2).LT.0.D0) EC= 0.05D0*EMP(1)
3730            IF(IWA(1).LE.-1.OR.IWA(2).LE.-1) E1=EC
3731            IF(IWA(2).LE.-1.OR.IWA(1).LE.-1) E2=EC
3732            IF(IWA(2).LE.-1.OR.IWA(1).LE.-1) GMOD=0.05D0*EMP(4)
3733            IF(IWA(1).LE.-2.OR.IWA(2).LE.-2) E1=-EC
3734            IF(IWA(2).LE.-2.OR.IWA(1).LE.-2) E2=-EC
3735            IF(IWA(2).LE.-2.OR.IWA(1).LE.-2) GMOD=-0.05D0*EMP(4)
3736            IF(IWA(1).GE.1.AND.EPSL(1).GT.0.D0) E1=FTU/(PEAKS-EUT)
3737            IF(IWA(2).GE.1.AND.EPSL(2).GT.0.D0) E2=FTU/(PEAKS-EUT)
3738      C
3739            SIGL(2) = E2*EPSL(2)+SIGL(2)
3740         80 IF(IWA(2).GE.2) SIGL(2) = 0.D0
3741            IF(IWA(2).EQ.1.AND.SIGL(2).LT.0.D0) SIGL(2)=0.D0
3742            IF(IWA(2).EQ.1.AND.SIGL(2).LE.0.D0) IWA(2)=2
3743      C
3744            SIGL(1) = E1*EPSL(1)+SIGL(1)
3745         81 IF(IWA(1).EQ.2) SIGL(1) = 0.D0
```

```
3746            IF(IWA(1).GE.1.AND.SIGL(1).LT.0.D0) SIGL(1)=0.D0
3747            IF(IWA(1).GE.1.AND.SIGL(1).LE.0.D0) IWA(1)=2
3748      C
3749        82  CM(1,2) = 0.D0
3750            CM(2,1) = 0.D0
3751            CM(1,1) = EC
3752            CM(2,2) = EC
3753            IF(IWA(1).GE.1) CM(1,1) = 0.D0
3754            IF(IWA(2).GE.1) CM(2,2) = 0.D0
3755      C
3756            DO 85 J =1,3
3757            CM(4,J)  = 0.D0
3758            CM(J,4)  = 0.D0
3759        85  CONTINUE
3760            SIGL(4) = GMOD*EPSL(4)+SIGL(4)
3761            CM(4,4) = EMP(4)*SIGL(1)/FTU/4.D0
3762            IF(CM(4,4).LT.0.05D0*EMP(4)) CM(4,4) = 0.05D0*EMP(4)
3763            IF(IWA(4).GE.2) CM(4,4) = 0.D0
3764            IF(IWA(4).GE.2) SIGL(4) = 0.999D0*FTU
3765            IF(IWA(1).LE.-1.OR.IWA(2).LE.-1) CM(4,4)=0.05D0*EMP(4)
3766            IF(IWA(1).LE.-2.OR.IWA(2).LE.-2) CM(4,4)=-0.05D0*EMP(4)
3767      C
3768      C
3769            CALL TRANSF(CM(1,1),ZETA,ISTYP)
3770            CALL TRANSS (SIGL(1),SIGT(1),-ZETA)
3771            CALL TRANSP (SIGT(1),SIGP(1),GAMA)
3772      C
3773            IF(SIGP(1).LE.FTU) GO TO 100
3774            IF(IWA(1).GE.2.AND.IWA(2).GE.2) GO TO 87
3775            IF(IWA(1).GE.2) IWA(2)=2
3776            IF(IWA(1).EQ.1) IWA(1)=2
3777            IF(IWA(1).GE.2.AND.IWA(2).GE.2) GO TO 80
3778            GO TO 81
3779        87  IF(IWA(1).GE.2.AND.IWA(2).GE.2) IWA(4)  = 2
3780            IF(IWA(4).EQ.2) GO TO 82
3781            GO TO 100
3782        90  CALL TRANSS (SIGT(1),SIGL(1),ZETA)
3783      C
3784       100  IF(IWA(1).LE.-1.OR.IWA(2).LE.-1) GO TO 140
3785            IF(SIGL(1).GE.0.D0.AND.SIGL(2).GE.0.D0) GO TO 140
3786      C
3787            IF(DABS(SIGP(2)).LT.1.D-3) GO TO 105
3788            FCU = SIGL(2)/SIGP(2)*EMP(12)
3789            IF(DABS(FCU).GT.DABS(EMP(12))) FCU = EMP(12)
3790       105  IF(SIGP(1)*SIGP(2).LT.0.D0) GO TO 110
3791            RF = 1.0
3792            GO TO 120
3793       110  RF = SIGP(2)/SIGP(1)/(SIGP(2)/SIGP(1)+EMP(12)/EMP(13))
3794            IF(RF.LT.0.5D0) RF = 0.5D0
3795       120  IF(DABS(FCU*RF).GT.DABS(SIGL(2))) GO TO 140
3796      C
3797            DO 130 I = 1,4
3798       130  EPST(I)  = EPST(I) + EPSI(I)
3799      C
3800            CALL TRANSE (EPST(1),EPSL(1),ZETA)
3801            IWA(2) = -1
3802            EC = 0.05D0*EMP(1)
3803            E2 = EC
```

```
3804            IF(IWA(1).LE.0) E1 = 0.05D0*EMP(1)
3805            IF(IWA(1).GE.1) E1 = 0.D0
3806            IF(IWA(1).GE.1) PR = 0.D0
3807            C = 1.D0/(1.D0-PR**2)
3808            CM(1,1) = C*E1
3809            CM(2,2) = C*E2
3810            CM(1,2) = PR*C*DSQRT(E1*E2)
3811            CM(2,1) = CM(1,2)
3812            CM(4,4) = 0.05D0*EMP(4)
3813            DO 135 J =1,3
3814            CM(4,J)  = 0.D0
3815            CM(J,4)  = 0.D0
3816     135    CONTINUE
3817        C
3818            PLAS = 0.D0
3819            IF(DABS(EPSL(2)).LT.1.D-10) GO TO 136
3820            PLAS =(EPSL(2)-RF*FCU/EMP(1))/EPSL(2)
3821     136    SIGL(2) = RF*FCU + (EPSL(2)-(RF*FCU)/EMP(1))*EC*C+
3822           *                   EPSL(1)*PLAS*PR*C*EC
3823            IF(IWA(1).EQ.0) SIGL(1) = SIGQ(1)+PLAS*EPSL(1)*EC*C+
3824           *                   EPSL(2)*PLAS*C*PR*EC
3825            SIGL(4)=SIGQ(4)+PLAS*EPSL(4)*0.05D0*EMP(4)
3826            CALL TRANSF (CM(1,1),ZETA,ISTYP)
3827            CALL TRANSS (SIGL(1),SIGT(1),-ZETA)
3828            CALL TRANSP (SIGT(1),SIGP(1),GAMA)
3829            GO TO 300
3830        C
3831     140    DO 150 I = 1,4
3832     150    EPST(I) = EPST(I)+EPSI(I)
3833        C
3834     300    IF(IWA(1).GT.-1.AND.IWA(2).GT.-1) GO TO 400
3835            IF(IWA(1).LE.-2.OR.IWA(2).LE.-2)  GO TO 400
3836            IF(SIGP(1)*SIGP(2).GE.0.D0) GO TO 310
3837            FCU = (1.D0-SIGP(1)/FTU)*EMP(12)
3838            IF(IWA(1).LE.-1.AND.SIGP(1).LT.1.1D0*FCU) IWA(1) = -2
3839            IF(IWA(2).LE.-1.AND.SIGP(2).LT.1.1D0*FCU) IWA(2) = -2
3840            IF(IWA(1).EQ.-2.AND.EPSQ(1).LT.0.D0) GO TO 350
3841            IF(IWA(2).EQ.-2.AND.EPSQ(2).LT.0.D0) GO TO 350
3842            GO TO 400
3843        C
3844     310    F = FU(SIGP(1),SIGP(2),FCU)
3845            IF(F.GT.0.D0) IWA(2) = -2
3846            IF(IWA(2).LE.-2) GO TO 350
3847            GO TO 400
3848        C
3849     350    CALL TRANSE (EPST(1),EPSL(1),ZETA)
3850            IWA(2) = -2
3851            EC = -0.05D0*EMP(1)
3852            E2 = EC
3853            IF(IWA(1).LE.0) E1 = EC
3854            IF(IWA(1).GE.1) E1 = 0.D0
3855            IF(IWA(1).GE.1) PR = 0.D0
3856            C = 1.D0/(1.D0-PR**2)
3857            CM(1,1) = C*E1
3858            CM(2,2) = C*E2
3859            CM(1,2) = PR*C*DSQRT(E1*E2)
3860            CM(2,1) = CM(1,2)
3861            CM(4,4) = -0.05D0*EMP(4)
```

```
3862            DO 365 J =1,3
3863            CM(4,J)  = 0.D0
3864            CM(J,4)  = 0.D0
3865       365  CONTINUE
3866       C
3867            PLAS = 0.D0
3868            IF(DABS(EPSL(2)).LT.1.D-10) GO TO 366
3869       C
3870            PLAS =(EPSL(2)-FCU/EMP(1)+0.1D0*FCU/EC)/EPSL(2)
3871       366  SIGL(2) = 1.1D0*FCU + EPSL(2)*PLAS*EC*C+
3872           *                      EPSL(1)*PLAS*PR*C*EC
3873            IF(IWA(1).LE.0) SIGL(1) = SIGQ(1)+PLAS*EPSL(1)*EC*C+
3874           *                      EPSL(2)*PLAS*C*PR*EC
3875            SIGL(4) = SIGQ(4) + PLAS*EPSL(4)*EC/(2.D0*(1.D0+PR))
3876            CALL TRANSF (CM(1,1),ZETA,ISTYP)
3877            CALL TRANSS (SIGL(1),SIGT(1),-ZETA)
3878            CALL TRANSP (SIGT(1),SIGP(1),GAMA)
3879       C
3880       C    WRITE  UPDATED GAUSS POINT INFORMATION ON FILE
3881       400  CALL BSRF (IOS,1)
3882            CALL WRITE (P(1),LEN,0,LNUM,IOS)
3883            RETURN
3884            END
3885            FUNCTION FU(SIG1,SIG2,FCU)
3886       C    ************************************************************
3887            IMPLICIT REAL*8(A-H,O-Z)
3888       C    CHECK KUPFER-GERSTLE FAILURE CRITERION FOR BIAXIAL CONDITION
3889            FU = (SIG1/FCU+SIG2/FCU)**2-DMIN1(SIG1,SIG2)/FCU-
3890           * 3.65D0*DMAX1(SIG1,SIG2)/FCU
3891            RETURN
3892            END
3893            SUBROUTINE STRSST (EPST,EPSP,SIGT,SIGP,YC,YI,KS,STSS,STNS)
3894       C
3895       C    THIS SEGMENT UPDATES STRESS AND MATERIAL PROPERTIES FOR
3896       C    REINFORCING STEEL OR PRESTRESSING TENDONS.          NORCO
3897       C    ************************************************************
3898            IMPLICIT REAL*8(A-H,O-Z)
3899            DIMENSION STSS(1),STNS(1)
3900       C
3901       C    CHECK FOR UNLOADING
3902            EPSE = EPST - EPSP
3903            SIGE = EPSE*YI
3904            IF(DABS(SIGE).LT.DABS(SIGP)) GO TO 300
3905       C
3906       C    OBTAIN NEW STRESS POINT AND TANGENT MODULUS
3907            DO 100 I=2,KS
3908            J    = I
3909            EPSD = DABS(EPST) - STNS(I)
3910            IF(EPSD.LT.0.D0) GO TO 200
3911       100  CONTINUE
3912       C
3913       C    STRAIN HAS EXCEEDED MAXIMUM ALLOWED.**BREAK**
3914            SIGT = 0.D0
3915            SIGP = 0.D0
3916            YC   = 0.D0
3917            RETURN
3918       C
3919       200  YC   = (STSS(J)-STSS(J-1))/(STNS(J)-STNS(J-1))
```

```
3920            SIGT =  STSS(J-1)*DSIGN(1.D0,EPST)
3921           *      + YC*(EPST-STNS(J-1)*DSIGN(1.D0,EPST))
3922            EPSP = EPST - SIGT/YI
3923            SIGP = DABS(SIGT)
3924            RETURN
3925      C
3926      C     UNLOADING IS VERIFIED
3927      300   SIGT = SIGE
3928            YC = YI
3929            RETURN
3930      C
3931            END
3932            SUBROUTINE   SUDOLD (AAA,BBB,III)
3933      C
3934      C     THIS SEGMENT CONTROLS FORMATION OF PSUEDO-LOAD VECTOR FROM
3935      C     THE CURRENT STRESS CONDITION.                          NORCO
3936      C     ***************************************************************
3937            IMPLICIT REAL*8(A-H,O-Z)
3938            COMMON /PROBCV/ NSTIF,IPRST,ISTYP,IMTYP,ITRAT,ILNGR,IHOPR,
3939           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
3940           *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
3941           *            INCBL,IEIGN,IBOND,ILINK
3942            COMMON /POINTR/
3943           *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
3944           *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
3945           *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
3946           *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
3947           *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
3948           *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
3949            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
3950            DIMENSION PSDLD(48),AAA(1),BBB(1),III(1)
3951      C
3952            REWIND IOS
3953            CALL CLEAR (BBB(K13),2*NMNOD)
3954            IWIND = 0
3955      C
3956      C     LOOP OVER ALL ELEMENTS
3957            DO 500 ME=1,NMELM
3958            CALL ELMDT4 (ME,THK,NS,NGL,NG,III(J2),III(J3),AAA(I8),
3959           *III(J5),NDEG)
3960            IF(NDEG.GT.3) IWIND=IWIND+1
3961      C     IF(NDEG.GT.3.OR.INCBL.NE.0) IWIND=IWIND+1
3962            IF(IWIND.EQ.1) REWIND 15
3963            ME1 = ME - 1
3964            NSS = NS
3965      C     IF(INCBL.NE.0) NSS = NS+2
3966            ND = NSS*2
3967            IF(IBOND.EQ.0) GO TO 50
3968            CALL ELMDT5 (ME,III(J18),NBD)
3969            ND = NSS*2 + NBD
3970        50  CALL CLEAR (PSDLD(1),ND)
3971      C
3972      C     OBTAIN PSUEDO-LOADS OF SOLID ELEMENT STRESSES
3973            CALL SUDOLS (ME,NS,NGL,NG,PSDLD(1),IOS)
3974      C
3975      C     OBTAIN PSUEDO-LOADS OF LONG. REINF.ELEMENT STRESSES
3976            IF(ILNGR.EQ.0) GO TO 100
3977            NL = III(J6+ME1)
```

```
3978            IF(NL.EQ.0) GO TO 100
3979            CALL SUDOLL (NG,NS,NL,0,PSDLD(1),IOS,INCBL,IBOND,NBD,NDEG)
3980      C
3981      C     OBTAIN PSUEDO-LOADS OF HOOP REINF.ELEMENT STRESSES
3982      100   IF(IHOPR.EQ.0) GO TO 200
3983            NL = III(J7+ME1)
3984            IF(NL.EQ.0) GO TO 200
3985            CALL SUDOLH (NG,NS,NL,0,PSDLD(1),IOS)
3986      C
3987      C     OBTAIN PSUEDO-LOADS OF LONG. PREST. ELEMENT STRESSES
3988      200   IF(ILNGP.EQ.0) GO TO 300
3989            NL = III(J8+ME1)
3990            IF(NL.EQ.0) GO TO 300
3991            CALL SUDOLL(NG,NS,NL,IPRST,PSDLD(1),IOS,INCBL,IBOND,NBD,NDEG)
3992      C
3993      C     OBTAIN PSUEDO-LOADS OF HOOP PREST. ELEMENT STRESSES.
3994      300   IF(IHOPP.EQ.0) GO TO 400
3995            NL = III(J9+ME1)
3996            IF(NL.EQ.0) GO TO 400
3997            CALL SUDOLH (NG,NS,NL,IPRST,PSDLD(1),IOS)
3998      C
3999      C     FORM PSUEDO-LOAD VECTOR(QT)
4000      400   CALL SUDOLV (ME,NS,PSDLD(1),BBB(K13),III(J5),III(J17),NMNOD,
4001           *NDEG,INCBL,IBOND,NBD,III(J18))
4002      500   CONTINUE
4003      C
4004      C     SUBTRACT  BOUNDARY REACTIONS FROM PSUEDO-LOAD VECTOR
4005            CALL SUDOLX (NMEBE,III(J1),AAA(I3),AAA(I4),AAA(I6),BBB(K12
4006           *             ),BBB(K13),III(J17),NMNOD)
4007      C
4008            RETURN
4009      C
4010            END
4011            SUBROUTINE SUDOLH (NG,NS,NL,IPRST,PSDLD,IOS)
4012      C
4013      C     THIS SEGMENT CALCULATES AND ACCUMULATES WORK EQUIVALENT
4014      C     PSUEDO-LOADS FOR A HOOP REINFORCING(PRESTRESSING) ELEMENT.
4015      C                                                          NORCO
4016      C     ************************************************************
4017            IMPLICIT REAL*8(A-H,O-Z)
4018            INTEGER*2 LEN1,LEN2
4019            DIMENSION PSDLD(1),PHI(16),Q(48),P(10)
4020            EQUIVALENCE (PHI(1),Q(1)),(SIGT,P(1)),(XG,P(8))
4021      C
4022      C     LOOP OVER ELEMENT LAYERS
4023            DO 300 MRB=1,NL
4024            READ (1) AREA
4025            IF(AREA.LT.1.D-10) GO TO 300
4026      C
4027      C     LOOP OVER GAUSSIAN POINTS
4028            DO 200 JG=1,NG
4029            READ(1) XG1,YG1,XX,YY,W
4030            CALL READ (Q(1),LEN1,0,LNUM,1)
4031            CALL READ (P(1),LEN2,0,LNUM,IOS)
4032            IF(IPRST.EQ.1) GO TO 200
4033            W = W*SIGT
4034      C
4035            DO 100 I=1,NS
```

```
4036            I2 = 2*I
4037            I1 = I2 - 1
4038            PSDLD(I1) = PSDLD(I1) + PHI(I)*W
4039      100   CONTINUE
4040      200   CONTINUE
4041      300   CONTINUE
4042      C
4043            RETURN
4044      C
4045            END
4046            SUBROUTINE SUDOLL(NG,NS,NL,IPRST,PSDLD,IOS,INCBL,IBOND,NBD,
4047           * NDEG)
4048      C
4049      C     THIS SEGMENT CALCULATES AND ACCUMULATES WORK EQUIVALENT
4050      C     PSUEDO-LOADS OF A LONGITUDINAL REINFORCING(PRESTRESSING)
4051      C     ELEMNT AND BOND ELEMENT                                NORCO
4052      C     ***************************************************************
4053            IMPLICIT REAL*8(A-H,O-Z)
4054            INTEGER*2 LEN1,LEN2
4055            DIMENSION PSDLD(1),PHI(16),SG(72),Q(88),P(10)
4056            EQUIVALENCE (PHI(1),Q(1)),(SG(1),Q(17)),(SIGT,P(1)),
4057           * (BTAU,P(7)),(XG,P(8))
4058      C
4059            ND = NS*2
4060            IF(IBOND.EQ.0) GO TO 50
4061            IF(NDEG.EQ.2.OR.NDEG.EQ.4) NB=3
4062            IF(NDEG.EQ.3.OR.NDEG.EQ.5) NB=4
4063        50  MBB = 0
4064      C     IF(INCBL.NE.0) ND = ND+4
4065      C
4066      C     LOOP OVER ELEMNT LAYERS
4067            DO 300 MRB=1,NL
4068            READ (1) AREA
4069            IF(AREA.LT.1.D-10) GO TO 300
4070            MBB = MBB + 1
4071      C
4072      C
4073      C     LOOP OVER GAUSSIAN POINTS
4074            DO 200 JG=1,NG
4075            READ (1) XG1,YG1,XX,YY,W
4076            CALL READ(Q(1),LEN1,0,LNUM,1)
4077            CALL READ(P(1),LEN2,0,LNUM,IOS)
4078            IF(IPRST.EQ.1) GO TO 200
4079            DO 100 I=1,ND
4080            PSDLD(I) = PSDLD(I) + SG(I)*W*SIGT
4081      100   CONTINUE
4082            IF(IBOND.EQ.0) GO TO 200
4083            W1 = W/AREA
4084            DO 150 J=1,NB
4085            K = ND + J + NB*(MBB-1)
4086            L = ND + J
4087            LL = 2*ND + J + NB
4088            PSDLD(K) = PSDLD(K) + SG(L)*W*SIGT + SG(LL)*W1*BTAU
4089      150   CONTINUE
4090      200   CONTINUE
4091      300   CONTINUE
4092      C
4093            RETURN
```

```
4094      C
4095            END
4096            SUBROUTINE SUDOLS  (ME,NS,NGL,NG,PSDLD,IOS)
4097      C
4098      C     THIS SEGMENT CALCULATES AND ACCUMULATES WORK EQUIVALENT
4099      C     PSUEDO-LOADS FOR A SOLID ELEMENT.                    NORCO
4100      C     ************************************************************
4101            IMPLICIT REAL*8(A-H,O-Z)
4102            INTEGER*2 LEN1,LEN2
4103            COMMON /PROBCV/ NSTIF,IPRST,ISTYP,IMTYP,ITRAT,ILNGR,IHOPR,
4104           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
4105           *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
4106           *            INCBL,IEIGN,IBOND,ILINK
4107            DIMENSION Q(48),PHI(16),PHIX(16),PSDLD(1),PHIY(16),P(52)
4108            EQUIVALENCE (PHI(1),Q(1)),(PHIX(1),Q(17)),(PHIY(1),Q(33)),
4109           *            (SIGT1,P(8)),(SIGT2,P(9)),(SIGT3,P(10)),(SIGT4,
4110           *            P(11)),(XG,P(14))
4111      C
4112      C     LOOP OVER GAUSSIAN POINTS
4113            DO 200 JG=1,NG
4114            DO 200 IG=1,NGL
4115            READ (1) XG,YG,XX,YY,ANGLE,W
4116            CALL READ (Q(1),LEN1,0,LNUM,1)
4117            CALL READ (P(1),LEN2,0,LNUM,IOS)
4118      C
4119            NSS = NS
4120      C     IF(INCBL.NE.0) NSS = NS+2
4121            DO 100 I=1,NSS
4122            I2 = I*2
4123            I1 = I2 - 1
4124            PX = PHIX(I)*W
4125            PY = PHIY(I)*W
4126            IF(ISTYP.EQ.0) GO TO 70
4127            GO TO 80
4128       70   PZ=0.D0
4129            GO TO 90
4130       80   PZ = PHI(I)/XG*W
4131       90   PSDLD(I1) = PSDLD(I1) + PX*SIGT1 + PZ*SIGT3 + PY*SIGT4
4132            PSDLD(I2) = PSDLD(I2) + PY*SIGT2 + PX*SIGT4
4133      100   CONTINUE
4134      C
4135      200   CONTINUE
4136      C
4137            RETURN
4138      C
4139            END
4140            SUBROUTINE SUDOLV (ME,NS,PSDLD,QT,NPELM,ID,NMNOD,NDEG,INCBL,
4141           * IBOND,NBD,NBELM)
4142      C
4143      C     THIS SEGMENT FORMS THE PSUEDO-LOAD VECTOR.           NORCO
4144      C     ************************************************************
4145            IMPLICIT REAL*8(A-H,O-Z)
4146            DIMENSION PSDLD(1),QT(1),NPELM(12,1),ID(2,NMNOD),ST(48,48),
4147           * NBELM(16,1)
4148      C
4149      C     IF(INCBL.EQ.0) GO TO 25
4150      C     LNUM = 4
4151      C     LNS  = NS*2 + 4
```

```
4152      C      GO TO 30
4153       25    IF(NDEG.LE.3) GO TO 80
4154             IF(NDEG.EQ.4) LNUM=2
4155             IF(NDEG.EQ.5) LNUM=8
4156             LNS=2*NS
4157       30    DO 50 I=1,LNS
4158             DO 50 J=I,LNS
4159       50    READ(15) ST(J,I)
4160             DO 60 K=1,LNUM
4161             LL=LNS-K
4162             KK=LL+1
4163             DO 60 L=1,LL
4164             DUM=ST(KK,L)/ST(KK,KK)
4165       60    PSDLD(L)=PSDLD(L)-PSDLD(KK)*DUM
4166             DO 65 I=1,LNUM
4167             II = LNS-LNUM+I
4168             WRITE(16) PSDLD(II)
4169       65    CONTINUE
4170      C
4171       80    K=0
4172             DO 100 I=1,12
4173             NODE = NPELM(I,ME)
4174             IF(NODE.EQ.0) GO TO 100
4175             K=K+1
4176             N2 = ID(2,NODE)
4177             N1 = ID(1,NODE)
4178             I2 = K*2
4179             I1 = I2 - 1
4180             IF(N1.EQ.0) GO TO 90
4181             QT(N1) = QT(N1) + PSDLD(I1)
4182        90   IF(N2.EQ.0) GO TO 100
4183             QT(N2) = QT(N2) + PSDLD(I2)
4184      100    CONTINUE
4185      C
4186             IF (IBOND.EQ.0) GO TO 300
4187             L = 2*NS
4188             DO 200 J = 1,16
4189             NODB = NBELM(J,ME)
4190             IF(NODB.EQ.0) GO TO 200
4191             L = L + 1
4192             NBB = ID(1,NODB)
4193             IF(NBB.EQ.0) GO TO 200
4194             QT(NBB) = QT(NBB) + PSDLD(L)
4195      200    CONTINUE
4196      C
4197      300    RETURN
4198      C
4199             END
4200             SUBROUTINE SUDOLX     (NMEBE,NPEBE,XPEBE,YPEBE,STEBE,UT,QT,
4201            *ID,NMNOD)
4202      C
4203      C      THIS SEGMENT SUBTRACTS EXTERNAL BOUNDARY REACTIONS FROM
4204      C      TOTAL PSUEDO-LOAD VECTOR.                              NORCO
4205      C      ********************************************************
4206             IMPLICIT REAL*8(A-H,O-Z)
4207             DIMENSION NPEBE(1),UT(1),QT(1),XPEBE(1),YPEBE(1),STEBE(1),
4208            *ID(2,NMNOD)
4209      C
```

```
      C     LOOP OVER ALL EXTERNAL BOUDARY ELEMENTS
            DO 100 M=1,NMEBE
            N  = NPEBE(M)
            N2 = ID(2,N)
            N1 = ID(1,N)
            C2 = XPEBE(M)**2
            S2 = YPEBE(M)**2
            CS = XPEBE(M)*YPEBE(M)
      C
            IF(N1.EQ.0) GO TO 80
            CST1=CS*UT(N1)
            GO TO 85
       80   CST1=0.0D0
       85   IF(N2.EQ.0) GO TO 90
            QT(N2) = QT(N2) + STEBE(M)*(CST1 + S2*UT(N2))
            CST2=CS*UT(N2)
            GO TO 95
       90   CST2=0.0D0
       95   IF(N1.EQ.0) GO TO 100
            QT(N1) = QT(N1) + STEBE(M)*(C2*UT(N1) + CST2)
      100   CONTINUE
      C
      C     ND = 2*NMNOD
      C     DO 200 J = 1,ND
      C200  WRITE(6,1001) QT(J)
      C1001 FORMAT(1X,D15.6)
            RETURN
      C
            END
            SUBROUTINE TCONVG  (K,BBB)
      C
      C     THIS SEGMENT TESTS CONVERGENCE OF THE DISPLACEMENTS AND/OR
      C     THE PSUEDOLOADS, USING FIRST NORMS.                  NORCO
      C     ***************************************************************
            IMPLICIT REAL*8(A-H,O-Z)
            COMMON /PROBCV/ NSTIF,IPRST,ISTYP,IMTYP,ITRAT,ILNGR,IHOPR,
           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
           *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
           *            INCBL,IEIGN,IBOND,ILINK
            DIMENSION BBB(1)
            COMMON /POINTR/
           *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
           *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
           *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
           *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
           *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
           *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
            COMMON /DATA1/ CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI
            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
            COMMON /TOLER/ PT,FNUO,FNPO,KDIV
            K     = 2
            ND    = NMNOD*2
            ITRAT = ITRAT + 1
            CALL VCMLT (BBB(K10),BBB(K10),DU,ND)
            CALL VCMLT (BBB(K12),BBB(K12),UT,ND)
            DO 100 I=1,ND
      100   BBB(K10+I-1) = BBB(K11+I-1) - BBB(K13+I-1)
            CALL VCMLT (BBB(K10),BBB(K10),DP,ND)
```

```
4268            FNU = DSQRT(DU/UT)
4269            FNP = DSQRT(DP/PT)
4270            OV  = DSQRT(PT/UT)
4271            IF(DABS(FNU).GT.DABS(FNUO).AND.DABS(FNP).GT.DABS(FNPO))
4272           *   KDIV = KDIV + 1
4273            RN = DFLOAT(ITRAT/KI)
4274            IF(RN.GT.DFLOAT(ITRAT)/DFLOAT(KI)-1.D-4) K = 1
4275            IF(FNU.LT.TU.AND.DABS(FNP).LT.TP) K = 0
4276            WRITE(IO,1200) ITRAT,FNU,FNP,OV
4277      C
4278            IF(K.EQ.0) GO TO 300
4279            FNUO = FNU
4280            FNPO = FNP
4281            IF(KDIV.GT.4) K = 4
4282            IF(ITRAT.LE.NITRT) GO TO 400
4283            WRITE(IO,1000) NITRT
4284            K = 4
4285      C
4286      300   IF(IPRST.EQ.1) CALL CLEAR (BBB(K11),2*ND)
4287      C
4288      400   RETURN
4289      1000  FORMAT(///,'NUMBER OF ITERATIONS HAS EXEEDED',I5)
4290      1200  FORMAT(I11,3D15.6)
4291            END
4292            SUBROUTINE TOUT (AAA,BBB,III,K)
4293      C
4294      C     THIS SEGMENT CONTROLS OUTPUT OF NODAL DISPLACEMENTS AND
4295      C     ELEMENT STRESSES AT THE GAUSS POINTS.                NORCO
4296      C     ****************************************************************
4297            IMPLICIT REAL*8(A-H,O-Z)
4298            COMMON /PROBCV/ NSTIF,IPRST,ISTYP,IMTYP,ITRAT,ILNGR,IHOPR,
4299           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
4300           *          NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
4301           *            INCBL,IEIGN,IBOND,ILINK
4302            COMMON /POINTR/
4303           *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
4304           *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
4305           *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
4306           *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
4307           *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
4308           *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
4309            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
4310            DIMENSION AAA(1),BBB(1),III(1)
4311      C
4312            REWIND IOS
4313            IF(K.EQ.0) REWIND 2
4314      C
4315      C     OUTPUT NODAL DISPLACEMENTS
4316            CALL TOUTDP (NMNOD,IO,BBB(K12),BBB(K14),III(J17),BBB(K11))
4317      C
4318      C     LOOP OVER ALL ELEMENTS TO OUTPUT STRESSES
4319            WRITE(IO,1100)
4320            IF(ILNGR.EQ.0) GO TO 100
4321            WRITE(10,1300)
4322            IF(IBOND.EQ.0) GO TO 50
4323            WRITE(10,1250)
4324            GO TO 100
4325       50   WRITE(10,1200)
```

```
4326      100   IF(IHOPR.EQ.0) GO TO 200
4327            WRITE(11,1400)
4328            WRITE(11,1200)
4329      200   IF(ILNGP.EQ.0) GO TO 300
4330            WRITE(12,1500)
4331            WRITE(12,1200)
4332      300   IF(IHOPP.EQ.0) GO TO 400
4333            WRITE(13,1600)
4334            WRITE(13,1200)
4335      C
4336      400   DO 800 ME=1,NMELM
4337            ME1 = ME - 1
4338      C
4339      C     OUTPUT SOLID ELEMENT STRESSES
4340            CALL TOUTSE (ME,NG,III(J3),K)
4341      C
4342      C     OUTPUT LONGITUDINAL REINFORCING ELEMENT STRESSES
4343            IF(ILNGR.EQ.0) GO TO 500
4344            NL = III(J6+ME1)
4345            IF(NL.EQ.0) GO TO 500
4346            CALL TOUTLH (ME,NG,NL,10,AAA(I9),K,IBOND)
4347      C
4348      C     OUTPUT HOOP REINFORCING ELEMENT STRESSES
4349      500   IF(IHOPR.EQ.0) GO TO 600
4350            NL = III(J7+ME1)
4351            IF(NL.EQ.0) GO TO 600
4352            CALL TOUTLH (ME,NG,NL,11,AAA(I11),K,IBOND)
4353      C
4354      C     OUTPUT LONGITUDINAL PRESTRESSING ELEMENT STRESSES
4355      600   IF(ILNGP.EQ.0) GO TO 700
4356            NL = III(J8+ME1)
4357            IF(NL.EQ.0) GO TO 700
4358            CALL TOUTLH (ME,NG,NL,12,AAA(I13),K,IBOND)
4359      C
4360      C     OUTPUT HOOP PRESTRESSING ELEMENT STRESSES
4361      700   IF(IHOPP.EQ.0) GO TO 800
4362            NL = III(J9+ME1)
4363            IF(NL.EQ.0) GO TO 800
4364            CALL TOUTLH (ME,NG,NL,13,AAA(I15),K,IBOND)
4365      C
4366      800   CONTINUE
4367      C
4368            RETURN
4369      C
4370      C     FORMAT STATEMENTS
4371      1100  FORMAT('1','STRESS STATE AT THE GAUSS POINTS FOR SOLID ',
4372           *       'ELEMENTS',/,51('*')//,' ELEMENT   GAUSS   ',
4373           *       'COORDINATES',14X,'GLOBAL STRESSES',10X,'LOCAL ',
4374           *       'STRESSES',12X,'PRINCIPAL STRESSES      CRACKING ',
4375           *       'FLAGS'//)
4376      1200  FORMAT('   ME  NL  JG',5X,'XG',10X,'YG',10X,'SIGT',10X,
4377           *       'EPST'//)
4378      1250  FORMAT('   ME  NL  JG',5X,'XG',10X,'YG',10X,'SIGT',10X,
4379           *       'EPST',10X,'BTAU'//)
4380      1300  FORMAT('1','STRESSES AT THE GAUSS POINTS FOR LONG. REINF',
4381           *       'ORCING ELEMENTS',/,59('*')//)
4382      1400  FORMAT('1','STRESSES AT THE GAUSS POINTS FOR HOOP REINF',
4383           *       ' ELEMENTS',/,52('*')//)
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 1500  FORMAT('1','STRESSES AT THE GAUSS POINTS FOR LONG. PREST',
     *       'RESSING ELEMENTS',/,60('*')//)
 1600  FORMAT('1','STRESSES AT THE GAUSS POINTS FOR HOOP PREST',
     *       'RESSING ELEMENTS',/,59('*')//)
C
      END
      SUBROUTINE TOUTDP (NMNOD,IO,UT,DU,ID,PT)
C
C     THIS SEGMENT PRINTS OUT NODAL DISPLACEMENTS.       NORCO
C     ************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      DIMENSION UT(1),DU(1),ID(2,NMNOD),PT(1)
C
      WRITE(IO,1000)
      DO 200 N=1,NMNOD
      N2 = ID(2,N)
      N1 = ID(1,N)
      IF(N1.EQ.0) GO TO 100
      XUT= UT(N1)
      XDU= DU(N1)
      XPT= PT(N1)
      GO TO 150
 100  XUT= 0.D0
      XDU= 0.D0
      XPT= 0.D0
 150  IF(N2.EQ.0) GO TO 175
      YUT= UT(N2)
      YDU= DU(N2)
      YPT= PT(N2)
      GO TO 180
 175  YUT= 0.D0
      YDU= 0.D0
      YPT= 0.D0
 180  WRITE(IO,1100) N,XUT,YUT,XDU,YDU,XPT,YPT
 200  CONTINUE
C
      RETURN
C
 1000 FORMAT('1','NODAL DISPLACEMENTS'/,19('*')//,
     *       '    N',7X,'U',14X,'V',13X,'DU',13X,'DV',13X,
     *                  'PX',13X,'PY'//)
 1100 FORMAT(I5,6D15.6)
C
      END
      SUBROUTINE TOUTLH (ME,NG,NL,IO1,AREA,K,IBOND)
C
C     THIS  SEGMENT OUTPUTS STRESSES AT THE GAUSS POINTS FOR THE
C     LONGITUDINAL(HOOP) ELEMENTS.                       NORCO
C     ************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      INTEGER*2 LEN
      COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
      DIMENSION P(10),AREA(4,1)
C
C     LOOP OVER ELEMENT LAYERS
      DO 200 MRB=1,NL
      IF(AREA(MRB,ME).LT.1.D-10) GO TO 200
C
```

```
      C     LOOP OVER GAUSS POINTS
            DO 100 JG=1,NG
            CALL READ (P(1),LEN,0,LNUM,IOS)
            IF(IBOND.EQ.0) GO TO 90
            IF(IO1.NE.10) GO TO 90
            WRITE(IO1,1000) ME,MRB,JG,P(8),P(9),P(1),P(2),P(7)
            GO TO 95
       90   WRITE(IO1,1000) ME,MRB,JG,P(8),P(9),P(1),P(2)
       95   IF(K.NE.0) GO TO 100
      C     WRITE CONVERGED STRESS DATA ON FILE 2
            CALL WRITE (P(1),LEN,0,LNUM,2)
      100   CONTINUE
      200   CONTINUE
      C
            WRITE(IO1,1100)
      C
             RETURN
      C
      1000  FORMAT(3I4,2D12.4,3D14.6)
      1100  FORMAT(' ')
      C
            END
            SUBROUTINE TOUTSE (ME,NG,NGELM,K)
      C
      C     THIS SEGMENT OUTPUTS THE STRESS STATE AT THE GAUSS POINTS
      C     IN THE GLOBAL AS WELL AS THE PRINCIPAL DIRECTIONS FOR THE
      C     SOLID ELEMENT.                                          NORCO
      C     ****************************************************************
            IMPLICIT REAL*8(A-H,O-Z)
            INTEGER*2 LEN
            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
            DIMENSION P(52),IWA(4),NGELM(1),SIGP(3),SIGT(4),SIGL(4),
           *   EPST(4)
            EQUIVALENCE (SIGP(1),P(1)),(SIGL(1),P(4)),
           *  (SIGT(1),P(8)),(GAMA,P(12)),(ZETA,P(13)),(XG,P(14)),
           *  (YG,P(15)),(IWA(1),P(32)),(EPST(1),P(38))
      C
            NGL = NGELM(ME)
            NG  = NGL/10
            NGL = NGL - NG*10
            DO 100 JG=1,NG
            DO 100 IG=1,NGL
            CALL READ (P(1),LEN,0,LNUM,IOS)
            IF(K.NE.0) GO TO 90
            CALL WRITE (P(1),LEN,0,LNUM,2)
       90   ZETA = ZETA*1.8D2/3.1415926536D0
            GAMA = GAMA*1.8D2/3.1415926536D0
            WRITE(IO,1000) ME,IG,XG,SIGT(1),SIGL(1),SIGP(1),IWA(1)
            WRITE(IO,1100)    JG,YG,SIGT(2),SIGL(2),SIGP(2),IWA(2)
            WRITE(IO,1200)     ZETA,SIGT(4),SIGL(4),SIGP(3),IWA(3)
            WRITE(IO,1300)          EPST(4),        GAMA,   IWA(4)
      100   CONTINUE
      C
            WRITE(IO,1400)
      C
            RETURN
      C
      1000  FORMAT(I5,'   IG   =',I2,'   XG   = ',D15.6,'   SIGR  =',
```

```
4500           *       D15.6,'   SIGXI  =',D15.6,'   SIG1  =',D15.6,
4501           *       '   IXI     =',I3)
4502      1100  FORMAT(8X,'JG   =',I2,'   YG   = ',D15.6,'   SIGZ  =',
4503           *       D15.6,'   SIGETA =',D15.6,'   SIG2  =',D15.6,
4504           *       '   IETA    =',I3)
4505      1200  FORMAT(19X,'ZETA = ',D15.6,'   SIGRZ =',D15.6,
4506           *       '   SIGXIET=',D15.6,'   SIGTH =',D15.6,
4507           *       '   ITHETA  =',I3)
4508      1300  FORMAT(41X,'   SSTRN =',D15.6,26X,
4509           *'   GAMA  =',D15.6,'   IXIETA  =',I3/)
4510      C1300 FORMAT(92X,'   GAMA  =',D15.6,'   IXIETA  =',I3/)
4511      1400  FORMAT(' ')
4512      C
4513            END
4514            SUBROUTINE   SOLV  (K,AAA,BBB,CCC,III)
4515      C
4516      C     THIS SEGMENT FORMS COLUMN HEIGHTS AND ADDRESSING ARRAYS
4517      C     FOR STRUCTURE STIFFNESS MATRIX, TRIANGULARIZES STIFFNESS
4518      C     MATRIX, REDUCES R.H.S. AND BACKSUBSTITUTES FOR NODAL
4519      C     DISPLACEMENTS.                                        NORCO
4520      C     ************************************************************
4521            IMPLICIT REAL*8(A-H,O-Z)
4522            COMMON /PROBCV/ NSTIF,IECHO,ISTYP,IMTYP,IDRUN,ILNGR,IHOPR,
4523           *                ILNGP,IHOPP,IDSLD,ISTRS,IGRLD,NMNOD,NMELM,
4524           *           NMEBE,NCMAT,NSMAT,NMPAR,ITEMP,ICNLD,NITRT,NEQ,
4525           *            INCBL,IEIGN,IBOND,ILINK
4526            DIMENSION AAA(1), BBB(1),CCC(1),III(1)
4527            COMMON /POINTR/
4528           *I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12,I13,I14,I15,I16,I17,
4529           *I18,I19,I20,I21,I22,I23,I24,I25,I26,I27,I28,
4530           *J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,
4531           *J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,
4532           *K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12,K13,K14,K15,K16,K17,
4533           *K18,K19,K20,K21,K22,K23,K24,K25,K26,K27,K28
4534            COMMON /DATA1/ CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI
4535            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
4536            GO TO (100,300,400) ,K
4537      C
4538      C
4539      100   J10 = ISPAC(4HMAXA,(NEQ+1),2)
4540            J11 = ISPAC(3HMHT,NEQ,2)
4541            CALL ICLEAR(III(J11),NEQ)
4542      C
4543      C     FORM COLUMN HEIGHTS ARRAY
4544            DO 200 ME=1,NMELM
4545            CALL ELMDT4(ME,THK,NS,NGL,NG,III(J2),III(J3),AAA(I8),
4546           *III(J5),NDEG)
4547      C     NS = III(J2+ME-1)*4
4548            IF(NDEG.EQ.4) NS=8
4549            IF(NDEG.EQ.5) NS=12
4550            ND = 2*NS
4551            IF(IBOND.EQ.0) GO TO 150
4552            CALL ELMDT5 (ME,III(J18),NBD)
4553            ND = 2*NS + NBD
4554      150   CALL SOLVCH (12,NS,ND,III(J17),ME,III(J11),III(J5),NMNOD,
4555           * IBOND,III(J18))
4556      200   CONTINUE
4557      C
```

```
4558      C     FORM DIAGONAL ELEMENTS ADDRESSING ARRAY
4559            CALL SOLVAD (III(J10),III(J11),NSTIF,NEQ)
4560            WRITE(IO,1000) NSTIF
4561            RETURN
4562      C
4563      C     TRIANGULARIZE STIFFNESS MATRIX
4564      300   CALL SOLVTR (CCC(1),III(J10),NEQ,IO,IMTYP,IDRUN)
4565            RETURN
4566      C
4567      C     REDUCE R.H.S. AND BACKSUBSTITUTE FROM THE TRIANGULARIZED
4568      C     STIFFNESS MATRIX FOR THE CORRESPONDING NODAL DISPLACEMENTS.
4569      400   ND = NEQ
4570            CALL SOLVRD (CCC(1),BBB(K10),III(J10),ND)
4571            CALL SOLVBS (BBB(K10),CCC(1),III(J10),ND)
4572            CALL SOLVUT (NMNOD,RX,BBB(K10),BBB(K12),BBB(K14),III(J17),NEQ)
4573      C     DO 500 I=1,ND
4574      C     II = I - 1
4575      C     BBB(K12+II) = BBB(K12+II) + BBB(K10+II)*RX
4576      C500  BBB(K14+II) = BBB(K14+II) + BBB(K10+II)*RX
4577            RETURN
4578      1000  FORMAT(//,40(1H*)//,'SIZE OF STIFNESS MATRIX =',I9//,
4579           *40(1H*))
4580            END
4581               SUBROUTINE SOLVAD (MAXA,MHT,NWA,NEQ)
4582      C
4583      C     THIS SUBROUTINE CALCULATES  THE ADDRESSES  OF THE DIAGONAL
4584      C     ELEMENTS  AND LENGTH OF A  STIFFNESS MATRIX UPPER TRIANGLE
4585      C     STORED COLUMN-WISE UNDER A SKYLINE.                NORCO
4586      C     ***************************************************************
4587            DIMENSION MAXA(1),MHT(1)
4588      C
4589            NM  = NEQ + 1
4590      C
4591            MAXA(1) = 1
4592      C
4593            IF(NEQ.EQ.1) GO TO 30
4594            DO 20 I=1,NEQ
4595            MAXA(I+1) = MAXA(I) + MHT(I) + 1
4596      20    CONTINUE
4597      C
4598            NWA = MAXA(NM) - 1
4599            GO TO 40
4600      C
4601      30    NWA = 1
4602      40    RETURN
4603      C
4604            END
4605            SUBROUTINE SOLVCH(NB,NODES,ND,ID,ME,MHT,NP,NMNOD,IBOND,NBELM)
4606      C
4607      C     THIS SUBROUTINE IS CALLED PER ELEMENT, OR PER SUBSTRUCTURE
4608      C     TO FORM AND UPDATE THE COLUMN HEIGHT ARRAY(MHT).  NORCO
4609      C***************************************************************
4610            DIMENSION MHT(1),NP(NB,1),LM(40),ID(2,NMNOD),NBELM(16,1)
4611      C
4612            DO 20 I=1,ND
4613        20  LM(I)=0
4614      C
4615            K=0
```

```
4616            DO 100 I=1,12
4617            IF(NP(I,ME).EQ.0) GO TO 100
4618            K=K+1
4619            I2 = K*2
4620            LM(I2)=ID(2,NP(I,ME))
4621      C
4622            LM(I2-1)=ID(1,NP(I,ME))
4623          100 CONTINUE
4624            IF(IBOND.EQ.0) GO TO 175
4625            L=0
4626            DO 150 J=1,16
4627            IF(NBELM(J,ME).EQ.0) GO TO 150
4628            L=L+1
4629            K=L+NODES*2
4630            LM(K)=ID(1,NBELM(J,ME))
4631          150  CONTINUE
4632      C
4633          175  LS = 10000
4634      C
4635            DO 200 I=1,ND
4636            IF(LM(I).EQ.0) GO TO 200
4637            IF(LM(I).GE.LS) GO TO 200
4638            LS = LM(I)
4639      200   CONTINUE
4640      C
4641            DO 300 I=1,ND
4642            II = LM(I)
4643            IF(II.EQ.0) GO TO 300
4644            MB = II - LS
4645            IF(MB.GT.MHT(II)) MHT(II) = MB
4646      300   CONTINUE
4647      C
4648            RETURN
4649      C
4650            END
4651            SUBROUTINE SOLVTR (A,MAXA,NEQ,IO,IMTYP,CTRAT)
4652      C
4653      C     THIS SEGMENT TRIANGULARIZES A STIFFNESS MATRIX STORED
4654      C     COLUMNWISE UNDER A SKYLINE.                          NORCO
4655      C     ******************************************************
4656            IMPLICIT REAL*8(A-H,O-Z)
4657            DIMENSION A(1),MAXA(1)
4658      C
4659      C
4660            IMAX=MAXA(NEQ+1)-1
4661      C     DO 50 I=1,IMAX
4662      C 50  WRITE(IO,1001) A(I)
4663      C     DO 60 J =1,NEQ
4664      C 60  WRITE(IO,1002) MAXA(J)
4665            DO  1000 N=1,NEQ
4666            KN = MAXA(N)
4667            KL = KN + 1
4668            KU = MAXA(N+1) - 1
4669            KH = KU - KL
4670            IF(KH) 900,500,100
4671      100   K  = N - KH
4672            IC = 0
4673            KLT= KU
```

```
4674            DO 400 J=1,KH
4675            IC = IC + 1
4676            KLT= KLT - 1
4677            KI = MAXA(K)
4678            ND = MAXA(K+1) - KI - 1
4679            IF(ND.LE.0) GO TO 400
4680            KK = IC
4681            IF(KK.GT.ND) KK = ND
4682            CALL VCMLT(A(KI+1),A(KLT+1),C,KK)
4683            A(KLT) = A(KLT) - C
4684     400    K  = K + 1
4685     C
4686     500    K  = N
4687            C  = 0.D0
4688            DO 600 KK = KL,KU
4689            K  = K - 1
4690            KI = MAXA(K)
4691            D  = A(KK)/A(KI)
4692            C  = C + D*A(KK)
4693            A(KK) = D
4694     600    CONTINUE
4695            A(KN) = A(KN) - C
4696     900    IF(A(KN)) 950,950,1000
4697     950    WRITE(IO,3000) N,A(KN)
4698            IF(IMTYP.EQ.1.AND.CTRAT.GT.1) CALL TOUT
4699            STOP
4700     990    WRITE(IO,3000) N,A(KN)
4701     1000   CONTINUE
4702     C
4703            RETURN
4704     C
4705     3000   FORMAT('ZERO OR NEGATIVE ELEMENT ON MAIN DIAGONAL NO.',I4,
4706          *D15.6)
4707     C1001  FORMAT(1X,D15.6)
4708     C1002  FORMAT(1X,I6)
4709     C
4710            END
4711            SUBROUTINE SOLVRD (A,B,MAXA,NEQ)
4712     C
4713     C      THIS SEGMENT REDUCES A LOAD VECTOR USING A TRIANGULARIZED
4714     C      SKYLINED STIFFNESS MATRIX.                              NORCO
4715     C      ********************************************************
4716            IMPLICIT REAL*8(A-H,O-Z)
4717            DIMENSION A(1),B(1),MAXA(1)
4718     C
4719     C      DO 50 I = 1,NEQ
4720     C 50   WRITE(6,1000) B(I)
4721     C1000  FORMAT(1X,D15.6)
4722            DO 300 N=1,NEQ
4723            KN = MAXA(N)
4724            KL = KN + 1
4725            KU = MAXA(N+1) - 1
4726            KH = KU - KL
4727            IF(KH) 300,100,100
4728     C
4729     100    K = N
4730            E = 0.D0
4731            DO 200 KK=KL,KU
```

```
4732            K = K - 1
4733            E = E + A(KK)*B(K)
4734      200   CONTINUE
4735      C
4736            B(N) = B(N) - E
4737      C
4738      300   CONTINUE
4739      C
4740            RETURN
4741      C
4742            END
4743               SUBROUTINE SOLVBS (B,A,MAXA,NEQ)
4744      C
4745      C     THIS SEGMENT BACKSUBSTITUTES FROM  TRANGULARIZED STIFFNESS
4746      C     MATRIX INTO VECTOR OF REDUCED  INCREMENT OF PSUEDO-LOAD TO
4747      C     OBTAIN CORRESPONDING INCREMENT OF DISPLACEMENT.   NORCO
4748      C     ***************************************************************
4749            IMPLICIT REAL*8(A-H,O-Z)
4750            DIMENSION A(1),B(1),MAXA(1)
4751      C
4752            N  = NEQ
4753      C
4754            DO 100 I=1,NEQ
4755            K = MAXA(I)
4756      100   B(I) = B(I)/A(K)
4757      C
4758            DO 600 L=2,NEQ
4759            KL = MAXA(N) + 1
4760            KU = MAXA(N+1) - 1
4761            IF(KU.LT.KL) GO TO 600
4762            IF(B(N).EQ.0.D0) GO TO 600
4763            K  = N
4764            C  = B(N)
4765            DO 400 KK=KL,KU
4766            K = K - 1
4767      400   B(K) = B(K) - A(KK)*C
4768      600   N  = N - 1
4769      C
4770      C     DO 700 I=1,NEQ
4771      C700  WRITE(6,1000) B(I)
4772      C1000 FORMAT(1X,D15.6)
4773            RETURN
4774      C
4775            END
4776            SUBROUTINE SOLVUT (NMNOD,RX,DQ,UT,DU,NODOF,NEQ)
4777      C
4778      C     SEGMENT TO UPDATE THE TOTAL DISPLACEMENT AND TOTAL
4779      C     INCREMENT OF DISPLACEMENT VECTORS                  NORCO
4780      C     ***************************************************************
4781            IMPLICIT REAL*8(A-H,O-Z)
4782            DIMENSION DU(1),UT(1),DQ(1),NODOF(2,1)
4783      C
4784            DO 200 I=1,NMNOD
4785      C     I2 = I*2
4786      C     I1 = I2 - 1
4787            N1 = NODOF(1,I)
4788            N2 = NODOF(2,I)
4789            IF(N1.EQ.0) GO TO 100
```

```
4790            UT(N1) = UT(N1) + RX*DQ(N1)
4791            DU(N1) = DU(N1) + RX*DQ(N1)
4792      100   IF(N2.EQ.0) GO TO 200
4793            UT(N2) = UT(N2) + RX*DQ(N2)
4794            DU(N2) = DU(N2) + RX*DQ(N2)
4795      200   CONTINUE
4796      C     DO 300 J= 1,NEQ
4797      C300  WRITE(6,1001) DQ(J),DU(J),UT(J)
4798      C1001 FORMAT(1X,3D15.6)
4799      C
4800            RETURN
4801      C
4802            END
4803            SUBROUTINE ARGYRS (X,C,NMP)
4804      C
4805      C     THIS SEGMENT CALCULATES THE CONTROL PARAMETERS OF THE
4806      C     FIVE-CONSTANT ARGYRES FAILURE SURFACE.          NORCO
4807      C     ************************************************************
4808            IMPLICIT REAL*8(A-H,O-Z)
4808.5          COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
4809            DIMENSION X(6),C(9)
4810            DATA C1,C2,C3,C4,C5,C6,C7/1.D0,2.D0,3.D0,4.D0,9.D0,
4811           *1.095445115D0,.36514837l6D0/
4812      C
4813            IF(NMP.LT.18) GO TO 200
4814      C
4815      C     HYPOELASTIC MODEL OR WILLAM WARNKE ELASTIC PLASTIC MODEL
4816            AC = X(1)
4817            AT = X(2)
4818            SI1 = X(3)
4819            RO1 = X(4)
4820            SI2 = X(5)
4821            RO2 = X(6)
4822            A2 = (C6*SI1*(AT-AC) - C6*AC*AT + RO1*(C2*AC+AT))/
4823           *     ((C2*AC+AT)*(SI1-AC*C2/C3)*(SI1+AT*C1/C3))
4824            A1 = A2*(C2*AC-AT)/C3 + C6*(AT-AC)/(C2*AC+AT)
4825            A0 = AC*A1*C2/C3 - A2*AC*AC*C4/C5 + C7*AC
4826      C
4827            S0 = (-A1 -DSQRT(A1*A1 - C4*A0*A2))/C2/A2
4828      C
4829            B2 = (RO2*(S0+C1/C3) - C7*(S0+SI2))/
4830           *     ((SI2+S0)*(SI2-C1/C3)*(S0+C1/C3))
4831            B1 = (SI2+C1/C3)*B2 + (C6-C3*RO2)/(C3*SI2-C1)
4832            B0 = -S0*B1 - S0*S0*B2
4833      C
4834            RI = (-(B1-A1) + DSQRT((B1-A1)**2 - C4*(B2-A2)*(B0-A0)))/
4835           *     (B2-A2)/C2
4836            RM = -SI2
4837            C(7) = S0 - 1.D-6
4838            C(8) = RI
4839            C(9) = RM + 1.D-6
4840            GO TO 400
4841      C200   IF (NMP.EQ.14) GO TO 300
4842      C
4843      C     VON MISES MODEL
4844      200   A2 = 0.D0
4845            A1 = 0.D0
4846            A0 = C7
```

```
4847            B2 = 0.D0
4848            B1 = 0.D0
4849            B0 = C7
4850            GO TO 400
4851      C
4852      CC     DRUCKER PRAGER MODEL
4853      C      A2 = 0.D0
4854      C      A1 =
4855      C      A0 =
4856      C      B2 = 0.D0
4857      C      B1 =
4858      C      B0 =
4859
4860      400   IF(A2.GT.0.D0.OR.
4861           *   A1.GT.0.D0.OR.
4862           *   A0.LT.0.D0.OR.
4863           *   B2.GT.0.D0.OR.
4864           *   B1.GT.0.D0.OR.
4865           *   B0.LT.0.D0)      GO TO 999
4866            C(1) = A2
4867            C(2) = A1
4868            C(3) = A0
4869            C(4) = B2
4870            C(5) = B1
4871            C(6) = B0
4872      C
4873            RETURN
4874      C
4875      999   WRITE(IO,1999) (X(I),I = 1,6),(C(I),I = 1,8)
4876      1999  FORMAT(///,'ERROR...CONVEXITY'//,6D15.6//,8D15.6)
4877            STOP
4878            END
4879            SUBROUTINE ARGYRV (XA,DVG,HVG,CTH,XH,XD)
4880      C
4881      C     THIS SEGMENT CALCULATES A CONTROL POINT IN PRINCIPAL STRE
4882      C     SS(STRAIN) SPACE ON A FAILURE SURFACE.          NORCO
4883      C     ************************************************************
4884            IMPLICIT REAL*8(A-H,O-Z)
4885            COMMON /DATA1/CD,CL,CT,CPN,CPT,CPD,EP,TU,TP,RX,MI,NI,KI,KX
4886            COMMON /FILES/ IN,IO,INS,IOS,IST,ILD
4887            DIMENSION XA(1)
4888      C
4889            XB = 1.D0
4890            CTH2 = 4.D0*CTH*CTH
4891            IF(DABS(HVG).GT.1.D-6) GO TO 100
4892            XD = 0.D0
4893            XH = 0.D0
4894            IF(DVG.LT.1.D-6) GO TO 1000
4895            XD = ARGYRX(XH,CTH,CTH2,XA(1))
4896            GO TO 1000
4897      100   IF(DVG.GT.1.D-6) GO TO 200
4898            XD = 0.D0
4899            XH = XA(7)
4900            IF(HVG.LT.0.D0) XH = XA(9)
4901            GO TO 1000
4902      C
4903      200   XH = HVG*XB
4904            XD = DVG*XB
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```
4905            IF(XH.GT.XA(9)) GO TO 300
4906            XD = XD*XA(9)/XH
4907            XH = XA(9)
4908            GO TO 400
4909      300   IF(XH.LT.XA(7)) GO TO 400
4910            XD = XD*XA(7)/XH
4911            XH = XA(7)
4912      400   Y1 = XD - ARGYRX(XH,CTH,CTH2,XA(1))
4913            IF(Y1.GE.0.D0) GO TO 500
4914            XB  = XB*2.D0
4915            Y2  = Y1
4916            XD2 = XD
4917            XH2 = XH
4918            GO TO 200
4919      C
4920      500   IF(XB.GT.1.D0) GO TO 600
4921      550   XB  = XB/2.D0
4922            Y2  = Y1
4923            XD2 = XD
4924            XH2 = XH
4925            XH  = HVG*XB
4926            XD  = DVG*XB
4927            Y1  = XD - ARGYRX(XH,CTH,CTH2,XA(1))
4928            IF(Y1.GE.0.D0) GO TO 550
4929      C
4930      600   XH1 = XH
4931            XD1 = XD
4932            K = 0
4933            P = -1.D6
4934      700   IF(DABS(Y1-Y2).LT.1.D-6) GO TO 1000
4935            XH = (Y1*XH2-Y2*XH1)/(Y1-Y2)
4936            XD = XD1*XH/XH1
4937            TEST = DABS(XD-P)/XD
4938            IF(TEST.LT.EP) GO TO 1000
4939            Y3 = XD - ARGYRX(XH,CTH,CTH2,XA(1))
4940            P = XD
4941            IF(Y1*Y3.GT.0.D0) GO TO 800
4942            XH2 = XH
4943            XD2 = XD
4944            Y2  = Y3
4945            GO TO 900
4946      800   XH1 = XH
4947            XD1 = XD
4948            Y1  = Y3
4949      900   K   = K + 1
4950            IF(K.LE.MI) GO TO 700
4951            WRITE(IO,2000) MI,HVG,DVG,XH,XD
4952            STOP
4953      C
4954      1000  RETURN
4955      C
4956      2000  FORMAT('MAX. ITER. NO. IS EXCEEDED',I3,4D15.6)
4957      C
4958            END
4959            FUNCTION ARGYRX (XH,CTH,CTH2,XA)
4960      C
4961      C     THIS SEGMENT OBTAINS AN AVERAGE SHEAR STRESS POINT ON THE
4962      C     ELLEPTIC TRACE OF THE 5-PARAMETER ARGYRIS SURFACE,CORRESPO
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```
C     NDING TO HYDROSTATIC STRESS XH AND AN ANGLE OF SIMILARITY
C     CTH.                                                  NORCO
C     ******************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      DIMENSION XA(1)
C
      R1 = XA(3) + (XA(2) + XA(1)*XH)*XH
      R2 = XA(6) + (XA(5) + XA(4)*XH)*XH
      IF(XH.LT.XA(8)) R1 = R2
      R3 = R2*R2 - R1*R1
      R4 = 2.D0*R1 - R2
      R5 = R3*CTH2 + (5.D0*R1 - 4.D0*R2)*R1
C
      R  = R2*(2.D0*R3*CTH + R4*DSQRT(DABS(R5)))/
     *        (R3*CTH2 + R4*R4)
      ARGYRX = R
C
      RETURN
C
      END
      SUBROUTINE WILAMC(SIGP,SIGQ,EPSD,GAMA,BETA,ISFT,CM)
C
C     SEGMENT TO CONTROL BRITTLE FRACTURE.              NORCO
C     ******************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      DIMENSION SIGP(1),SIGQ(1),EPSD(1),CM(4,1),DLM(4),ETAP(4),
     *          ETAG(4),EPSQ(4),ISFT(1)
      DATA CPI/1.570796327D0/
C
C     IDENTIFY MAXIMUM TENSILE STRESS
      SIGMAX = 0.D0
      DO 100 I=1,3
      IF(SIGP(I).LE.0.D0) GO TO 100
      IF(SIGP(I).LT.SIGMAX) GO TO 100
      SIGMAX = SIGP(I)
      KMAX = I
100   CONTINUE
C
C     IDENTIFY DIRECTION OF THE NORMAL TO THE CRACKED PLANE
      IF (KMAX.EQ.1) BETA = GAMA
      IF (KMAX.EQ.2) BETA = GAMA + CPI
      IF (KMAX.EQ.3) BETA = 0.D0
      CALL CLEAR (ETAP,4)
      ETAP(KMAX) = 1.D0
C
C     FORM CRACKED STRAIN INCREMENT
      DO 200 I =1,4
      DLM(I) = 0.D0
      DO 200 J=1,4
      DLM(I) = DLM(I) + CM(I,J)*ETAP(J)
200   CONTINUE
      DLAM = 0.D0
      DETA = 0.D0
      CALL TRANSE(EPSD,ETAG,BETA)
      DO 300 I=1,4
      DETA = DETA + DLM(I)*ETAP(I)
      DLAM = DLAM + DLM(I)*ETAG(I)
300   CONTINUE
```

```
5021            DCRK = (DLAM+SIGMAX)/DETA
5022      C
5023      C     CALCULATE FINAL STRESSES TAKING INTO CONSIDERATION STRESS
5024      C     RELEASE
5025            DO 400 I=1,4
5026            EPSQ(I) = ETAG(I) - ETAP(I)*DCRK
5027      400   CONTINUE
5028            CALL TRANSE(EPSQ,ETAG,-BETA)
5029            DO 500 J=1,4
5030            SIGQ(J) = SIGQ(J) + CM(I,J)*ETAG(I)
5031      500   CONTINUE
5032      C
5033            ISFT(KMAX+1) = 1
5034      C
5035            RETURN
5036      C
5037            END
5038            SUBROUTINE WILAMG (SIGP,STSS,FCU,SIGQ,DFDSG,FN,HVG)
5039      C
5040      C     SEGMENT TO CALCULATE YEILD FUNCTION AND DERIVATIVE W.R.T.
5041      C     THE STRESS STATE.                                    NORCO
5042      C     ************************************************************
5043            IMPLICIT REAL*8(A-H,O-Z)
5044            DIMENSION SIGP(1),STSS(1),SIGQ(1),SIGV(4),DTHDSG(4),
5045           *          DFDSG(1),DLIJ(4)
5046            DATA C15/0.258198889D0/,C3/1.732050808D0/,
5047           *     C27/38.18376619D0/,C5/1.290994449D0/,
5048           *     DLIJ/3*1.D0,0.D0/ ,C9/12.72792206D0/
5049      C
5050            SV1 = (SIGP(1) + SIGP(2) + SIGP(3))/3.D0
5051            SV2 = (SIGP(1)-SIGP(2))**2 + (SIGP(2)-SIGP(3))**2
5052           *    + (SIGP(3)-SIGP(1))**2
5053            DO 100 I=1,3
5054            SIGV(I) = SIGQ(I) - SV1
5055      100   CONTINUE
5056            SIGV(4) = SIGQ(4)
5057            SV3 = (SIGP(1)-SV1)*(SIGP(2)-SV1)*(SIGP(3)-SV1)
5058      C
5059            DVGN = DSQRT(SV2)*C15/DABS(FCU)
5060            HVG  = SV1/DABS(FCU)
5061            THT  = DARCOS(C27*SV3/(SV2*DSQRT(SV2)))/3.D0
5062            CTH  = DCOS(THT)
5063            STH  = DSIN(THT)
5064      C
5065            CALL WILAMX(STSS,HVG,CTH,DVG,RC,RT,S,T,U,RC2,RT2,CTH2,
5066           *            RCT,RCT2,RCT3)
5067            FN = DVGN/DVG - 1.D0
5068      C
5069      C     OBTAIN GRADIENT OF SURFACE AT STRESS POINT(HVG,DVG,THT)
5070      200   DFDDVG = -DVGN/(DVG*DVG)
5071            DRTDSM = (STSS(2) + 2.D0*STSS(1)*HVG)/DABS(FCU)
5072            DRCDSM = (STSS(5) + 2.D0*STSS(4)*HVG)/DABS(FCU)
5073            DSDSM  = 2.D0*CTH*((3.D0*RC2 - RT2)*DRCDSM
5074           *        - 2.D0*RCT*DRTDSM)
5075            DTDSM  = 2.D0*(RC*DRTDSM + (RT - RC)*DRCDSM)*RCT3
5076           *        + (2.D0*RCT-RC2)*((-8.D0*RT*CTH2+1.D1*RT-4.D0*RC)
5077           *        *DRTDSM + (8.D0*RC*CTH2-4.D0*RT)*DRCDSM)/2.D0/RCT3
5078            DUDSM  = (8.D0*RT*STH*STH - 4.D0*RC)*DRTDSM
```

```
5079           *       + (8.D0*RC*CTH2 +2.D0*RC - 4.D0*RT)*DRCDSM
5080            DVGDSM = (U*(DSDSM +DTDSM) - (S + T)*DUDSM)/(U*U)
5081            DFDVDS = 1.D0/(DVGN*DVG*FCU*FCU*5.D0)
5082            DSTDTH = -2.D0*RC*RCT2*STH - 4.D0*RC*(2.D0*RT-RC)*RCT2*STH*
5083           *          CTH/RCT3
5084            DUDTH  = -8.D0*RCT2*STH*CTH
5085            DVGDTH = (U*DSTDTH - (S+T)*DUDTH)/(U*U)
5086            CX     = -C3/DSQRT(SV2**3/54.D0 - 2.7D1*SV3**2)
5087            CY     = 9.D0*SV3/SV2
5088            CZ     = SV2/9.D0
5089            SV42   = SIGV(4)*SIGV(4)
5090      C
5091            DTHDSG(1)= CX*(SIGV(1)*SIGV(1) + SV42 - CZ - CY*SIGV(1))
5092            DTHDSG(2)= CX*(SIGV(2)*SIGV(2) + SV42 - CZ - CY*SIGV(2))
5093            DTHDSG(3)= CX*(SIGV(3)*SIGV(3)        - CZ - CY*SIGV(3))
5094            DTHDSG(4)= CX*SIGV(4)*(SIGV(1)+SIGV(2) - CY)
5095      C
5096            DO 300 I=1,4
5097            DFDSG(I) = DFDDVG*(DVGDSM*DLIJ(I)/3.D0 + DVGDTH*DTHDSG(I))
5098           *         + DFDVDS*SIGV(I)
5099      300   CONTINUE
5100      C
5101            RETURN
5102      C
5103            END
5104            SUBROUTINE WILAMX (STSS,HVG,CTH,DVG,RC,RT,S,T,U,RC2,RT2,
5105           *                   CTH2,RCT,RCT2,RCT3)
5106      C
5107      C     CALCULATE THE WILLAM-WARNKE DEVIATORIC TRACE    NORCO
5108      C     ************************************************************
5109            IMPLICIT REAL*8(A-H,O-Z)
5110            DIMENSION STSS(1)
5111      C
5112            HVG2 = HVG*HVG
5113            CTH2 = CTH*CTH
5114            RT   = STSS(3) + STSS(2)*HVG + STSS(1)*HVG2
5115            RC   = STSS(6) + STSS(5)*HVG + STSS(4)*HVG2
5116            RC2  = RC*RC
5117            RT2  = RT*RT
5118            RCT  = RC*RT
5119            RCT2 = RC2 - RT2
5120            RCT3 = DSQRT(4.D0*RCT2*CTH2 + 5.D0*RT2 - 4.D0*RCT)
5121            S = 2.D0*RC*RCT2*CTH
5122            T = RC*(2.D0*RT-RC)*RCT3
5123            U = 4.D0*CTH2*RCT2 + RC2 + 4.D0*RT2 - 4.D0*RCT
5124            DVG = (S+T)/U
5125      C
5126            RETURN
5127      C
5128            END
5129            SUBROUTINE CONSTM (EMDC,PRTC,CM)
5130      C
5131      C     THIS SEGMENT PREPARES AN AXISYMMETRIC CONSTITUTIVE MATRIX
5132      C     FOR AN ORTHOTROPIC 3-D MATERIAL.                  NORCO
5133      C     ************************************************************
5134            IMPLICIT REAL*8(A-H,O-Z)
5135            DIMENSION EMDC(1),PRTC(1),CM(4,1)
5136      C
```

```
5137      C     FORM MATERIAL STIFFNESS MATRIX
5138            P23 = DSQRT(PRTC(2)*PRTC(3))
5139            P13 = DSQRT(PRTC(1)*PRTC(3))
5140            P21 = DSQRT(PRTC(2)*PRTC(1))
5141            Y12 = DSQRT(DABS(EMDC(1)*EMDC(2)))
5142            Y23 = DSQRT(DABS(EMDC(2)*EMDC(3)))
5143            Y31 = DSQRT(DABS(EMDC(3)*EMDC(1)))
5144            PHI = 1.D0 - P23*P23 - P13*P13 - P21*P21 - 2.D0*P21*P23*P13
5145      C
5146            CM(1,1) = EMDC(1)*(1.D0-P23*P23)/PHI
5147            CM(1,2) = Y12*(P23*P13+P21)/PHI
5148            CM(1,3) = Y31*(P23*P21+P13)/PHI
5149            CM(2,1) = CM(1,2)
5150            CM(2,2) = EMDC(2)*(1.D0-P13*P13)/PHI
5151            CM(2,3) = Y23*(P21*P13+P23)/PHI
5152            CM(3,1) = CM(1,3)
5153            CM(3,2) = CM(2,3)
5154            CM(3,3) = EMDC(3)*(1.D0-P21*P21)/PHI
5155            DO 100 I=1,3
5156            CM(I,4) = 0.D0
5157      100   CM(4,I) = 0.D0
5158            CM(4,4) = EMDC(4)
5159      C
5160      500   RETURN
5161      C
5162            END
5163            SUBROUTINE ORDER (SIGP,SIGD)
5164      C
5165      C     THIS SEGMENT REARRANGES THE PRINCIPAL STRESS VECTOR IN
5166      C     ASCENDING ORDER OF MAGNITUDE.                          NORCO
5167      C     ***************************************************************
5168            IMPLICIT REAL*8(A-H,O-Z)
5169            DIMENSION SIGP(3),SIGD(3)
5170      C
5171            SMIN = SIGP(1)
5172            SMAX = SIGP(1)
5173            IMIN = 1
5174            IMAX = 1
5175            DO 100 I=2,3
5176            IF(SMIN.GT.SIGP(I)) IMIN = I
5177            IF(SMAX.LT.SIGP(I)) IMAX = I
5178            SMIN = SIGP(IMIN)
5179      100   SMAX = SIGP(IMAX)
5180      C
5181            SIGD(1) = SMIN
5182            SIGD(3) = SMAX
5183      C
5184            DO 200 I=1,3
5185            IF(IMIN.EQ.I.OR.IMAX.EQ.I) GO TO 200
5186            K = I
5187            GO TO 300
5188      200   CONTINUE
5189      300   SIGD(2) = SIGP(K)
5190      C
5191            RETURN
5192      C
5193            END
5194            FUNCTION  POISN (PRTI,EPSQ,EPSC)
```

```
5195      C
5196      C     THIS SEGMENT CALCULATES POISSON'S RATIO AS A FUNCTION OF
5197      C     CURRENT EQUIVALENT UNIAXIAL STRAIN.                NORCO
5198      C     ***************************************************
5199            IMPLICIT REAL*8(A-H,O-Z)
5200      C
5201            IF(DABS(EPSC).LT.1.D-12) GO TO 400
5202            EE     = EPSQ/EPSC
5203            IF(EPSQ.GT.0.D0) GO TO 100
5204            PRTC  = PRTI*(1.D0+1.3763*EE-5.36D0*EE**2+8.586D0*EE**3)
5205            IF(PRTC.LT.PRTI) PRTC = PRTI
5206            IF(PRTC.GT.0.49D0) PRTC = 0.49D0
5207            GO TO 400
5208      C
5209      100   IF(EE.GT.0.5D0) GO TO 200
5210            PRTC = PRTI
5211            GO TO 400
5212      C
5213      200   IF(EE.GT.1.D0) GO TO 300
5214            PRTC = PRTI*2.D0*(1.D0 - EE)
5215            GO TO 400
5216      C
5217      300   PRTC = 0.D0
5218      C
5219      400   POISN = PRTC
5220      C
5221            RETURN
5222      C
5223            END
5224            SUBROUTINE SAENZ (SIGQ,EPSQ,SIGC,EPSC,EMDC,EMDI,ISFT,I,IT)
5225      C
5226      C     THIS SEGMENT CALCULATES STRESS AND YOUNG'S MODULUS AS FUN
5227      C     CTIONS OF CURRENT EQUIVALENT UNIAXIAL STRAIN AND CURRENT
5228      C     MATERIAL PROPERTIES.                               NORCO
5229      C     ***************************************************
5230            IMPLICIT REAL*8(A-H,O-Z)
5231            COMMON /DATA2/ EPSY,EDBR
5232            IF(DABS(SIGC).LT.1.D-6.OR.DABS(EPSC).LT.1.D-12) GO TO 800
5233            ISFT = 0
5234            EE = EPSQ/EPSC
5235            ES = SIGC/EPSC
5236            RE = EMDI/ES
5237            IF(EE.GT.1.D0) GO TO 200
5238      C
5239      C     SAENZ THREE PARAMETER EQUATION UP TO PEAK
5240            AA     = 1.D0 + (RE - 2.D0)*EE + EE*EE
5241            SIGQ   = EMDI*EPSQ/AA
5242            EMDC   = EMDI*(1.D0 - EE*EE)/(AA*AA)
5243            GO TO 800
5244      C
5245      C     PIECEWISE LINEAR DEGRADING CURVE BEYOND PEAK
5246      200   ISFT = 1
5247            IF(I+IT.EQ.5) GO TO 500
5248            AY    = DFLOAT(IDINT(EPSY/DABS(EPSC)))
5249            AX    = AY + 1.D0
5250            IF(EPSQ.LT.0.D0) AX = 2.D0
5251            IF(EE.GT.AX) GO TO 300
5252            EMDC = -EDBR*ES
```

```
5253            SIGQ = SIGC*(1.D0 - EDBR*(EE - 1.D0))
5254            IF(SIGQ*SIGC.LE.0.D0) GO TO 400
5255            GO TO 800
5256      300   IF(EPSQ.LT.0.D0) GO TO 400
5257            BS   = 1.D0 - EDBR*AY
5258            IF(BS.LE.0.D0) GO TO 400
5259            ED   = EDBR/1.D2
5260            AZ   = BS/ED + AX
5261            IF(EE.GT.AZ) GO TO 400
5262            SIGQ = SIGC*ED*(AZ - EE)
5263            EMDC = -ED*ES
5264            GO TO 800
5265      C
5266      C     CONCRETE HAS COMPLETELY DETERIORATED
5267      400   SIGQ  = 0.D0
5268            EMDC  = 0.D0
5269            ISFT  = 2
5270            GO TO 800
5271      C
5272      C     SHEAR STRESS STRAIN CURVE
5273      500   SIGQ = SIGC*(1.D0 - EDBR*(EE - 1.D0)/1.D1)
5274            EMDC = -EDBR*ES/1.D1
5275      C
5276      800   RETURN
5277            END
5278            SUBROUTINE STREN (SOTN,SOTO,STSP,SOTC,XCU,SCU,STU)
5279      C
5280      C     THIS SEGMENT CALCULATES  MAXIMUM STRESSES CORRESPONDING TO
5281      C     A GIVEN STATE OF STRESS, OR THE CORRESPONDING EQUIVALENT
5282      C     UNIAXIAL STRAINS.                                    NORCO
5283      C     (SOT = SECOND ORDER TENSOR)
5284      C     ************************************************************
5285            IMPLICIT REAL*8(A-H,O-Z)
5286            DIMENSION SOTF(3),SOTO(1),SOTN(1),SOTP(3),STSP(1),SOTC(1),
5287           *          SOTQ(3),CS(3)
5288      C
5289      C     OBTAIN PRINCIPAL STRESSES
5290            CALL TRANSP (SOTN(1),SOTP(1),GAMA)
5291            CALL TRANSP (SOTO(1),SOTQ(1),GAMA)
5292            SN = DSQRT(SOTP(1)**2+SOTP(2)**2+SOTP(3)**2)
5293            SO = DSQRT(SOTQ(1)**2+SOTQ(2)**2+SOTQ(3)**2)
5294      C
5295      C     CHECK FAILURE MODE
5296            K = 1
5297            DO 100 I=1,3
5298      100   IF(SOTP(I).GE.0.D0) K = K + 1
5299            IF(K.LE.2) GO TO 300
5300      C
5301      C     TENSION-TENSION-(TENSION/COMPRESSION)
5302            DO 200 I=1,3
5303            IF(SOTP(I).GT.0.D0) SOTF(I) = STU
5304      200   IF(SOTP(I).LE.0.D0) SOTF(I) = SCU
5305            GO TO 800
5306      C
5307      C     COMPRESSION-COMPRESSION-(TENSION/COMPRESSION)
5308      C     OBTAIN MEAN NORMAL STRESS(HVG), MEAN SHEAR STRESS(DVG),
5309      C     AND COSINE ANGLE OF SIMILARITY(CTH).
5310      300   CALL ORDER (SOTP(1),SOTF(1))
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```
5311            SDV = (SOTF(1)-SOTF(2))**2+(SOTF(2)-SOTF(3))**2+(SOTF(3)
5312           *      -SOTF(1))**2
5313            DVG = DSQRT(SDV/15.D0)/DABS(XCU)
5314            HVG = -(SOTF(1) + SOTF(2) + SOTF(3))/3.D0/XCU
5315            CTH = 1.D0
5316            IF(SDV.LT.1.D-12) GO TO 400
5317            CTH = -(SOTF(1) + SOTF(2)-2.D0*SOTF(3))/DSQRT(SDV*2.D0)
5318     400    DO 500 I=1,3
5319     500    CS(I) = SOTP(I)/SN
5320     C
5321     C      FIND MAGNITUDE(SD) OF FAILURE VECTOR
5322            CALL ARGYRV(STSP(1),DVG,HVG,CTH,HS,DS)
5323            SD = DSQRT(HS*HS*3.D0  +  DS*DS*5.D0)*DABS(SCU)
5324            DO 600 I=1,3
5325     600    SOTF(I) = CS(I)*SD
5326            IF(K.EQ.1) GO TO 800
5327     C
5328     C      COMPRESSION-COMPRESSION-TENSION
5329            DO 700 I=1,3
5330     700    IF(SOTF(I).LT.0.D0.AND.SOTF(I).GT.SCU) SOTF(I) = SCU
5331     C
5332     800    SD = DSQRT(SOTF(1)**2+SOTF(2)**2+SOTF(3)**2)
5333            SQ = SD/SO
5334            DO 900 I=1,3
5335            SOTC(I) = SOTO(I)*SQ
5336     900    IF(SOTC(I).GT.STU) SOTC(I) = STU
5337     C
5338            SOTC(4) = DSQRT(SD**2-((SOTF(1)+SOTF(2)+SOTF(3))/3.D0)**2)
5339           *         *DSIGN(1.D0,SOTO(4))
5340            RETURN
5341     C
5342            END
5343            SUBROUTINE TRANSE (EPSO,EPSR,GAMA)
5344     C
5345     C      THIS SEGMENT TRANSFORMS GLOBAL STRAIN TENSOR INTO
5346     C      LOCAL COORDINATES.                                    FEPARC5.1
5347     C      ******************************************************
5348            IMPLICIT REAL*8(A-H,O-Z)
5349            DIMENSION EPSR(1),EPSO(1)
5350            EPSM = (EPSO(1) + EPSO(2))/2.D0
5351            EPSN = (EPSO(1) - EPSO(2))/2.D0
5352            EPS4 = EPSO(4)/2.D0
5353     C
5354            CO = DCOS(2.D0*GAMA)
5355            SI = DSIN(2.D0*GAMA)
5356     C
5357            EPSR(1) = EPSM + EPSN*CO + EPS4*SI
5358            EPSR(2) = EPSM - EPSN*CO - EPS4*SI
5359            EPSR(3) = EPSO(3)
5360            EPSR(4) = 2.D0*(EPS4*CO - EPSN*SI)
5361     C
5362            RETURN
5363            END
5364            SUBROUTINE TRANSF (CM,GAMA,ISTYP)
5365     C
5366     C      THIS SEGMENT TRANSFORMS MATERIAL STIFFNESS MATRIX INTO
5367     C      GLOBAL COORDINATES.                                   NORCO
5368     C      ******************************************************
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5369            IMPLICIT REAL*8(A-H,O-Z)
5370            DIMENSION CM(4,4),TR(4,4),CT(4,4)
5371      C
5372      C     FORM TRANSFORMATION MATRIX
5373            CO = DCOS(GAMA)
5374            SI = DSIN(GAMA)
5375            CO2 = CO*CO
5376            SI2 = SI*SI
5377            CS  = CO*SI
5378            TR(1,1) = CO2
5379            TR(1,2) = SI2
5380            TR(1,4) = CS
5381            TR(2,1) = SI2
5382            TR(2,2) = CO2
5383            TR(2,4) =-CS
5384            TR(4,1) =-2.D0*CS
5385            TR(4,2) = 2.D0*CS
5386            TR(4,4) = CO2 - SI2
5387            DO 100 I=1,4
5388            TR(I,3) = 0.D0
5389      100   TR(3,I) = 0.D0
5390            IF(ISTYP.EQ.1) TR(3,3) = 1.D0
5391      C
5392      C     TRANSFORM STIFFNESS MATRIX
5393            DO 300 I=1,4
5394            DO 300 J=1,4
5395            C       = 0.D0
5396            DO 200 K=1,4
5397      200   C       = C + CM(K,J)*TR(K,I)
5398      300   CT(J,I) = C
5399            DO 500 I=1,4
5400            DO 500 J=1,4
5401            C       = 0.D0
5402            DO 400 K=1,4
5403      400   C       = C + TR(K,J)*CT(K,I)
5404      500   CM(J,I) = C
5405      C
5406      900   RETURN
5407      C
5408            END
5409            SUBROUTINE TRANSP (SIGT,SIGP,GAMA)
5410      C
5411      C     THIS SEGMENT CALCULATES PRINCIPAL STRESSES.      NORCO
5412      C     ************************************************************
5413            IMPLICIT REAL*8(A-H,O-Z)
5414            DIMENSION SIGT(1),SIGP(1)
5415      C
5416            SIGM = (SIGT(1) + SIGT(2))/2.D0
5417            SIGN = (SIGT(1) - SIGT(2))/2.D0
5418            RADS = DSQRT(SIGN**2 + SIGT(4)**2)
5419            SIGP(1) = SIGM + RADS
5420            SIGP(2) = SIGM - RADS
5421            SIGP(3) = SIGT(3)
5422            IF(SIGT(4).EQ.0.D0.AND.SIGN.EQ.0.D0) GO TO 100
5423            GAMA = DATAN2(SIGT(4),SIGN)/2.D0
5424            GO TO 200
5425      100   GAMA = 0.D0
5426      C
```

```
 5427      200   RETURN
 5428      C
 5429            END
 5430            SUBROUTINE TRANSS (SIGO,SIGR,GAMA)
 5431      C
 5432      C     THIS SEGMENT TRANSFORMS GLOBAL STRESSES INTO LOCAL
 5433      C     COORDINATES, OR VICE VERSA.                    NORCO
 5434      C     ***************************************************
 5435            IMPLICIT REAL*8(A-H,O-Z)
 5436            DIMENSION SIGO(1),SIGR(1)
 5437      C
 5438            SIGM = (SIGO(1) + SIGO(2))/2.D0
 5439            SIGN = (SIGO(1) - SIGO(2))/2.D0
 5440            CO   = DCOS(2.D0*GAMA)
 5441            SI   = DSIN(2.D0*GAMA)
 5442      C
 5443            SIGR(1) = SIGM + SIGN*CO + SIGO(4)*SI
 5444            SIGR(2) = SIGM - SIGN*CO - SIGO(4)*SI
 5445            SIGR(3) = SIGO(3)
 5446            SIGR(4) = SIGO(4)*CO - SIGN*SI
 5447      C
 5448            RETURN
 5449      C
 5450            END
 5451            SUBROUTINE TRANCM (CM,DM,BETA)
 5452      C
 5453      C     THIS SEGMENT TRANSFORMS A PLANE STRESS CONSTITUTIVE
 5454      C     MATRIX AS A FOURTH ORDER TENSOR
 5455      C     ***************************************************
 5456      C
 5457            IMPLICIT REAL*8(A-H,O-Z)
 5458            DIMENSION T(3,3),CM(4,4),DM(4,4),TR(3,3)
 5459            T(1,1) = DCOS(BETA)**2
 5460            T(1,2) = DSIN(BETA)**2
 5461            T(1,3) = DCOS(BETA)*DSIN(BETA)
 5462            T(2,1) = T(1,2)
 5463            T(2,2) = T(1,1)
 5464            T(2,3) = -T(1,3)
 5465            T(3,1) = -2.0D0*T(1,3)
 5466            T(3,2) = -T(3,1)
 5467            T(3,3) = T(1,1)-T(1,2)
 5468            CALL CLEAR (TR(1,1),9)
 5469            CALL CLEAR (DM(1,1),16)
 5470            DO 100 K =1,3
 5471            DO 100 I =1,3
 5472            DO 100 J =1,3
 5473       100  TR(I,K) = TR(I,K)+T(I,J)*T(J,K)
 5474            DO 200 L =1,3
 5475            DO 200 M =1,3
 5476            DO 200 N =1,3
 5477       200  DM(M,L) = DM(M,L)+TR(M,N)*CM(N,L)
 5478            RETURN
 5479            END
 5480            SUBROUTINE ELMDT1 (ME,NS,XEL,YEL,NPELM,XCORD,YCORD,NEL,NDEG)
 5481      C
 5482      C     THIS SEGMENT LOCATES SOME ELEMENT VARIABLES.       NORCO
 5483      C     ***************************************************
 5484            IMPLICIT REAL*8(A-H,O-Z)
```

```
5485            DIMENSION XEL(16),YEL(16),YCORD(1),NPELM(12,1),XCORD(1),
5486           *NEL(12)
5487            K=0
5488            DO 100 I=1,12
5489            NODE = NPELM(I,ME)
5490            NEL(I)=NODE
5491            IF(NODE.EQ.0) GO TO 100
5492            K=K+1
5493            XEL(K) = XCORD(NODE)
5494            YEL(K) = YCORD(NODE)
5495       100  CONTINUE
5496            IF(NDEG.LE.3) GO TO 150
5497            IF(NDEG.EQ.5) GO TO 140
5498            XEL(9)=2.5D-1*(XEL(1)+XEL(2)+XEL(3)+XEL(4))
5499            YEL(9)=2.5D-1*(YEL(1)+YEL(2)+YEL(3)+YEL(4))
5500            GO TO 150
5501       C
5502       140  XEL(13)=1.0D0/3.0D0*(XEL(6)-XEL(12))+XEL(12)
5503            YEL(13)=1.0D0/3.0D0*(YEL(11)-YEL(5))+YEL(5)
5504            XEL(14)=2.0D0/3.0D0*(XEL(6)-XEL(12))+XEL(12)
5505            YEL(14)=1.0D0/3.0D0*(YEL(7)-YEL(9))+YEL(9)
5506            XEL(15)=2.0D0/3.0D0*(XEL(10)-XEL(8))+XEL(8)
5507            YEL(15)=2.0D0/3.0D0*(YEL(7)-YEL(9))+YEL(9)
5508            XEL(16)=1.0D0/3.0D0*(XEL(10)-XEL(8))+XEL(8)
5509            YEL(16)=2.0D0/3.0D0*(YEL(11)-YEL(5))+YEL(5)
5510       150  RETURN
5511       C
5512            END
5513            SUBROUTINE ELMDT2 (ME,NS,DEL,NPELM,DQ,NMNOD,ID)
5514       C
5515       C    THIS SEGMENT OBTAINS ELEMENT MATERIAL INFORMATION AND NOD
5516       C    AL DISPLACEMENTS.                                        NORCO
5517       C    ***************************************************************
5518            IMPLICIT REAL*8(A-H,O-Z)
5519            DIMENSION NPELM(12,1),DQ(1),DEL(1),ID(2,NMNOD),LM(24)
5520       C
5521            K=0
5522            DO 100 I=1,12
5523       C
5524            NODE = NPELM(I,ME)
5525            IF(NODE.EQ.0) GO TO 100
5526            K=K+1
5527            I2 = 2*K
5528            I1 = I2 - 1
5529            LM(I2)=ID(2,NPELM(I,ME))
5530            LM(I1)=ID(1,NPELM(I,ME))
5531       100  CONTINUE
5532       C
5533            DO 200 J=1,24
5534            IF(LM(J).GT.0) GO TO 190
5535            DEL(J)=0.0D0
5536            GO TO 200
5537         190 M=LM(J)
5538            DEL(J)=DQ(M)
5539         200 CONTINUE
5540            RETURN
5541       C
5542            END
```

```
5543            SUBROUTINE ELMDT3 (ME,NS,NPELM,TEMPI,TEL)
5544      C
5545      C     THIS SEGMENT OBTAINS ELEMENT NODAL TEMPRATURE.    NORCO
5546      C     ************************************************************
5547            IMPLICIT REAL*8(A-H,O-Z)
5548            DIMENSION NPELM(12,1),TEMPI(1),TEL(1)
5549      C
5550            K=0
5551            DO 100 I=1,12
5552            NODE = NPELM(I,ME)
5553            IF(NODE.EQ.0) GO TO 100
5554            K=K+1
5555            TEL(K) = TEMPI(NODE)
5556      100   CONTINUE
5557      C
5558            RETURN
5559      C
5560            END
5561            SUBROUTINE ELMDT4 (ME,THK,NS,NGL,NG,NDELM,NGELM,THKSE,
5562           *NPELM,NDEG)
5563      C
5564      C     THIS SEGMENT IDENTIFEIES THE INTEGRATION SCHEME.  NORCO
5565      C     ************************************************************
5566            IMPLICIT REAL*8(A-H,O-Z)
5567            DIMENSION NDELM(1),NGELM(1),THKSE(1),NPELM(12,1)
5568            K=0
5569      C
5570            THK  = THKSE(ME)
5571            NDEG = NDELM(ME)
5572            IF(NDEG.LE.3) GO TO 90
5573            IF(NDEG.EQ.4) NS=9
5574            IF(NDEG.EQ.5) NS=16
5575            GO TO 110
5576         90 DO 100 I=1,12
5577            IF(NPELM(I,ME).EQ.0) GO TO 100
5578            K=K+1
5579        100 CONTINUE
5580            NS=K
5581      C
5582        110 NGL  = NGELM(ME)
5583            NG   = NGL/10
5584            NGL  = NGL - NG*10
5585      C
5586            RETURN
5587      C
5588            END
5589            SUBROUTINE SHAPE1 (ETA,NDEG,PHI,PHIY)
5590      C
5591      C     THIS SUBROUTINE COMPUTES ONE DIMENSIONAL SHAPE FUNCTIONS
5592      C     AND DERIVATIVES.                                    NORCO
5593      C     ************************************************************
5594            IMPLICIT REAL*8(A-H,O-Z)
5595            DIMENSION PHI(1),PHIY(1), ICORD(4,3)
5596            DATA ICORD/-1,1,2*0,-1,0,1,0,-3,-1,1,3/
5597      C
5598            GO TO (100,300,600),NDEG
5599      C
5600      C     LINEAR SHAPE FUNCTIONS AND DERUVATIVES
```

```
5601      100   K = 0
5602            DO 200 LJ = 1,2
5603            J  =  ICORD(LJ,1)
5604            RJ = DFLOAT(J)
5605            K  =  K+1
5606            PHI(K)  = .5D0*(1.D0+RJ*ETA)
5607            PHIY(K) = .5D0*RJ
5608      200   CONTINUE
5609            RETURN
5610      C
5611      C     QUADRATIC SHAPE FUNCTIONS AND DERIVATIVES
5612      300   K  =  0
5613            ETA2  = ETA**2
5614            DO 500 LJ = 1,3
5615            J  =  ICORD(LJ,2)
5616            JA =  IABS(J)
5617            RJ = DFLOAT(J)
5618            IF(JA.NE.1) GO TO 400
5619      C
5620      C     END POINTS
5621            K  =  K+1
5622            PHI(K)  = .5D0*ETA*RJ*(1.D0+ETA*RJ)
5623            PHIY(K) = .5D0*RJ*(1.D0+2.D0*ETA*RJ)
5624            GO TO 500
5625      C
5626      C     MID.SIDE POINT
5627      400   K  =  K+1
5628            PHI(K)  = 1.D0 - ETA2
5629            PHIY(K) = -2.D0*ETA
5630      500   CONTINUE
5631            RETURN
5632      C
5633      C     CUBIC SHAPE FUNCTIONS AND DERIVATIVES
5634      600   K = 0
5635            ETA2  =  ETA**2
5636            C16  = 1.D0/1.6D1
5637            C916 = 9.D0*C16
5638            DO 800 LJ = 1,4
5639            J  =  ICORD(LJ,3)
5640            JA = (IABS(J)+1)/3
5641            RJ =  DFLOAT(J)/3.D0
5642            IF(JA.NE.1) GO TO 700
5643      C
5644      C     END POINTS
5645            K  =  K+1
5646            PHI(K)  =  C16*(9.D0*ETA2-1.D0)*(1.D0+RJ*ETA)
5647            PHIY(K) =  C16*(1.8D1*ETA-RJ+2.7D1*RJ*ETA2)
5648            GO TO 800
5649      C
5650      C     SIDE POINTS
5651      700   K  =  K+1
5652            PHI(K)  = C916*(1.D0+9.D0*RJ*ETA)*(1.D0-ETA2)
5653            PHIY(K) = C916*(9.D0*RJ-2.D0*ETA-2.7D1*RJ*ETA2)
5654      800   CONTINUE
5655            RETURN
5656            END
5657            FUNCTION ISPAC(NAME,LENGTH,K)
5658      C
```

```
5659      C      A SIMPLE MANAGER WHICH WORKS WITH 5 FIXED LENGTH COMMON BLO
5660      C      CKS, A 5-COLUMN NAME DIRECTORY AND POINTER DIRECTORY.
5661      C      ************************************************************
5662             REAL*8 NAMES,NAME
5663             COMMON /DIMCOM/ NAMES(5,30),LAST1,LAST2,LAST3,LAST4,LAST5,
5664            *MAXDIM,IPT(5,31),ICOM(5)
5665      C
5666      C      CHECK IF NAME ALREADY EXISTS.
5667             ISPACE = LOCOM(NAME,K)
5668             IF(ISPACE.EQ.0) GO TO 10
5669             GO TO 100
5670      C
5671      C      ENTER NEW NAME IN DIRECTORY.
5672      10     GO TO (20,30,40,50,60),K
5673      20     LAST1 = LAST1 + 1
5674             LAST  = LAST1
5675             GO TO 70
5676      30     LAST2 = LAST2 + 1
5677             LAST  = LAST2
5678             GO TO 70
5679      40     LAST3 = LAST3 + 1
5680             LAST  = LAST3
5681             GO TO 70
5682      50     LAST4 = LAST4 + 1
5683             LAST  = LAST4
5684             GO TO 70
5685      60     LAST5 = LAST5 + 1
5686             LAST  = LAST5
5687      C
5688      70      IF(LAST.GT.MAXDIM) GO TO 200
5689             NAMES(K,LAST) = NAME
5690             ISPACE = IPT(K,LAST)
5691             IPT(K,LAST+1) = ISPACE + LENGTH
5692             IF((IPT(K,LAST+1)-1).GT.ICOM(K)) GO TO 300
5693             ISPAC = ISPACE
5694      C
5695             RETURN
5696      C
5697      C      EXITS RESULTING FROM DIAGNOSED ERRORS
5698      100    WRITE(6,1000) NAME
5699      1000   FORMAT(22H***NAME ALREADY EXISTS,10X,A8)
5700             GO TO 400
5701      200    WRITE(6,2000) NAME,K
5702      2000   FORMAT(17H***TABLE OVERFLOW ,10X,A8,I4)
5703             GO TO 400
5704      300    WRITE(6,3000) NAME,K,IPT(K,LAST),LENGTH
5705      3000   FORMAT(23H***COMMON AREA OVERFLOW ,A8,3I4)
5706      400    CALL EXIT
5707      C
5708             END
5709             FUNCTION LOCOM(NAME,K)
5710      C
5711      C      LOCATES INDEX OF A GIVEN NAME IN NAMES DIRECTORY.
5712      C      ************************************************************
5713             REAL*8 NAME,NAMES
5714             COMMON /DIMCOM/ NAMES(5,30),LAST1,LAST2,LAST3,LAST4,LAST5,
5715            *MAXDIM,IPT(5,31),ICOM(5)
5716      C
```

```
5717            GO TO (10,20,30,40,50),K
5718      10    LAST = LAST1
5719            GO TO 60
5720      20    LAST = LAST2
5721            GO TO 60
5722      30    LAST = LAST3
5723            GO TO 60
5724      40    LAST = LAST4
5725            GO TO 60
5726      50    LAST = LAST5
5727      C
5728      60    IF(LAST.EQ.0) GO TO 200
5729            DO 100 M=1,LAST
5730            IF(NAMES(K,M).NE.NAME) GO TO 100
5731            LOCOM = M
5732            RETURN
5733      100   CONTINUE
5734      200   LOCOM = 0
5735      C
5736            RETURN
5737      C
5738            END
5739            SUBROUTINE REMOV (NAME,K)
5740      C
5741      C     REMOVES NAME, IF IT IS THE LAST VARIABLE IN COLUMN K, IN
5742      C     DIRECTORY, AND UPDATES POINTERS ACCORDINGLY.
5743      C     ************************************************************
5744            REAL*8 NAME,NAMES
5745            COMMON /DIMCOM/ NAMES(5,30),LAST1,LAST2,LAST3,LAST4,LAST5,
5746           *MAXDIM,IPT(5,31),ICOM(5)
5747      C
5748            GO TO (10,20,30,40,50),K
5749      10    LAST = LAST1
5750            GO TO 60
5751      20    LAST = LAST2
5752            GO TO 60
5753      30    LAST = LAST3
5754            GO TO 60
5755      40    LAST = LAST4
5756            GO TO 60
5757      50    LAST = LAST5
5758      C
5759      60    IF(NAMES(K,LAST).NE.NAME)  GO TO 150
5760      C
5761      C     LAST VARIABLE IN DIRECTORY COLUMN K IS NAME;  REMOVE IT.
5762            IPT(K,LAST+1) = 0
5763            NAMES(K,LAST) = 0
5764            GO TO (70,80,90,100,110),K
5765      70    LAST1 = LAST1 - 1
5766            GO TO 120
5767      80    LAST2 = LAST2 - 1
5768            GO TO 120
5769      90    LAST3 = LAST3 - 1
5770            GO TO 120
5771      100   LAST4 = LAST4 - 1
5772            GO TO 120
5773      110   LAST5 = LAST5 - 1
5774      C
```

```
 5775      120   RETURN
 5776      C
 5777      150   WRITE(6,1500) NAME,NAMES(K,LAST)
 5778      1500  FORMAT(37H***NAME IS NOT LAST VARIABLE IN NAMES  ,2A8)
 5779            CALL EXIT
 5780      C
 5781            END
 5782            SUBROUTINE REMOV2 (K)
 5783      C
 5784      C     INITIALISES COLUMN K IN NAMES AND IPT, AND LASTK
 5785      C     ************************************************************
 5786            REAL*8 NAME,NAMES
 5787            COMMON /DIMCOM/ NAMES(5,30),LAST1,LAST2,LAST3,LAST4,LAST5,
 5788           *MAXDIM,IPT(5,31),ICOM(5)
 5789      C
 5790            GO TO (10,20,30,40,50),K
 5791      10    LAST = LAST1
 5792            LAST1=0
 5793            GO TO 60
 5794      20    LAST = LAST2
 5795            LAST2=0
 5796            GO TO 60
 5797      30    LAST = LAST3
 5798            LAST3=0
 5799            GO TO 60
 5800      40    LAST = LAST4
 5801            LAST4=0
 5802            GO TO 60
 5803      50    LAST = LAST5
 5804            LAST5=0
 5805      C
 5806      60    LASTN = LAST + 1
 5807            DO 100 J=2,LASTN
 5808            J1 = J - 1
 5809            NAMES(K,J1) = 0
 5810            IPT(K,J)    = 0
 5811      100   CONTINUE
 5812      C
 5813            RETURN
 5814      C
 5815            END
 5816            SUBROUTINE CLEAR (A,LEN)
 5817      C
 5818      C     THIS SEGMENT CLEARS A DOUBLE PRESC. ARRAY OF LENGTH LEN.
 5819      C     ************************************************************
 5820            IMPLICIT REAL*8(A-H,O-Z)
 5821            DIMENSION A(LEN)
 5822      C
 5823            DO 100 I=1,LEN
 5824            A(I) = 0.D0
 5825      100   CONTINUE
 5826      C
 5827            RETURN
 5828      C
 5829            END
 5830            SUBROUTINE ICLEAR (J,LEN)
 5831      C
 5832      C     THIS SEGMENT CLEARS AN INTEGER ARRAY OF LENGTH LEN.
```

```
5833     C     ************************************************************
5834           DIMENSION J(LEN)
5835     C
5836           DO 100 I=1,LEN
5837           J(I) = 0
5838     100   CONTINUE
5839     C
5840           RETURN
5841     C
5842           END
5843           SUBROUTINE BLKSTR (A,LENGTH,IOF)
5844     C
5845     C     THIS SEGMENT BLOCKS AND STORES A REAL*8 ARRAY ON FILE IOF.
5846     C     MAXIMUM RECORD LENGTH 32000 BYTES                    NORCO
5847     C     ************************************************************
5848           IMPLICIT REAL*8(A-H,O-Z)
5849           INTEGER*2 LEN
5850           DIMENSION A(1)
5851     C
5852           NBLK = LENGTH/4000
5853           IF(NBLK.EQ.0) GO TO 200
5854           DO 100 K=1,NBLK
5855           LEN = 32000
5856           NOE = 4000*(K-1) + 1
5857     100   CALL WRITE (A(NOE),LEN,0,LNUM,IOF)
5858     200   LEN = (LENGTH - 4000*NBLK)*8
5859           NOE = 4000*NBLK + 1
5860           IF(NOE.GT.LENGTH) GO TO 300
5861           CALL WRITE (A(NOE),LEN,0,LNUM,IOF)
5862     C
5863     300   RETURN
5864     C
5865           END
5866           SUBROUTINE BLKRTV (A,LENGTH,INF)
5867     C
5868     C     THIS SEGMENT BLOCKS AND RETRIEVES A REAL*8 ARRAY FROM FILE
5869     C     INF. MAXIMUM RECORD LENGTH IS 32000 BYTES            NORCO
5870     C     ************************************************************
5871           IMPLICIT REAL*8(A-H,O-Z)
5872           INTEGER*2 LEN
5873           DIMENSION A(1)
5874     C
5875           NBLK = LENGTH/4000
5876           IF(NBLK.EQ.0) GO TO 200
5877           DO 100 K=1,NBLK
5878           NOE = 4000*(K-1) + 1
5879     100   CALL READ (A(NOE),LEN,0,LNUM,INF)
5880     200   NOE = 4000*NBLK + 1
5881           IF(NOE.GT.LENGTH) GO TO 300
5882           CALL READ (A(NOE),LEN,0,LNUM,INF)
5883     C
5884     300   RETURN
5885     C
5886           END
5887           SUBROUTINE IBLKST (I,LENGTH,IOF)
5888     C
5889     C     THIS SEGMENT BLOCKS AND STORES AN INTEGER ARRAY ON FILE IOF
5890     C     MAXIMUM RECORD LENGTH IS 32000 BYTES                 NORCO
```

```
      C     ***************************************************************
            INTEGER*2 LEN
            DIMENSION I(1)
      C
            NBLK = LENGTH/8000
            IF (NBLK.EQ.0) GO TO 200
            DO 100 K = 1,NBLK
            LEN = 32000
            NOE = 8000*(K-1) + 1
      100   CALL WRITE (I(NOE),LEN,0,LNUM,IOF)
      200   LEN = (LENGTH - 8000*NBLK)*4
            NOE = 8000*NBLK + 1
            IF(NOE.GT.LENGTH) GO TO 300
            CALL WRITE (I(NOE),LEN,0,LNUM,IOF)
      C
      300   RETURN
      C
            END
            SUBROUTINE IBLKRT (I,LENGTH,INF)
      C
      C     THIS SEGMENT RETRIEVES A BLOCKED INTEGER ARRAY FROM FILE
      C     INF. MAXIMUM RECORD LENGTH IS 32000 BYTES          NORCO
      C     ***************************************************************
            INTEGER*2 LEN
            DIMENSION I(1)
      C
            NBLK = LENGTH/8000
            IF (NBLK.EQ.0) GO TO 200
            DO 100 K = 1,NBLK
            NOE = 8000*(K-1) + 1
      100   CALL READ (I(NOE),LEN,0,LNUM,INF)
      200   NOE = 8000*NBLK + 1
            IF(NOE.GT.LENGTH) GO TO 300
            CALL READ (I(NOE),LEN,0,LNUM,INF)
      C
      300   RETURN
      C
            END
            SUBROUTINE STORE (K,AAA,BBB,III)
      C
      C     THIS SEGMENT STORES VARIABLES, ARRAYS AND POINTERS ON FILE
      C     AT THE END OF A LOAD STEP.                          NORCO
      C     ***************************************************************
            IMPLICIT REAL*8(A-H,O-Z)
            REAL*8 NMS
            INTEGER*2 LEN
            DIMENSION AAA(1),BBB(1),III(1),MMM(171)
            COMMON /PROBCV/ KKK(26)
            COMMON /POINTR/ LLL(84)
            COMMON /FILES / IN,IO,INS,IOS,IST,ILD
            COMMON /DIMCOM/ NMS(150),L1,L2,L3,L4,L5,MX,IPT(155),ICM(10)
            EQUIVALENCE (L1,MMM(1))
      C
            IF(K.EQ.1) GO TO 100
            REWIND IST
      C
            LEN = 4*26
            CALL WRITE (KKK(1),LEN,0,LNUM,IST)
```

```
5949            LEN = 4*84
5950            CALL WRITE (LLL(1),LEN,0,LNUM,IST)
5951            LEN = 1200
5952            CALL WRITE (NMS,LEN,0,LNUM,IST)
5953            LEN = 4*171
5954            CALL WRITE (MMM,LEN,0,LNUM,IST)
5955            LNT = ICM(1)
5956            WRITE(IST) LNT
5957            CALL BLKSTR(AAA(1),LNT,IST)
5958            LNT = ICM(2)
5959            WRITE(IST) LNT
5960            CALL IBLKST(III(1),LNT,IST)
5961            LNT = (LLL(66)-1)
5962            WRITE(IST)LNT
5963            CALL BLKSTR (BBB(1),LNT,IST)
5964      C
5965      100   REWIND ILD
5966            LNT = 2*(LLL(68)-LLL(67))
5967            WRITE (ILD) LNT
5968            CALL BLKSTR(BBB(LLL(67)),LNT,ILD)
5969      C
5970            RETURN
5971      C
5972            END
5973            SUBROUTINE RSTORE (K,AAA,BBB,III)
5974      C
5975      C     THIS SEGEMNT RESTORES VARIABLES, ARRAYS AND POINTERS FROM
5976      C     *FILE AT THE BEGINNING OF A LOAD STEP.                NORCO
5977      C     ************************************************************
5978            IMPLICIT REAL*8(A-H,O-Z)
5979            REAL*8 NMS
5980            INTEGER*2 LEN
5981            DIMENSION AAA(1),BBB(1),III(1),MMM(171)
5982            COMMON /FILES / IN,IO,INS,IOS,IST,ILD
5983            COMMON /PROBCV/ KKK(26)
5984            COMMON /POINTR/ LLL(84)
5985            COMMON /DIMCOM/ NMS(150),L1,L2,L3,L4,L5,MX,IPT(155),ICM(10)
5986            EQUIVALENCE (L1,MMM(1))
5987      C
5988            IF (K.EQ.1) GO TO 100
5989            REWIND ILD
5990            REWIND IST
5991      C
5992            CALL READ (KKK(1),LEN,0,LNUM,IST)
5993            CALL READ (LLL(1),LEN,0,LNUM,IST)
5994            CALL READ (NMS,LEN,0,LNUM,IST)
5995            CALL READ (MMM,LEN,0,LNUM,IST)
5996            GO TO 200
5997      100   READ (IST) LNT
5998            CALL BLKRTV (AAA(1),LNT,IST)
5999            READ (IST) LNT
6000            CALL IBLKRT (III(1),LNT,IST)
6001            READ (IST) LNT
6002            CALL BLKRTV (BBB(1),LNT,IST)
6003            READ (ILD) LNT
6004            CALL BLKRTV (BBB(LLL(67)),LNT,ILD)
6005      C
6006      200   RETURN
```

```
      C
            END
            SUBROUTINE SHAPE2 (XI,ETA,NEL,NDEG,PHI,PHIX,PHIY,INCBL)
      C
      C     THIS SEGMENT FORMS SHAPE FUNCTIONS AND DERIVATIVES
      C     FOR VARIABLE NUMBER NODE AND LAGRANGIAN ELEMENTS
            IMPLICIT REAL*8(A-H,O-Z)
            DIMENSION PHI(16),PHIX(16),PHIY(16),NEL(12)
      C     CORNER NODES LINEAR DISPLACEMENT
            PXI=1.0D0+XI
            PETA=1.0D0+ETA
            SXI=1.0D0-XI
            SETA=1.0D0-ETA
            PHI(1)=2.5D-1*SXI*SETA
            PHI(2)=2.5D-1*PXI*SETA
            PHI(3)=2.5D-1*PXI*PETA
            PHI(4)=2.5D-1*SXI*PETA
            PHIX(1)=-2.5D-1*SETA
            PHIY(1)=-2.5D-1*SXI
            PHIX(2)=2.5D-1*SETA
            PHIY(2)=-2.5D-1*PXI
            PHIX(3)=2.5D-1*PETA
            PHIY(3)=2.5D-1*PXI
            PHIX(4)=-2.5D-1*PETA
            PHIY(4)=2.5D-1*SXI
      C     INCOMPATIBLE ELEMENTS
            IF(NDEG.GT.1) GO TO 200
            IF(INCBL.EQ.0) GO TO 100
            PHI(5) = 1.D0 - XI**2
            PHI(6) = 1.D0 - ETA**2
            PHIX(5) = -2.D0*XI
            PHIX(6) = 0.D0
            PHIY(5) = 0.D0
            PHIY(6) = -2.D0*ETA
        100 RETURN
      C     MIDSIDE NODES
        200 DO 210 I=5,8
            M=I+4
            IF(NEL(I).GT.0) GO TO 250
        210 CONTINUE
            IF(NDEG.GT.3) GO TO 309
            GO TO 310
        250 IF(NEL(M).GT.0) GO TO 300
            S2XI=5.0D-1*(1.0D0-XI**2)
            S2ETA=5.0D-1*(1.0D0-ETA**2)
            N=I-4
            GO TO (251,252,253,254),N
        251 PHI(I)=S2XI*SETA
            PHIX(I)=-XI*SETA
            PHIY(I)=-S2XI
            GO TO 255
        252 PHI(I)=S2ETA*PXI
            PHIX(I)=S2ETA
            PHIY(I)=-ETA*PXI
            GO TO 255
        253 PHI(I)=S2XI*PETA
            PHIX(I)=-XI*PETA
            PHIY(I)=S2XI
```

```
      GO TO 255
  254 PHI(I)=S2ETA*SXI
      PHIX(I)=-S2ETA
      PHIY(I)=-ETA*SXI
  255 DO 260 J=1,2
      K=I-5+J
      IF(K.EQ.5) GO TO 270
      GO TO 271
  270 K=1
  271 PHI(K)=PHI(K)-5.0D-1*PHI(I)
      PHIX(K)=PHIX(K)-5.0D-1*PHIX(I)
      PHIY(K)=PHIY(K)-5.0D-1*PHIY(I)
  260 CONTINUE
      GO TO 210
  300 N=I-4
      XI3=1.0D0/16.0D0*(-27.0D0*XI**3-9.0D0*XI**2+
     *27.0D0*XI+9.0D0)
      XI23=1.0D0-XI**2+1.0D0/16.0D0*(27.0D0*XI**3+
     *7.0D0*XI**2-27.0D0*XI-7.0D0)
      ETA3=1.0D0/16.0D0*(-27.0D0*ETA**3-9.0D0*ETA**2
     *+27.0D0*ETA+9.0D0)
      ETA23=1.0D0-ETA**2+1.0D0/16.0D0*(27.0D0*ETA**3
     *+7.0D0*ETA**2-27.0D0*ETA-7.0D0)
      GO TO (301,302,303,304),N
  301 PHI(I)=XI23*SETA*5.0D-1
      PHI(M)=XI3*SETA*5.0D-1
      PHIX(I)=(-2.0D0*XI+1.0D0/16.0D0*(81.0D0*XI**2+
     *14.0D0*XI-27.0D0))*SETA*5.0D-1
      PHIX(M)=1.0D0/16.0D0*(-81.0D0*XI**2-18.0D0*XI+
     *27.0D0)*SETA*5.0D-1
      PHIY(I)=-XI23*5.0D-1
      PHIY(M)=-XI3*5.0D-1
      GO TO 306
  302 PHI(I)=ETA23*PXI*5.0D-1
      PHI(M)=ETA3*PXI*5.0D-1
      PHIX(I)=ETA23*5.0D-1
      PHIX(M)=ETA3*5.0D-1
      PHIY(I)=(-2.0D0*ETA+1.0D0/16.0D0*(81.0D0*ETA**2
     *+14.0D0*ETA-27.0D0))*PXI*5.0D-1
      PHIY(M)=1.0D0/16.0D0*(-81.0D0*ETA**2-18.0D0*
     *ETA+27.0D0)*PXI*5.0D-1
      GO TO 306
  303 PHI(I)=XI3*PETA*5.0D-1
      PHI(M)=XI23*PETA*5.0D-1
      PHIX(I)=1.0D0/16.0D0*(-81.0D0*XI**2-18.0D0*XI+
     *27.0D0)*PETA*5.0D-1
      PHIX(M)=(-2.0D0*XI+1.0D0/16.0D0*(81.0D0*XI**2+
     *14.0D0*XI-27.0D0))*PETA*5.0D-1
      PHIY(I)=XI3*5.0D-1
      PHIY(M)=XI23*5.0D-1
      GO TO 306
  304 PHI(I)=ETA3*SXI*5.0D-1
      PHI(M)=ETA23*SXI*5.0D-1
      PHIX(I)=-ETA3*5.0D-1
      PHIX(M)=-ETA23*5.0D-1
      PHIY(I)=1.0D0/16.0D0*(-81.0D0*ETA**2-18.0D0*
     *ETA+27.0D0)*SXI*5.0D-1
      PHIY(M)=(-2.0D0*ETA+1.0D0/16.0D0*(81.0D0*ETA**2
```

```
     *+14.0D0*ETA-27.0D0))*SXI*5.0D-1
      GO TO 307
  306 L=N+1
      GO TO 308
  307 L=1
C     CORRECTION FOR CORNER NODES
  308 PHI(N)=PHI(N)-2.0D0/3.0D0*PHI(I)-1.0D0/3.0D0*PHI(M)
      PHIX(N)=PHIX(N)-2.0D0/3.0D0*PHIX(I)-1.0D0/3.0D0*PHIX(M)
      PHIY(N)=PHIY(N)-2.0D0/3.0D0*PHIY(I)-1.0D0/3.0D0*PHIY(M)
      PHI(L)=PHI(L)-1.0D0/3.0D0*PHI(I)-2.0D0/3.0D0*PHI(M)
      PHIX(L)=PHIX(L)-1.0D0/3.0D0*PHIX(I)-2.0D0/3.0D0*PHIX(M)
      PHIY(L)=PHIY(L)-1.0D0/3.0D0*PHIY(I)-2.0D0/3.0D0*PHIY(M)
      IF(I.NE.8) GO TO 210
      IF(NDEG.LE.3) GO TO 310
  309 K=0
      DO 500 J=1,12
      IF(NEL(J).EQ.0) GO TO 500
      K=J+K
  500 CONTINUE
      IF(K.LT.36) GO TO 310
      XIL=1.0D0-XI**2
      ETL=1.0D0-ETA**2
      PH11=XIL*ETL
      PX11=ETL*(-2.0D0*XI)
      PY11=XIL*(-2.0D0*ETA)
      C276=27.0D0/16.0D0
      C13=1.0D0/3.0D0
      C16=1.0D0/6.0D0
      C916=9.0D0/16.0D0
      C23=2.0D0/3.0D0
      C38=3.0D0/8.0D0
      C316=3.0D0/16.0D0
      C932=9.0D0/32.0D0
C     ALTHOUGH IN THE FOLLOWING SHAPE FUNCTIONS ARE
C     CALCULATED AFTER ADDING INTERIOR NODES FOR
C     VARIABLE NUMBER NODE ELEMENTS,DERIVATIVES ARE
C     EVALUATED ONLY FOR FULL QUADRATIC OR CUBIC
C     LAGRANGIAN ELEMENTS
      IF(K.EQ.36) GO TO 515
      IF(K.EQ.45) GO TO 520
      IF(K.EQ.46) GO TO 521
      IF(K.EQ.47) GO TO 522
      IF(K.EQ.48) GO TO 523
      IF(K.EQ.55) GO TO 524
      IF(K.EQ.57.AND.NEL(9).EQ.0) GO TO 525
      IF(K.EQ.57.AND.NEL(9).NE.0) GO TO 526
      IF(K.EQ.56.OR.K.EQ.66) GO TO 512
      IF(K.EQ.58.OR.K.EQ.67) GO TO 513
      IF(K.EQ.59) GO TO 527
      IF(K.EQ.68.OR.K.EQ.78) GO TO 512
      IF(K.EQ.69) GO TO 513
  512 PH12=C276*ETL*XIL*(C13+XI)
      PH21=C276*ETL*XIL*(C13-XI)
      IF(K.EQ.78) GO TO 513
      IF(K.EQ.56) GO TO 518
      IF(K.EQ.66) GO TO 517
      IF(K.EQ.68) GO TO 528
  513 PH13=C276*XIL*ETL*(C13+ETA)
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6181            PH31=C276*XIL*ETL*(C13-ETA)
6182            IF(K.EQ.78) GO TO 514
6183            IF(K.EQ.58) GO TO 519
6184            IF(K.EQ.67) GO TO 529
6185            IF(K.EQ.69) GO TO 530
6186          514 PH14=C276*XIL*(C13-XI)*C276*ETL*(C13-ETA)
6187            PX14=C276*(-2.0D0*XI*(C13-XI)-XIL)*C276*ETL*(C13-ETA)
6188            PY14=C276*XIL*(C13-XI)*C276*(-2.0D0*ETA*(C13-ETA)-ETL)
6189      C
6190            PH24=C276*XIL*(C13+XI)*C276*ETL*(C13-ETA)
6191            PX24=C276*(-2.0D0*XI*(C13+XI)+XIL)*C276*ETL*(C13-ETA)
6192            PY24=C276*XIL*(C13+XI)*C276*(-2.0D0*ETA*(C13-ETA)-ETL)
6193      C
6194            PH34=C276*XIL*(C13+XI)*C276*ETL*(C13+ETA)
6195            PX34=C276*(-2.0D0*XI*(C13+XI)+XIL)*C276*ETL*(C13+ETA)
6196            PY34=C276*XIL*(C13+XI)*C276*(-2.0D0*ETA*(C13+ETA)+ETL)
6197      C
6198            PH44=C276*XIL*(C13-XI)*C276*ETL*(C13+ETA)
6199            PX44=C276*(-2.0D0*XI*(C13-XI)-XIL)*C276*ETL*(C13+ETA)
6200            PY44=C276*XIL*(C13-XI)*C276*(-2.0D0*ETA*(C13+ETA)+ETL)
6201      C
6202            GO TO 516
6203      C     QUADRATIC ELEMENT ONE CENTRE NODE
6204          515 DO 600 I=5,8
6205            PHI(I)=PHI(I)-5.0D-1*PH11
6206            PHIX(I)=PHIX(I)-5.0D-1*PX11
6207            PHIY(I)=PHIY(I)-5.0D-1*PY11
6208          600 CONTINUE
6209            DO 610 I=1,4
6210            PHI(I)=PHI(I)+2.5D-1*PH11
6211            PHIX(I)=PHIX(I)+2.5D-1*PX11
6212            PHIY(I)=PHIY(I)+2.5D-1*PY11
6213          610 CONTINUE
6214            GO TO 310
6215      C     CUBIC ELEMENT FOUR INTERIOR NODES
6216          516 PHI(5)=PHI(5)-C23*PH14-C13*PH44
6217            PHIX(5)=PHIX(5)-C23*PX14-C13*PX44
6218            PHIY(5)=PHIY(5)-C23*PY14-C13*PY44
6219      C
6220            PHI(9)=PHI(9)-C23*PH24-C13*PH34
6221            PHIX(9)=PHIX(9)-C23*PX24-C13*PX34
6222            PHIY(9)=PHIY(9)-C23*PY24-C13*PY34
6223      C
6224            PHI(6)=PHI(6)-C23*PH24-C13*PH14
6225            PHIX(6)=PHIX(6)-C23*PX24-C13*PX14
6226            PHIY(6)=PHIY(6)-C23*PY24-C13*PY14
6227      C
6228            PHI(10)=PHI(10)-C23*PH34-C13*PH44
6229            PHIX(10)=PHIX(10)-C23*PX34-C13*PX44
6230            PHIY(10)=PHIY(10)-C23*PY34-C13*PY44
6231      C
6232            PHI(7)=PHI(7)-C23*PH34-C13*PH24
6233            PHIX(7)=PHIX(7)-C23*PX34-C13*PX24
6234            PHIY(7)=PHIY(7)-C23*PY34-C13*PY24
6235      C
6236            PHI(11)=PHI(11)-C23*PH44-C13*PH14
6237            PHIX(11)=PHIX(11)-C23*PX44-C13*PX14
6238            PHIY(11)=PHIY(11)-C23*PY44-C13*PY14
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      C
            PHI(8)=PHI(8)-C23*PH44-C13*PH34
            PHIX(8)=PHIX(8)-C23*PX44-C13*PX34
            PHIY(8)=PHIY(8)-C23*PY44-C13*PY34
      C
            PHI(12)=PHI(12)-C23*PH14-C13*PH24
            PHIX(12)=PHIX(12)-C23*PX14-C13*PX24
            PHIY(12)=PHIY(12)-C23*PY14-C13*PY24
      C
            PHI(1)=PHI(1)+C23*C23*PH14+C13*C23*PH24+
     *C13*C13*PH34+C23*C13*PH44
            PHIX(1)=PHIX(1)+C23*C23*PX14+C13*C23*PX24+
     *C13*C13*PX34+C23*C13*PX44
            PHIY(1)=PHIY(1)+C23*C23*PY14+C13*C23*PY24+
     *C13*C13*PY34+C23*C13*PY44
      C
            PHI(2)=PHI(2)+C23*C13*PH14+C23*C23*PH24+
     *C23*C13*PH34+C13*C13*PH44
            PHIX(2)=PHIX(2)+C23*C13*PX14+C23*C23*PX24+
     *C23*C13*PX34+C13*C13*PX44
            PHIY(2)=PHIY(2)+C23*C13*PY14+C23*C23*PY24+
     *C23*C13*PY34+C13*C13*PY44
      C
            PHI(3)=PHI(3)+C13*C13*PH14+C23*C13*PH24+
     *C23*C23*PH34+C23*C13*PH44
            PHIX(3)=PHIX(3)+C13*C13*PX14+C23*C13*PX24+
     *C23*C23*PX34+C23*C13*PX44
            PHIY(3)=PHIY(3)+C13*C13*PY14+C23*C13*PY24+
     *C23*C23*PY34+C23*C13*PY44
      C
            PHI(4)=PHI(4)+C23*C13*PH14+C13*C13*PH24+
     *C23*C13*PH34+C23*C23*PH44
            PHIX(4)=PHIX(4)+C23*C13*PX14+C13*C13*PX24+
     *C23*C13*PX34+C23*C23*PX44
            PHIY(4)=PHIY(4)+C23*C13*PY14+C13*C13*PY24+
     *C23*C13*PY34+C23*C23*PY44
      C
            GO TO 310
      C     ONE INTERIOR NODE FOR VARIABLE NODE ELEMENT
        520 PHI(5)=PHI(5)-C932*PH11
            PHI(9)=PHI(9)-C932*PH11
            PHI(6)=PHI(6)-5.0D-1*PH11
            PHI(7)=PHI(7)-5.0D-1*PH11
            PHI(8)=PHI(8)-5.0D-1*PH11
            PHI(1)=PHI(1)+C932*PH11
            PHI(2)=PHI(2)+C932*PH11
            PHI(3)=PHI(3)+2.5D-1*PH11
            PHI(4)=PHI(4)+2.5D-1*PH11
            GO TO 310
        521 PHI(5)=PHI(5)-5.0D-1*PH11
            PHI(6)=PHI(6)-C932*PH11
            PHI(7)=PHI(7)-5.0D-1*PH11
            PHI(8)=PHI(8)-5.0D-1*PH11
            PHI(10)=PHI(10)-C932*PH11
            PHI(1)=PHI(1)+2.5D-1*PH11
            PHI(2)=PHI(2)+C932*PH11
            PHI(3)=PHI(3)+C932*PH11
            PHI(4)=PHI(4)+2.5D-1*PH11
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```
      GO TO 310
C
  522 PHI(5)=PHI(5)-5.0D-1*PH11
      PHI(6)=PHI(6)-5.0D-1*PH11
      PHI(7)=PHI(7)-C932*PH11
      PHI(8)=PHI(8)-5.0D-1*PH11
      PHI(11)=PHI(11)-C932*PH11
      PHI(1)=PHI(1)+2.5D-1*PH11
      PHI(2)=PHI(2)+2.5D-1*PH11
      PHI(3)=PHI(3)+C932*PH11
      PHI(4)=PHI(4)+C932*PH11
      GO TO 310
  523 PHI(5)=PHI(5)-5.0D-1*PH11
      PHI(6)=PHI(6)-5.0D-1*PH11
      PHI(7)=PHI(7)-5.0D-1*PH11
      PHI(8)=PHI(8)-C932*PH11
      PHI(12)=PHI(12)-C932*PH11
      PHI(1)=PHI(1)+C932*PH11
      PHI(2)=PHI(2)+2.5D-1*PH11
      PHI(3)=PHI(3)+2.5D-1*PH11
      PHI(4)=PHI(4)+C932*PH11
      GO TO 310
  524 PHI(5)=PHI(5)-C932*PH11
      PHI(6)=PHI(6)-C932*PH11
      PHI(7)=PHI(8)-5.0D-1*PH11
      PHI(8)=PHI(8)-5.0D-1*PH11
      PHI(9)=PHI(9)-C932*PH11
      PHI(10)=PHI(10)-C932*PH11
      PHI(1)=PHI(1)+C932*PH11
      PHI(2)=PHI(2)+5.0D0/16.0D0*PH11
      PHI(3)=PHI(3)+C932*PH11
      PHI(4)=PHI(4)+2.5D-1*PH11
      GO TO 310
  525 PHI(5)=PHI(5)-5.0D-1*PH11
      PHI(6)=PHI(6)-C932*PH11
      PHI(7)=PHI(7)-C932*PH11
      PHI(8)=PHI(8)-5.0D-1*PH11
      PHI(10)=PHI(10)-C932*PH11
      PHI(11)=PHI(11)-C932*PH11
      PHI(1)=PHI(1)+2.5D-1*PH11
      PHI(2)=PHI(2)+C932*PH11
      PHI(3)=PHI(3)+5.0D0/16.0D0*PH11
      PHI(4)=PHI(4)+C932*PH11
      GO TO 310
  526 PHI(5)=PHI(5)-C932*PH11
      PHI(6)=PHI(6)-5.0D-1*PH11
      PHI(7)=PHI(7)-5.0D-1*PH11
      PHI(8)=PHI(8)-C932*PH11
      PHI(9)=PHI(9)-C932*PH11
      PHI(12)=PHI(12)-C932*PH11
      PHI(1)=PHI(1)+5.0D0/16.0D0*PH11
      PHI(2)=PHI(2)+C932*PH11
      PHI(3)=PHI(3)+2.5D-1*PH11
      PHI(4)=PHI(4)+C932*PH11
      GO TO 310
  527 PHI(5)=PHI(5)-5.0D-1*PH11
      PHI(6)=PHI(6)-5.0D-1*PH11
      PHI(7)=PHI(7)-C932*PH11
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6355            PHI(8)=PHI(8)-C932*PH11
6356            PHI(11)=PHI(11)-C932*PH11
6357            PHI(12)=PHI(12)-C932*PH11
6358            PHI(1)=PHI(1)+C932*PH11
6359            PHI(2)=PHI(2)+2.5D-1*PH11
6360            PHI(3)=PHI(3)+C932*PH11
6361            PHI(4)=PHI(4)+5.0D0/16.0D0*PH11
6362            GO TO 310
6363      C     TWO INTERIOR NODES FOR VARIABLE NUMBER NODE ELEMENT
6364        518 PHI(5)=PHI(5)-5.0D-1*PH21
6365            PHI(6)=PHI(6)-C23*PH12-C13*PH21
6366            PHI(7)=PHI(7)-5.0D-1*PH12
6367            PHI(8)=PHI(8)-C23*PH21-C13*PH12
6368            PHI(9)=PHI(9)-5.0D-1*PH12
6369            PHI(11)=PHI(11)-5.0D-1*PH21
6370            PHI(1)=PHI(1)+C13*PH21+C16*PH12
6371            PHI(2)=PHI(2)+C13*PH12+C16*PH21
6372            PHI(3)=PHI(3)+C13*PH12+C16*PH21
6373            PHI(4)=PHI(4)+C13*PH21+C16*PH12
6374            GO TO 310
6375        517 PHI(5)=PHI(5)-5.0D-1*PH21
6376            PHI(6)=PHI(6)-C38*PH12-C316*PH21
6377            PHI(7)=PHI(7)-5.0D-1*PH12
6378            PHI(8)=PHI(8)-C23*PH21-C13*PH12
6379            PHI(9)=PHI(9)-5.0D-1*PH12
6380            PHI(10)=PHI(10)-C38*PH12-C316*PH21
6381            PHI(11)=PHI(11)-5.0D-1*PH21
6382            PHI(1)=PHI(1)+C13*PH21+C16*PH12
6383            PHI(2)=PHI(2)+C38*PH12+C316*PH21
6384            PHI(3)=PHI(3)+C38*PH12+C316*PH21
6385            PHI(4)=PHI(4)+C13*PH21+C16*PH12
6386            GO TO 310
6387        519 PHI(5)=PHI(5)-C23*PH31-C13*PH13
6388            PHI(6)=PHI(6)-5.0D-1*PH31
6389            PHI(7)=PHI(7)-C23*PH13-C13*PH31
6390            PHI(8)=PHI(8)-5.0D-1*PH13
6391            PHI(12)=PHI(12)-5.0D-1*PH31
6392            PHI(1)=PHI(1)+C13*PH31+C16*PH13
6393            PHI(2)=PHI(2)+C13*PH31+C16*PH13
6394            PHI(3)=PHI(3)+C13*PH13+C16*PH31
6395            PHI(4)=PHI(4)+C13*PH13+C16*PH31
6396            GO TO 310
6397        528 PHI(5)=PHI(5)-5.0D-1*PH21
6398            PHI(6)=PHI(6)-C23*PH12-C13*PH21
6399            PHI(7)=PHI(7)-5.0D-1*PH12
6400            PHI(8)=PHI(8)-C38*PH21-C316*PH12
6401            PHI(9)=PHI(9)-5.0D-1*PH12
6402            PHI(11)=PHI(11)-5.0D-1*PH21
6403            PHI(12)=PHI(12)-C38*PH21-C316*PH12
6404            PHI(1)=PHI(1)+C38*PH21+C316*PH12
6405            PHI(2)=PHI(2)+C13*PH12+C16*PH21
6406            PHI(3)=PHI(3)+C13*PH12+C16*PH21
6407            PHI(4)=PHI(4)+C38*PH21+C316*PH12
6408            GO TO 310
6409        529 PHI(5)=PHI(5)-C38*PH31-C316*PH13
6410            PHI(6)=PHI(6)-5.0D-1*PH31
6411            PHI(7)=PHI(7)-C23*PH13-C13*PH31
6412            PHI(8)=PHI(8)-5.0D-1*PH13
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6413            PHI(9)=PHI(9)-C38*PH31-C316*PH13
6414            PHI(10)=PHI(10)-5.0D-1*PH13
6415            PHI(12)=PHI(12)-5.0D-1*PH31
6416            PHI(1)=PHI(1)+C38*PH31+C316*PH13
6417            PHI(2)=PHI(2)+C38*PH31+C316*PH13
6418            PHI(3)=PHI(3)+C13*PH13+C16*PH31
6419            PHI(4)=PHI(4)+C13*PH13+C16*PH31
6420            GO TO 310
6421          530 PHI(5)=PHI(5)-C23*PH31-C13*PH13
6422            PHI(6)=PHI(6)-5.0D-1*PH31
6423            PHI(7)=PHI(7)-C38*PH13-C316*PH31
6424            PHI(8)=PHI(8)-5.0D-1*PH13
6425            PHI(10)=PHI(10)-5.0D-1*PH13
6426            PHI(11)=PHI(11)-C38*PH13-C316*PH31
6427            PHI(12)=PHI(12)-5.0D-1*PH31
6428            PHI(1)=PHI(1)+C13*PH31+C16*PH13
6429            PHI(2)=PHI(2)+C13*PH31+C16*PH13
6430            PHI(3)=PHI(3)+C38*PH13+C316*PH31
6431            PHI(4)=PHI(4)+C38*PH13+C316*PH31
6432       C    REARRANGE SHAPE FUNCTINS AND DERIVATIVES SEQUECIALLY
6433        310 KK=0
6434            DO 311 LJ=1,12
6435            IF(NEL(LJ).EQ.0) GO TO 311
6436            KK=KK+1
6437            T1=PHI(LJ)
6438            T2=PHIX(LJ)
6439            T3=PHIY(LJ)
6440            PHI(KK)=T1
6441            PHIX(KK)=T2
6442            PHIY(KK)=T3
6443          311 CONTINUE
6444            IF(NDEG.EQ.2.AND.INCBL.NE.0) GO TO 890
6445            IF(NDEG.LE.3) GO TO 900
6446            IF(K.EQ.36) GO TO 810
6447            IF(K.EQ.45) GO TO 810
6448            IF(K.EQ.46) GO TO 810
6449            IF(K.EQ.47) GO TO 810
6450            IF(K.EQ.48) GO TO 810
6451            IF(K.EQ.55) GO TO 810
6452            IF(K.EQ.57.AND.NEL(9).EQ.0) GO TO 810
6453            IF(K.EQ.57.AND.NEL(9).NE.0) GO TO 810
6454            IF(K.EQ.56.OR.K.EQ.66) GO TO 810
6455            IF(K.EQ.58.OR.K.EQ.67) GO TO 810
6456            IF(K.EQ.59) GO TO 810
6457            IF(K.EQ.68) GO TO 810
6458            IF(K.EQ.69) GO TO 810
6459            IF(K.EQ.78) GO TO 811
6460       C
6461        810 PHI(9)=PH11
6462            PHIX(9)=PX11
6463            PHIY(9)=PY11
6464            GO TO 900
6465       C
6466        811 PHI(13)=PH14
6467            PHI(14)=PH24
6468            PHI(15)=PH34
6469            PHI(16)=PH44
6470            PHIX(13)=PX14
```

```
      PHIX(14)=PX24
      PHIX(15)=PX34
      PHIX(16)=PX44
      PHIY(13)=PY14
      PHIY(14)=PY24
      PHIY(15)=PY34
      PHIY(16)=PY44
      GO TO 900
C     INCOMPATIBLE QUADRATIC ELEMENT
  890 PHI(9) = XI*(1.D0-XI**2)
      PHI(10) = ETA*(1.D0-ETA**2)
      PHIX(9) = 1.D0-3.D0*XI**2
      PHIX(10) = 0.D0
      PHIY(9) = 0.D0
      PHIY(10)= 1.D0-3.D0*ETA**2
  900 RETURN
      END
VCMLT   CSECT
        USING VCMLT,12
        STM   14,12,12(13)
        LR    12,15
        LA    11,SAVE
        ST    11,8(0,13)
        ST    13,4(0,11)
        LR    13,11
*
        L     2,0(1)
        L     4,4(1)
        L     5,8(1)
        L     3,12(1)
        L     3,0(3)
        SLL   3,3
        LA    8,8
        LR    9,3
        SR    9,8
        SR    7,7
        SDR   0,0
*
RET     LD    4,0(2,7)
        MD    4,0(4,7)
        ADR   0,4
        BXLE  7,8,RET
        STD   0,0(5)
        L     13,4(0,13)
        LM    14,12,12(13)
        SR    15,15
        BR    14
SAVE    DS    18F
        END
      SUBROUTINE ELMDT6 (ME,NS,DEL,NPELM,DQ,NMNOD,ID,NBELM,NBD)
C
C     THIS SEGMENT OBTAINS ELEMENT MATERIAL INFORMATION AND NOD
C     AL DISPLACEMENTS.                                      NORCO
C     ********************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      DIMENSION NPELM(12,1),DQ(1),DEL(1),ID(2,NMNOD),LM(40),
     *NBELM(16,1)
C
```

```
6529            ND=2*NS
6530            K=0
6531            DO 100 I=1,12
6532            NODE = NPELM(I,ME)
6533            IF(NODE.EQ.0) GO TO 100
6534            K=K+1
6535            I2 = 2*K
6536            I1 = I2 - 1
6537            LM(I2)=ID(2,NPELM(I,ME))
6538            LM(I1)=ID(1,NPELM(I,ME))
6539       100  CONTINUE
6540       C
6541            ND=2*NS+NBD
6542            L=0
6543            DO 150 I=1,16
6544            IF(NBELM(I,ME).EQ.0) GO TO 150
6545            L=L+1
6546            J=L+2*NS
6547            LM(J)=ID(1,NBELM(I,ME))
6548        150 CONTINUE
6549       C
6550          160 DO 200 J=1,ND
6551            IF(LM(J).GT.0) GO TO 190
6552            DEL(J)=0.0D0
6553            GO TO 200
6554          190 M=LM(J)
6555            DEL(J)=DQ(M)
6556          200 CONTINUE
6557            RETURN
6558       C
6559            END
6560            SUBROUTINE ELMDT5 (ME,NBELM,NBD)
6561       C
6562       C    THIS SEGMENT CALCULATES THE TOTAL NUMBER OF BOND SLIP
6563       C    NODES PER SOLID ELEMENT
6564       C    ********************************************************
6565       C
6566            DIMENSION NBELM(16,1)
6567            NBD=0
6568            DO 100 I=1,16
6569            IF(NBELM(I,ME).EQ.0) GO TO 100
6570            NBD=NBD+1
6571       100  CONTINUE
6572       C
6573            RETURN
6574       C
6575            END
6576            SUBROUTINE SHAPE4 (ETA,NDEG,PHI,PHIY,PHYY)
6577       C
6578       C    THIS SUBROUTINE COMPUTES ONE DIMENSIONAL SHAPE FUNCTIONS
6579       C    AND DERIVATIVES.                                    NORCO
6580       C    ************************************************************
6581            IMPLICIT REAL*8(A-H,O-Z)
6582            DIMENSION PHI(1),PHIY(1), ICORD(4,3),PHYY(4)
6583            DATA ICORD/-1,1,2*0,-1,0,1,0,-3,-1,1,3/
6584       C
6585            GO TO (100,300,600),NDEG
6586       C
```

```
      C     LINEAR SHAPE FUNCTIONS AND DERUVATIVES
100   K = 0
      DO 200 LJ = 1,2
      J  =  ICORD(LJ,1)
      RJ = DFLOAT(J)
      K  =  K+1
      PHI(K)  = .5D0*(1.D0+RJ*ETA)
      PHIY(K) = .5D0*RJ
200   CONTINUE
      RETURN
C
C     QUADRATIC SHAPE FUNCTIONS AND DERIVATIVES
300   K  =  0
      ETA2  = ETA**2
      DO 500 LJ = 1,3
      J  =  ICORD(LJ,2)
      JA =  IABS(J)
      RJ = DFLOAT(J)
      IF(JA.NE.1) GO TO 400
C
C     END POINTS
      K  =  K+1
      PHI(K)  = .5D0*ETA*RJ*(1.D0+ETA*RJ)
      PHIY(K) = .5D0*RJ*(1.D0+2.D0*ETA*RJ)
      GO TO 500
C
C     MID.SIDE POINT
400   K  =  K+1
      PHI(K)  = 1.D0 - ETA2
      PHIY(K) = -2.D0*ETA
500   CONTINUE
      RETURN
C
C     CUBIC SHAPE FUNCTIONS AND DERIVATIVES
600   K = 0
      ETA2  =  ETA**2
      C16  = 1.D0/1.6D1
      C916 = 9.D0*C16
      DO 800 LJ = 1,4
      J  =  ICORD(LJ,3)
      JA = (IABS(J)+1)/3
      RJ =  DFLOAT(J)/3.D0
      IF(JA.NE.1) GO TO 700
C
C     END POINTS
      K  =  K+1
      PHI(K)  =  C16*(9.D0*ETA2-1.D0)*(1.D0+RJ*ETA)
      PHIY(K) =  C16*(1.8D1*ETA-RJ+2.7D1*RJ*ETA2)
      PHYY(K) =  C16*(1.8D1+5.4D1*RJ*ETA)
      GO TO 800
C
C     SIDE POINTS
700   K  =  K+1
      PHI(K)  = C916*(1.D0+9.D0*RJ*ETA)*(1.D0-ETA2)
      PHIY(K) = C916*(9.D0*RJ-2.D0*ETA-2.7D1*RJ*ETA2)
      PHYY(K) = C916*(-2.D0-5.4D1*RJ*ETA)
800   CONTINUE
      RETURN
```

```
      END
      SUBROUTINE SHAPE3 (XI,ETA,PHXX,PHYY)
C
C     THIS SEGMENT FORMS SECOND DERIVATIVES OF SHAPE FUNCTIONS
C     FOR BOND ELEMENT , AT THE GAUSS POINT
C     SPECIFIED BY(XI,ETA).
C     ************************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      DIMENSION PHXX(16),PHYY(16), ICORD(4),NPORD(12)
      DATA ICORD/-3,-1,1,3/
     *    ,NPORD/1,12,8,4,5,11,9,7,2,6,10,3/
C
C
C
C     SECOND DERIVATIVES FOR CUBIC DISPLACEM
C     ENTS
      K = 0
      XI2 = XI**2
      ETA2 = ETA**2
      C32 = 1.D0/3.2D1
      C932 = 9.D0/3.2D1
      DO 900 LI = 1,4
      I = ICORD(LI)
      IA = (IABS(I)+1)/3
      RI = DFLOAT(I)/3.D0
      DO 900 LJ = 1,4
      J = ICORD(LJ)
      JA = (IABS(J)+1)/3
      RJ = DFLOAT(J)/3.D0
      IF(IA.NE.1.OR.JA.NE.1) GO TO 750
C
C     CORNER POINTS
      K = K+1
      N = NPORD(K)
      X1 = 1.D0+RI*XI
      Y1 = 1.D0+RJ*ETA
      PHXX(N) = C32*Y1*1.8D1*(3.D0*RI*XI+1.D0)
      PHYY(N) = C32*X1*1.8D1*(3.D0*RJ*ETA+1.D0)
      GO TO 900
C
C     AT INTERIOR POINTS ON SIDES
750   IF(IA.EQ.0.AND.JA.EQ.0)  GO TO 900
      K = K+1
      N = NPORD(K)
      IF(IA.NE.1)  GO TO 800
      X1 = 1.D0+RI*XI
      Y1 = 1.D0-ETA2
      PHYY(N) = -C932*X1*(5.4D1*RJ*ETA+2.D0)
      GO TO 900
C
800   X1 = 1.D0-XI2
      Y1 = 1.D0+RJ*ETA
      PHXX(N) = -C932*Y1*(5.4D1*RI*XI+2.D0)
C
900   CONTINUE
C
      RETURN
      END
```

APPENDIX B

LISTING OF NORCOMESH

```
C *                                                                *
C *             PROGRAM FOR NORCO BY S. BALAKRISHNAN               *
C * *
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
      THANK YOU PAT COLLINS
      TO RUN:  RUN *FORTGTEST SCARDS=NORCPLOT
          RUN -LOAD#+*PLOTLIB 4=REFERENCE DISPLACEMENTS FILE
           5=(NORCO OUTPUTFILE)
           6=REPLOTFILE 7=CONTROLFILE 8=-GOOF 9=PLOTFILE T=5S
  $RUN -LOAD#+*PLOTLIB 5=-V6 6=-P6 7=FP.PC 8=-GOOF 9=-PLOT T=5S
C
C  UNIT 4: CONTAINS A REFERENCE SET OF DISPLACEMENTS TO BE
C          SUBTRACTED FROM THOSE READ FROM UNIT 5
C  UNIT 5: CONTAINS THE NORCO OUTPUT FILE
C  UNIT 6: STORES GEOMETRIC AND STRESS DATA IN MACHINE LANGUAGE
C          FOR SUBSEQUENT PLOTTING SO THAT UNIT 5 MAY BE DESTROYED
C  UNIT 7: THE SET OF PLOTTING CONTROL PARAMETERS
C  UNIT 8: ERROR MESSAGE FILE
C  UNIT 9: THE OUTPUT FILE FOR PLOTTING
C
C  CONTROLFILE:
C       (F10.0,5I5)     DLEN,MEMORY,IREF,LCASE,NCASES,LTYPE
C            (4I5)      NSKIP,LSKIP,MSKIP,IGHOST
C      (F10.0,12A4)     DFACTR,DSUBHD  (OR ENTER A BLANK LINE)
C      (F10.0,12A4)     SFACTR,SUBHED  (OR ENTER A BLANK LINE)
C WHERE:
C        DLEN = VERTICAL MESH LENGTH, CENTIMETRES <15 CM.
C        MEMORY = 0, MESH DATA WILL BE WRITTEN ON UNIT 6
C               = 1, MESH DATA WILL BE READ FROM UNIT 6
C        IREF   = 0, NO REFERENCE DISPLACEMENTS ARE READ
C               =-1, DISPLACEMENTS FROM THIS RUN ARE WRITTEN ON 4
C               = 1, DISPLACEMENTS READ FROM 4 ARE SUBTRACTED FROM
C                    DISPLACEMENTS FROM NORCO OUTPUT
C        LCASE =  STARTING  LOAD STEP FOR PLOTTING
C        NCASES=  TOTAL NUMBER OF LOAD STEPS TO BE PLOTTED
C        LTYPE = 0,  VARIABLE  NUMBER NODE ELEMENTS
C              = 1,  CONSECUTIVE NODE NUMBERING
C        NSKIP = NODE NUMBERING CONTROL PARAMETER.
C                      IF NSKIP=0, THE NODES ARE NOT NUMBERED.
C        LSKIP = ELEMENT NUMBERING CONTROL PARAMETER.
C                      IF LSKIP=0, THE ELEMENTS ARE NOT NUMBERED
C        MSKIP = MATERIAL NUMBERING CONTROL PARAMETER
C                   IF MSKIP=0, THE MATERIAL TYPES ARE NOT PRINTED
C        IGHOST = 1, GHOST IMAGE OF THE UNDEFORMED MESH DISPLAYED
C        DFACTR = THE ACCENTUATING FACTOR FOR NODAL DISPLACEMENTS
C           IF "DFACTR" >0, A DEFORMED MESH IS DRAWN
C                       =0, THE ORIGINAL MESH IS DRAWN
C                       <0, DISPLACEMENT ARROWS ARE USED
C        DSUBHD = A SUBHEADING USED WITH DISPLACEMENTS
C        SFACTR = THE STRESS SCALE FACTOR FOR ELEMENT STRESSES FOR
C           PLOTTING OF PRINCIPAL STRESSES, IN KPA/CM.
C              NOTE: UNIFORM STRESS ARROWS ARE PLOTTED
C                    AT CRACK LOCATIONS,ORIENTED ALONG CRACKS,
C                    WITH LENGTH OF SIGMA1 AS 0.5 CM.S
C
C        SUBHED = A SUBHEADING USED WITH THE STRESS OUTPUT
C
C
```

```
C     FOR VIEWING ON THE TECTRONIX TERMINAL, RUN *PLOTSEE
C     FOR HARD COPY, RUN *CALCOMPQ PAR=FILE=PLOTFILE PEN=(3BLK,3RED)
C                              FORM=NRWH RETURN=CIVE
C
      IMPLICIT REAL*8(A-H,O-Z)
      LOGICAL*1 BUF(32767),STRIN1(20),STRIN2(20),STRIN3(20),
     * STRIN4(20)
      INTEGER*2 LEN
      INTEGER*4 RMODS
      DATA RMODS/0/,IO/5/,STRIN1/'C','O','M','P','L',15*' '/,
     * STRIN2/'S','O','L','I','D',15*' '/,
     * STRIN3/'D','I','S','P','L',15*' '/,
     * STRIN4/'S','T','R','E','S',15*' '/,
     *LENS/5/
C ***************************************************************
C                                          ... CORE-TO-CORE I/O
      CALL FTNCMD('BUFFER 98;')
      CALL FTNCMD('BUFFER 99;')
C
C ***************************************************************
      DIMENSION  XYZ(3,500),DISPL(3,500),REFDIS(3,500),
     *   XMEAN(500),YMEAN(500)
      DIMENSION  XG(2000),YG(2000),SIG1(2000),SIG2(2000),
     * ZETA(2000),GAMA(2000),IXI(2000),IETA(2000)
      REAL  HED(20),DSUBHD(12),SUBHED(12),FORMAT(9),GAP(5)
C
      INTEGER NODELE(12,500),MAT(500)
C
      DATA ICOMP/'COMP'/,ISOLI/'SOLI'/,ISTEP/'STEP'/,IDISP/'DISP'/
      DATA ISTR/'STRE'/
      DATA XMIN/1.D4/,YMIN/1.D4/,XMAX/-1.D4/,YMAX/-1.D4/
      DATA FORMAT/'(I7,',',  ',' 4X,',' I4,',' 2X,',3(F1',',2.0,'/
      DATA FORMAT(8)/'2X) '/,FORMAT(9)/'   )'/,SLASH/'/'/,BLANK/' '/
      DATA GAP/'     ','/   ','//  ','/// ','////'/
C
C     READ LENGTH(CM.) OF Y-AXIS,I/P SOURCE,REF.DISP,LOAD STEP ETC.
      READ(7,1003)DLEN,MEMORY,IREF,LCASE,NCASES,LTYPE
 1003 FORMAT(F10.0,5I5)
 1004 FORMAT(F10.0,12A4)
C                          ... NODE, ELEMENT, & MAT'L NUMBERING CODES
      READ(7,1005)NSKIP,LSKIP,MSKIP,IGHOST
 1005 FORMAT(4I5)
C                                          ... DEFORMATIONS REQ'D?
      READ(7,1004)DFACTR,DSUBHD
      YFACTR = DFACTR
      DFACTR = 0.D0
C                                         ... STRESS CROSSES REQ'D?
      READ(7,1004)SFACTR,SUBHED
      XFACTR = SFACTR
      IF(MEMORY.EQ.1) GO TO 100
C                                        ... PROBLEM HEADING
      READ(5,1001)HED
 1001 FORMAT(1X,20A4)
C
      CALL SKIP(5,14)
      READ(5,1002) MODEX
      CALL SKIP(5,30)
      READ(5,1002)NUMNP
```

```
 1002 FORMAT(49X,I5)
      CALL SKIP(5,1)
      READ(5,1002)NELE
      CALL SKIP(5,3)
      READ(5,1002)NMAT
C
      WRITE(6,1001)HED
      WRITE(6,1005)NUMNP,NELE,MODEX,NMAT
      GO TO 101
C
  100 CONTINUE
      READ(6,1001)HED
      READ(6,1005)NUMNP,NELE,MODEX,NMAT
      NCASES=1
C
  101 CONTINUE
C                                          ... SEARCH FOR NODAL CO-ORDS
C
      IF(MEMORY.EQ.1) GO TO 103
C
      LOC=2
C
   10 CONTINUE
      CALL READ(BUF,LEN,RMODS,LNR,IO,&20)
      IF(LEN.LT.LENS+LOC) GO TO 10
      IF(LCOMC(LENS,STRIN1,BUF(LOC)).NE.0) GO TO 10
C     WRITE(6,9100)LNR
C9100 FORMAT('STRING FOUND AT LINE',I10)
   20 CONTINUE
C                                        ... READ NODAL CO-ORDS
      CALL SKIP(5,6)
      DO 102 N=1,NUMNP
      READ(5,1006)NN,(XYZ(I,NN),I=2,3)
      XYZ(1,NN) = 0.D0
 1006 FORMAT(I5,10X,2D15.6)
      IF(NN.NE.N)WRITE(8,1007)N,NN
 1007 FORMAT(1X,'EXPECTING GENERATED NODAL DATA FOR NODE ',I5,
     * ' BUT READ NODE ',I5,' INSTEAD.')
C
      XMIN=DMIN1( XMIN,XYZ(2,N) )
      YMIN=DMIN1( YMIN,XYZ(3,N) )
      XMAX=DMAX1( XMAX,XYZ(2,N) )
      YMAX=DMAX1( YMAX,XYZ(3,N) )
C
  102 CONTINUE
      WRITE(6,1008)(NN,(XYZ(I,NN),I=1,3),NN=1,NUMNP)
      WRITE(6,1009) XMIN, YMIN, XMAX, YMAX
      GO TO 104
 1008 FORMAT(I5,3D15.6)
 1009 FORMAT(4D15.6)
C
  103 CONTINUE
      READ(6,1008) (N,(XYZ(I,N),I=1,3),N=1,NUMNP)
      READ(6,1009) XMIN, YMIN, XMAX, YMAX
C
  104 CONTINUE
C
C                    ... FACTOR FOR SCALING: MESH UNITS PER PLOT-CM
```

```
      FS=(YMAX-YMIN)/DLEN
C
C                                        ... CONVERT X,Y TO PLOT UNITS
      DO 110 N=1,NUMNP
C
      XYZ(2,N)=(XYZ(2,N)-XMIN)/FS
      XYZ(3,N)=(XYZ(3,N)-YMIN)/FS
C
  110 CONTINUE
      IF(MEMORY.EQ.1) GO TO 130
C
C                        ... NO. ELEMENTS AND NO. MATERIALS
      CALL METRIC(1)
C
C                         ... LOOKING FOR GLOBAL NODE NO.S
C
      LOC=11
C
   30 CONTINUE
      CALL READ(BUF,LEN,RMODS,LNR,IO,&40)
      IF(LEN.LT.LENS+LOC) GO TO 30
      IF(LCOMC(LENS,STRIN2,BUF(LOC)).NE.0) GO TO 30
C     WRITE(6,9100)LNR
   40 CONTINUE
C
      CALL SKIP(5,6)
      DO 120 L=1,NELE
C
      READ(5,1011)LL,MAT(LL),(NODELE(IJKL,LL),IJKL=1,12)
 1011 FORMAT(I6,24X,I6,6X,12I6)
C
      IF(LL.NE.L)WRITE(8,1012)L,LCOUNT,LL
 1012 FORMAT(1X,'EXPECTING ELEMENT DATA FOR ELEMENT ',I5,
     *' ELEMENT TYPE ',I5,' BUT READ ELEMENT ',I5,' INSTEAD.')
C
  120 CONTINUE
      WRITE(6,1011)(L,MAT(L),(NODELE(IJKL,L),IJKL=1,12),L=1,NELE)
      GO TO 140
C
  130 CONTINUE
      READ(6,1011)(L,MAT(L), (NODELE(IJKL,L),IJKL=1,12),L=1,NELE)
C
  140 CONTINUE
C                                        ... BEGIN PLOTTING
      DO 2000 KPL = 1,NCASES
      IF(KPL.EQ.1) GO TO 149
      DO 148 NODE=1,NUMNP
      XYZ(2,NODE)=XYZ(2,NODE)-DISPL(2,NODE)*DFBYFS
      XYZ(3,NODE)=XYZ(3,NODE)-DISPL(3,NODE)*DFBYFS
  148 CONTINUE
  149 NPLOT = 0
      DFACTR = 0.D0
      SFACTR = XFACTR
  150 CALL PLOTS
      CALL METRIC(1)
C                                                ... FRAME
      CALL PLOT(0.0, 0.0, 3)
      CALL RECT(0.0, 0.0, 15., 22., 0., 3)
```

```
      C                                                  ... MOVE ORIGIN
            CALL PLOT(1.0,1.0,-3)
      C
            YPOS=13.5D0
            CALL NEWPEN(1)
      C                                                  ... PRINT HEADING
            CALL SYMBOL(1.0,YPOS,0.25,HED,0.0,80)
      C
            NDRAW=1
            LEARN=0
      C                                ...A RUN AND NO MEMORY: WRITE ON 6
            IF(MODEX.EQ.0.AND.MEMORY.EQ.0) LEARN=1
      C
            IF(DFACTR.LT.1.D-3.AND.DFACTR.GT.-1.D-3) NDRAW=0
      C
            IF(LEARN.EQ.0.AND.NDRAW.EQ.0) GO TO 300
      C
            DFBYFS=DABS(DFACTR)/FS
      C
            XPOS=1.0D0
            YPOS=YPOS-1.0D0
      C
            LSTEP = LCASE+KPL-1
      C                                              ... LOAD STEP IDENTIFIER
            CALL SYMBOL(XPOS,YPOS,0.15,'LOAD STEP ',0.0,10)
            XPOS=XPOS+1.5D0
            FL=DFLOAT(LSTEP)
            CALL NUMBER(XPOS,YPOS,0.15,FL,0.0,-1)
            XPOS=XPOS+1.5D0
      C
            IF(NDRAW.EQ.0) GO TO 170
      C                                            ... DEF'N. SUBHEADIN
            CALL SYMBOL(XPOS,YPOS,0.15,DSUBHD,0.0,48)
      C
            IF (MEMORY.EQ.1) GO TO 180
        170 CONTINUE
      C                                ... LOOKING FOR DISPLACEMENT INFO
            LOC=8
      C
         50 CONTINUE
            IF(NPLOT.NE.0) GO TO 195
            CALL READ(BUF,LEN,RMODS,LNR,IO,&60)
            IF(LEN.LT.LENS+LOC) GO TO 50
            IF(LCOMC(LENS,STRIN3,BUF(LOC)).NE.0) GO TO 50
      C     WRITE(6,9100)LNR
         60 CONTINUE
      C
            CALL SKIP(5,5)
      C
            DO 175 N=1,NUMNP
      C
            READ(5,1078) NODE,(DISPL(I,NODE),I=2,3)
       1078 FORMAT(I5,2D15.6)
        175 CONTINUE
      C
            WRITE(6,1078) (NODE,(DISPL(I,NODE),I=2,3),NODE=1,NUMNP)
            GO TO 190
        180 CONTINUE
```

```
      READ(6,1078) (NODE,(DISPL(I,NODE),I=2,3),NODE=1,NUMNP)
  190 CONTINUE
C
  195 IF(IGHOST.EQ.0.OR.NDRAW.EQ.0) GO TO 250
C
C                              ... GHOST IMAGE OF ORIGINAL MESH
      DO 240 L=1,NELE
      JLOCAL=1
      XMN=0.DO
      YMN=0.DO
      JJ = 0
C
      M=NODELE(JLOCAL,L)
      CALL PLOT(XYZ(2,M),XYZ(3,M),3)
      XMN=XMN+XYZ(2,M)
      YMN=YMN+XYZ(3,M)
      JJ=JJ+1
C
C     CONSECUTIVE NODE NUMBERING
      DO 230 NC=2,12
      IF(LTYPE.EQ.0) GO TO 200
      JLOCAL=NC
      GO TO 210
C     NODE SEQUENCE: 1 5 9 2 6 10 3 7 11 4 8 12
  200 JLOCAL=JLOCAL+4   -  JLOCAL/9*11
  210 M=NODELE(JLOCAL,L)
      IF(M.EQ.0) GO TO 230
C                                    ... DRAW DASHED LINE BETWEEN NODES
      CALL DASHPT(XYZ(2,M),XYZ(3,M),0.3)
C                                    ... INCR. AVG. VALUES
      XMN=XMN+XYZ(2,M)
      YMN=YMN+XYZ(3,M)
      JJ=JJ+1
  230 CONTINUE
C                                    ... CLOSE ELEMENT
      M=NODELE(1,L)
      CALL DASHPT(XYZ(2,M),XYZ(3,M),0.3)
  240 CONTINUE
C
  250 CONTINUE
C
C                                    ... NO REFERENCE DISPLACEMENTS
      IF(IREF.EQ.0) GO TO 270
C                                    ... READ REFERENCE DISPLACEMENTS
      IF(IREF.EQ.1) GO TO 260
C             ... WRITE FEPARCS DISPLACEMENTS AS REFERENCE
      WRITE(4,2501)
 2501 FORMAT(1X,'REFERENCE DISPLACEMENTS OBTAINED FROM:')
      WRITE(4,1001)HED
      WRITE(4)((DISPL(I,N),I=2,3),N=1,NUMNP)
      GO TO 270
C                                       ... READ REFERENCE DISPLACEMENTS
  260 CONTINUE
      CALL SKIP(5,5)
      READ(4)((REFDIS(I,N),I=1,3),N=1,NUMNP)
      DO 270 N=1,NUMNP
      DO 265 I=1,3
      DISPL(I,N)=DISPL(I,N)-REFDIS(I,N)
```

```
      265 CONTINUE
      270 CONTINUE
          IF(DFACTR.GT.0.D0)GO TO 290
C
          IF(NDRAW.EQ.0) GO TO 310
C
          DO 280 NODE=1,NUMNP
C                                          ... ARROW TO DEFORMED LOCATION
          XTIP=XYZ(2,NODE)+DISPL(2,NODE)*DFBYFS
          YTIP=XYZ(3,NODE)+DISPL(3,NODE)*DFBYFS
C                                             ... SET POINT LENGTH
          SQDSIZ=(DISPL(2,NODE)**2+DISPL(3,NODE)**2)*DFBYFS**2
          AHLEN=0.5*DSQRT(SQDSIZ)
C                                           ... MAX. ARROWHD SIZE
C         IF(AHLEN.GT.0.1D0) AHLEN=0.1D0
          AHWID=0.5D0*AHLEN
C                                                ... PLOT ARROW
          CALL PLOT(XYZ(2,NODE),XYZ(3,NODE),3)
          CALL AROHD(XYZ(2,NODE),XYZ(3,NODE),XTIP,YTIP,AHLEN,AHWID,16)
      280 CONTINUE
          GO TO 300
C
C                                           ... USE DEFORMED MESH
      290 CONTINUE
          DO 295 NODE=1,NUMNP
          XYZ(2,NODE)=XYZ(2,NODE)+DISPL(2,NODE)*DFBYFS
          XYZ(3,NODE)=XYZ(3,NODE)+DISPL(3,NODE)*DFBYFS
      295 CONTINUE
      300 CONTINUE
      310 CONTINUE
C
C                                          ... DRAW ELEMENT
          DO 370 L=1,NELE
          XMN=0.0D0
          YMN=0.0D0
          JJ=0
          JLOCAL=1
C
          M=NODELE(JLOCAL,L)
          CALL PLOT(XYZ(2,M),XYZ(3,M),3)
          XMN=XMN+XYZ(2,M)
          YMN=YMN+XYZ(3,M)
          JJ=JJ+1
C
          DO 340 NC=2,12
          IF(LTYPE.EQ.0) GO TO 320
C         CONSECUTIVE NODE NUMBERING
          JLOCAL=NC
          GO TO 330
C         NODE SEQUENCE: 1 5 9 2 6 10 3 7 11 4 8 12
      320 JLOCAL=JLOCAL+4   -  JLOCAL/9*11
      330 M=NODELE(JLOCAL,L)
          IF(M.EQ.0) GO TO 340
C                                 ... DRAW LINE BETWEEN NODES
          CALL PLOT(XYZ(2,M),XYZ(3,M),2)
C                                    ... INCR. AVG. VALUES
          XMN=XMN+XYZ(2,M)
          YMN=YMN+XYZ(3,M)
```

```
      JJ=JJ+1
  340 CONTINUE
C                                              ... CLOSE ELEMENT
      M=NODELE(1,L)
      CALL PLOT(XYZ(2,M),XYZ(3,M),2)
C                                               ... MEAN CO-ORDS.
      XMEAN(L)=XMN/JJ
      YMEAN(L)=YMN/JJ
C                                          ... DRAW ELEMENT NUMBER
      IF(LSKIP.NE.1) GO TO 350
      XX1=XMEAN(L)-0.2D0
      YY1=YMEAN(L)+0.12D0
      CALL PLOT(XX1,YY1,3)
      FL=DFLOAT(L)
      CALL NUMBER(XX1,YY1,0.1,FL,0.0,-1)
  350 CONTINUE
C                                          ... DRAW MATERIAL NUMBER
      IF(MSKIP.NE.1) GO TO 360
      CALL NEWPEN(2)
      XX2=XMEAN(L)-0.15D0
      YY2=YMEAN(L)-0.25D0
      CALL PLOT(XX2,YY2,3)
      FM=DFLOAT(MAT(L))
      CALL SYMBOL(XX2,YY2,0.17,'M',0.0,1)
      XX3=XX2+0.2D0
      CALL NUMBER(XX3,YY2,0.17,FM,0.0,-1)
  360 CONTINUE
C
  370 CONTINUE
C                                             ...DRAW NODE NUMBER
      IF(NSKIP.NE.1) GO TO 390
      CALL NEWPEN(2)
      DO 380 NN=1,NUMNP
      A=XYZ(2,NN)+0.06D0
      B=XYZ(3,NN)+0.06D0
      FNUM=DFLOAT(NN)
      CALL NUMBER(A,B,0.1,FNUM,0.0,-1)
  380 CONTINUE
  390 CONTINUE
C
C                    ... LEARN=1 IF REPLOT IS BEING FILLED
      LEARN=0
C                    ... NDRAW=1 IF STRESSES ARE BEING DRAWN
      NDRAW=1
      IF (MODEX.EQ.0.AND.MEMORY.EQ.0) LEARN=1
C
      IF(SFACTR.LT.1.D-8.AND.SFACTR.GT.-1.D-8) NDRAW=0
C
      IF(LEARN.EQ.0.AND.NDRAW.EQ.0) GO TO 700
C
      IF(SFACTR.GT.1.0D-8)SSCALE=SFACTR
C
      IF(SFACTR.LT.-1.0D-8)SSCALE=1./DABS(SFACTR)
      IF(NDRAW.EQ.0) GO TO 400
C
C                                             ... STRESS SUBHEADING
      XPOS=XPOS+48.0D0*0.6D0*0.15D0+1.5D0
      CALL SYMBOL(XPOS,YPOS,0.15,SUBHED,0.0,48)
```

```
      C
        400 CONTINUE
            IF(NPLOT.NE.0) GO TO 425
      C                                    ... LOOKING FOR STRESS INFO
      C
            LOC=2
      C
        70  CONTINUE
            CALL READ(BUF,LEN,RMODS,LNR,IO,&80)
            IF(LEN.LT.LENS+LOC) GO TO 70
            IF(LCOMC(LENS,STRIN4,BUF(LOC)).NE.0) GO TO 70
      C     WRITE(6,9100)LNR
        80  CONTINUE
            CALL SKIP(5,5)
            IF(MEMORY.EQ.1) GO TO 430
            I =1
       410  READ(5,4011) XG(I),SIG1(I),IXI(I)
            IF(XG(I).EQ.0.DO.AND.SIG1(I).EQ.0.DO) GO TO 411
            GO TO 412
       411  READ(5,4011) XG(I),SIG1(I),IXI(I)
            IF(XG(I).EQ.0.DO.AND.SIG1(I).EQ.0.DO) GO TO 420
       412  READ(5,4011) YG(I),SIG2(I),IETA(I)
            READ(5,4011) ZETA(I)
            READ(5,4021) GAMA(I)
            IF(XG(I).EQ.0.DO.AND.YG(I).EQ.0.DO) GO TO 420
            WRITE(6,4012) XG(I),SIG1(I),IXI(I)
            WRITE(6,4012) YG(I),SIG2(I),IETA(I)
            WRITE(6,4012) ZETA(I)
            WRITE(6,4012) GAMA(I)
            I=I+1
            CALL SKIP(5,1)
            GO TO 410
       420  IMAX=I - 1
            WRITE(6,4022) IMAX
       4011 FORMAT(26X,D15.6,61X,D15.6,12X,I3)
       4012 FORMAT(1X,2D15.6,I5)
       4021 FORMAT(102X,D15.6)
       4022 FORMAT(I5)
        425 IF(NDRAW.EQ.0) GO TO 700
            GO TO 440
      C
        430 CONTINUE
            READ(6,4012) XG(I),SIG1(I),IXI(I)
            READ(6,4012) YG(I),SIG2(I),IETA(I)
            READ(6,4012) ZETA(I)
            READ(6,4012) GAMA(I)
            READ(6,4022) IMAX
      C
        440 CONTINUE
      C
            DO 470 L=1,IMAX
            SMAX = DMAX1(SIG1(L),SIG2(L))
            SMIN = DMIN1(SIG1(L),SIG2(L))
            IF(SFACTR.GT.0.0D0) GO TO 450
            IF(IXI(L).EQ.0.AND.IETA(L).EQ.0) GO TO 470
      C
      C     UNIFORM STRESS ARROWS FOR CRACKS
      C
```

```
      C     (SINCE THE MOST POSITIVE STRESS I.E. TENSION IS "SMAX",
      C     IT IS FACTORED BY 0.5 TO  PLOT IT AS THE MINOR STRESS: )
      C
            SMAX=0.5DO
            SMIN=-1.DO
            ANGLE = ZETA(L)
            GO TO 460
          450 ANGLE =GAMA(L)
      C
          460 FXG = (XG(L)-XMIN)/FS
            FYG = (YG(L)-YMIN)/FS
      C     ********************************************************
      C                                                             *
            CALL CROSS(SMAX,SMIN,ANGLE,SSCALE,FXG,FYG)
      C                                                             *
      C     ********************************************************
      C
          470 CONTINUE
          700 CONTINUE
      C                                                 ... LEGEND
            KD=0
            KX=0
            KS=0
      C                                                 ... DEF'N USED
            IF(DFACTR.LT.-1.D-10.OR.DFACTR.GT. 1.D-10)KD=1
      C                                               ... PRINCIPAL STR.
            IF(SFACTR.LT.-1.D-10)KX=1
      C                                               ... SCALED STRESSES
            IF(SFACTR.GT.1.D-10)KS=1
      C
            XB=16.5DO
            YL=0.45DO+0.3DO*(2.DO/3.DO*KD+KX+KS)
            YB=12.5DO-YL
            CALL RECT(XB,YB,YL,3.60 ,0.3,3)
            XB=XB+0.09DO
            YB=YB+0.15DO
      C                                           ... SCALED STRESSES
            IF(KS.NE.1)GO TO 500
            CALL SYMBOL(XB,YB,0.15,'STRESS:          KSI/CM',0.0,23)
            CALL NUMBER(XB+1.25,YB,0.15,SFACTR,0.0,3)
            YB=YB+0.3DO
      C
          500 CONTINUE
      C                                           ... UNIFORM STRESSES
            IF(KX.NE.1) GO TO 510
            CALL SYMBOL(XB,YB,0.15,' PRINCIPAL STRESS DIR.',0.0,22)
            YB=YB+0.3DO
      C                                 ... DEFORMATION EXAGGERATION
          510 CONTINUE
            IF(KD.NE.1)GO TO 520
            RNUM=DABS(DFACTR)
            CALL SYMBOL(XB,YB,0.15,' EXAG.:  ',0.0,9)
            CALL NUMBER(XB+1.25,YB,0.15,RNUM,0.0,2)
            YB=YB+0.2DO
            CALL SYMBOL(XB,YB,0.15,' DEF''N.',0.0,7)
            YB=YB+0.3DO
      C                                                 ... PLOT SCALE
          520 CONTINUE
```

```
      CALL SYMBOL(XB,YB,0.15,' SCALE:          IN/CM',0.0,21)
      CALL NUMBER(XB+1.25,YB,0.15,FS,0.0,+3)
C                                                  ... DRAUGHTSMAN
      CALL SYMBOL(21.5,-1.0,0.20,'BALA',0.0,3)
C                                                  ... END PLOTTING
      CALL PLOT(0.0,0.0,999)
      NPLOT = NPLOT+1
      IF(NPLOT.GE.3) GO TO 2000
      IF(NPLOT.EQ.2) GO TO 1900
      SFACTR = -0.5D0
      DFACTR = 0.D0
      GO TO 150
 1900 SFACTR = 0.D0
      DFACTR = YFACTR
      GO TO 150
 2000 CONTINUE
C
      RETURN
      END
      SUBROUTINE CROSS(SIGMA1,SIGMA2,DEGREE,SCALE,X,Y)
C     ******************************************************
      IMPLICIT REAL*8(A-H,O-Z)
      DIMENSION SIGMA(2)
C
      SIGMA(1)=SIGMA1
      SIGMA(2)=SIGMA2
      THETA=DEGREE*3.141592654D0/180.D0
C
      DO 100 I=1,2
C
C                                        ... (ARROWHEAD TYPE)
      INDIAN=26
C
      DX=SIGMA(I)/SCALE*DCOS(THETA)
      DY=SIGMA(I)/SCALE*DSIN(THETA)
C
C                     ... TAIL & HEAD CO-ORDS. OF STRESS CROSS
      XPAGE=X-0.5D0*DX
      YPAGE=Y-0.5D0*DY
      XTIP=X+0.5D0*DX
      YTIP=Y+0.5D0*DY
C
C                           ... LENGTH OF LINE IN SIGMA(I) DIR.
      AHLEN=DABS(SIGMA(I))/SCALE/3.0D0
      IF(AHLEN.GT.0.1)AHLEN=0.25D0
      AHWID=0.5D0*AHLEN
C
C                                      ... ARROWHEAD FOR TENSION
      IF(SIGMA(I).LT.0.0) GO TO 80
C
      CALL AROHD(XPAGE,YPAGE,XTIP,YTIP,AHLEN,AHWID,INDIAN)
      GO TO 90
C
C                                      ... LINE FOR COMPRESSION
   80 CONTINUE
      CALL PLOT(XPAGE,YPAGE,3)
      CALL PLOT(XTIP,YTIP,2)
      CALL PLOT(XTIP,YTIP,3)
```

```
      C
      C                                                ... ROTATE BY PI/2
        90  CONTINUE
            THETA=THETA+3.141592654DO/2.ODO
      C
       100  CONTINUE
            RETURN
            END
            SUBROUTINE SKIP(IOUNIT,NLINES)
      C     ******************************************************
            IF(NLINES.EQ.O)GO TO 1
            DO 1 I=1,NLINES
            READ(IOUNIT,98)
         98 FORMAT(1X,'THIS STATEMENT SKIPS A LINE')
          1 CONTINUE
      C
            RETURN
            END
            SUBROUTINE SYMBOL(X,Y,HEI,ICHAR,ANG,NCHARS)
      C     ******************************************************
            IMPLICIT REAL*8(A-H,O-Z)
            DIMENSION ICHAR(1)
            IF(NCHARS.LE.O) GO TO 1O
      C
      C     REPLACE TN WITH ANY OF THE CHARACTER SETS IN
      C     THE WRITEUP R145. (*** NOTE ***: NOW IN TO11)
      C
            CALL PALPHA('ROMANSX ',O)
            CALL PSYM(X,Y,HEI,ICHAR,ANG,NCHARS)
            RETURN
      1O    CONTINUE
            CALL LSYMB(X,Y,HEI,ICHAR,ANG,NCHARS)
            RETURN
            END
```