A POST-PROCESSOR FOR CONCRETE COLUMNS

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By

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PREFACE

A series of programs were developed to evaluate slenderness effects in reinforced concrete columns and to check the capacity of user-input column designs subjected to axial forces and moments about either or both axes. The programs were designed for use on the Hewlett-Packard 9000 desktop computer. In addition, a design-analysis link was made between these programs and the frame program written by Louis O. Bass.

Only rectangular tied cross sections with rectangular bar arrangements were considered. Slenderness effects were evaluated using the approximate (moment magnifier) method of ACI 318-83.

The author wishes to express his appreciation to Professor Louis O. Bass for his guidance in this effort. Special thanks also to Liz, for her patience, understanding and encouragement.

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INTRODUCTION

The post-processor consists of a series of four programs. The first program is used to input data required for load combinations and the evaluation of slenderness effects. Load combinations are made with the second program. The third program evaluates slenderness effects and magnifies column end moments. The fourth program is used to determine the adequacy of user input column designs. Figure 1 illustrates a typical sequence of program execution.

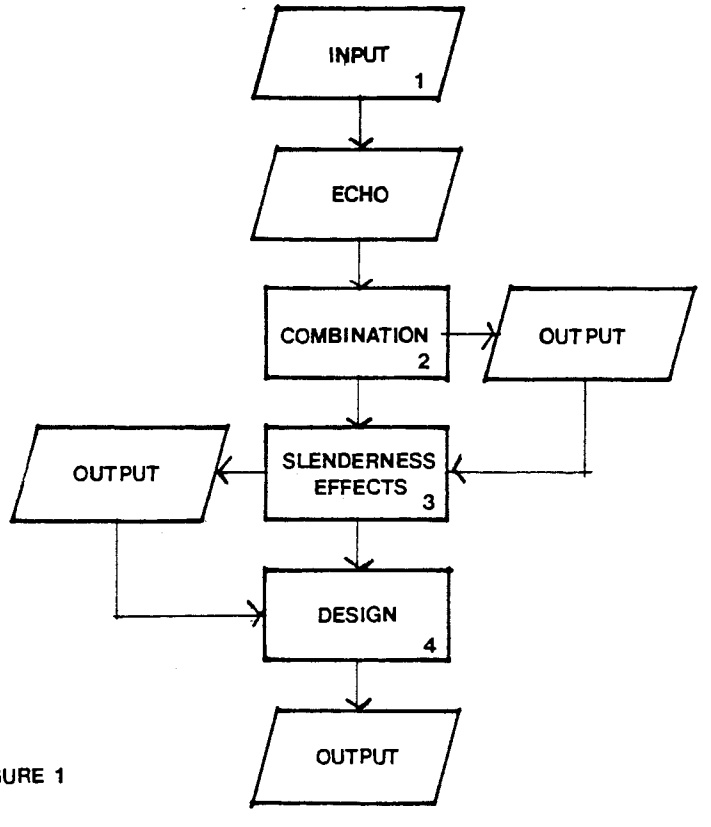

FIGURE 1

INPUT

Files containing the data required to make load combinations and evaluate slenderness effects are built using the Input Program.

If the structure is analyzed using the frame program, a relationship between each column to be designed and members in the frame model must be established. This is done by specifying column incidences. If a frame member has it's i-end at the bottom of the column, it is referred to as the i-end member. Similarly, the j-end member has it's j-end at the top of the column. In addition to relating frame members to columns, this system provides a means of accounting for endistances.

Column dimensions are referenced to the faces of the column. The width is measured along the z-face and depth is measured along the y-face of the column. This is illustrated in Figure 2. Input length units are specified by the user and may be feet or inches. However, all length units are converted to inches for internal calculations.

Gross moment of inertia and radius of gyration about each axis are calculated internally with radius of gyration taken as .3 times the overall dimensions in each direction.

Material properties need not be the same for all columns. The ultimate compressive concrete strength (F'c) and concrete

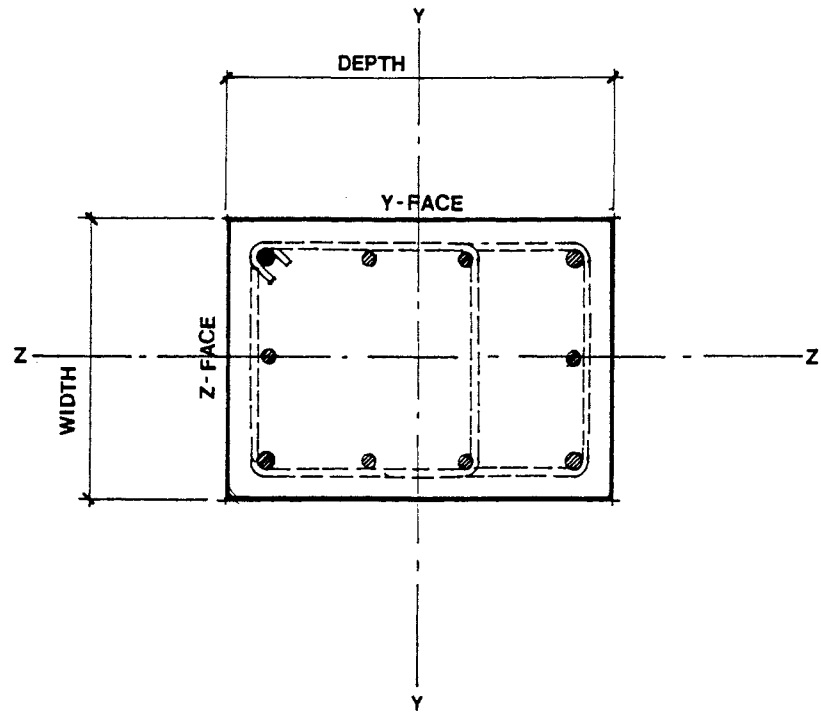

FIGURE 2

weight are input and modulus of elasticity is calculated in accordance with ACI 8.5.1. Strength and weight must be input in Psi and Pcf regardless of input units specified by the user.

Length data to be input consists of; 1) weither or not the column is braced, 2) effective length factors, and 3) unbraced lengths.

Braced conditions are referenced to the y and z-planes. A column braced in the z-plane may be interpreted to have a greater resistance to buckling about the y-axis. Similarly, a column braced in the y-plane has greater resistance to buckling about the z-axis. It is left to the designer to determine the extent to which the columns are braced. The commentary to ACI 318-83 discusses several methods for making this determination.

The effective length factor (K) for braced columns is conservatively taken to be one. The K-factors input are used in the calculation of sidesway moment magnifiers. Ky is used for calculations related to stability about the y-axis. Kz relates to the same calculations about the z-axis.

Unbraced lengths Ly and Lz refer to the distance between braced points in the z and y planes respectively. (Ly-z, Lz-y) These values are input in user specified length units.

Live load reduction factors are input for each column and should not be greater than one. If no value is input for a column the reduction factor is assumed to be one. Axial forces and moments resulting from live loads are multiplied by the factor input. The value input should reflect the percentage of load remaining after reduction.

Column forces and moments may be input or if the frame program is used, read from files. When input, forces and moments should be in the member system. These are shown in their positive sense in Figure 4.

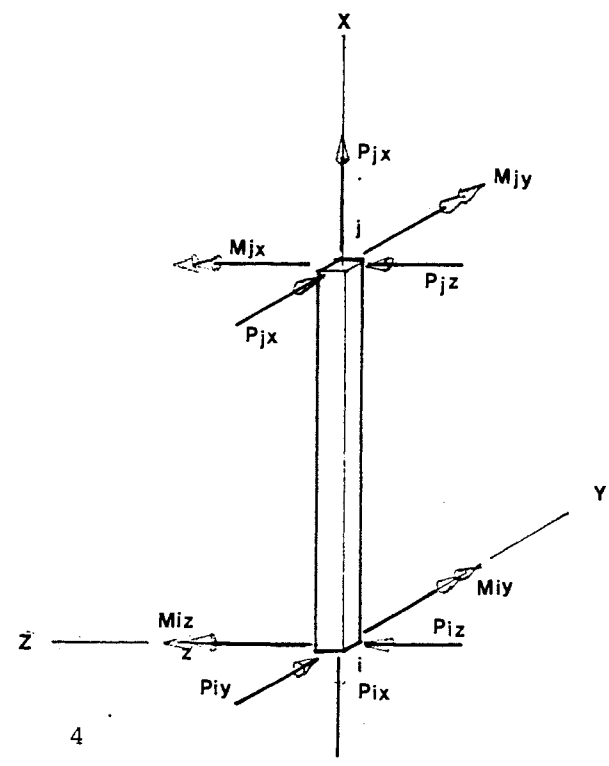

FIGURE 4

Figure 5 illustrates the sequence of input for combination data. The total number of load combinations to be made is input first. Then for each combination the number of load cases to be combined is input. For each load case in a combination the case number is input accompanied by the appropriate load factors required by ACI 9.2 and a code defining the load type. Three codes are available:

1) Input a 1 for dead or any sustained loads.

2) Input a 2 for live load.

3) Input a 3 for lateral load which may consist of wind, seismic or any load causing (appreciable) sidesway.

If the load case in question is a wind or seismic load, the direction in which it is applied is input. Input a 1 if it is in the z-direction; input a 2 if it is in the y-direction.

To account for variation in modeling techniques a modification factor for axial forces and one for moments may be specified by the user. End forces and moments are multiplied by the appropriate modification factor. Sheer is multiplied by the moment modification factor so that static equilibrium is maintained.

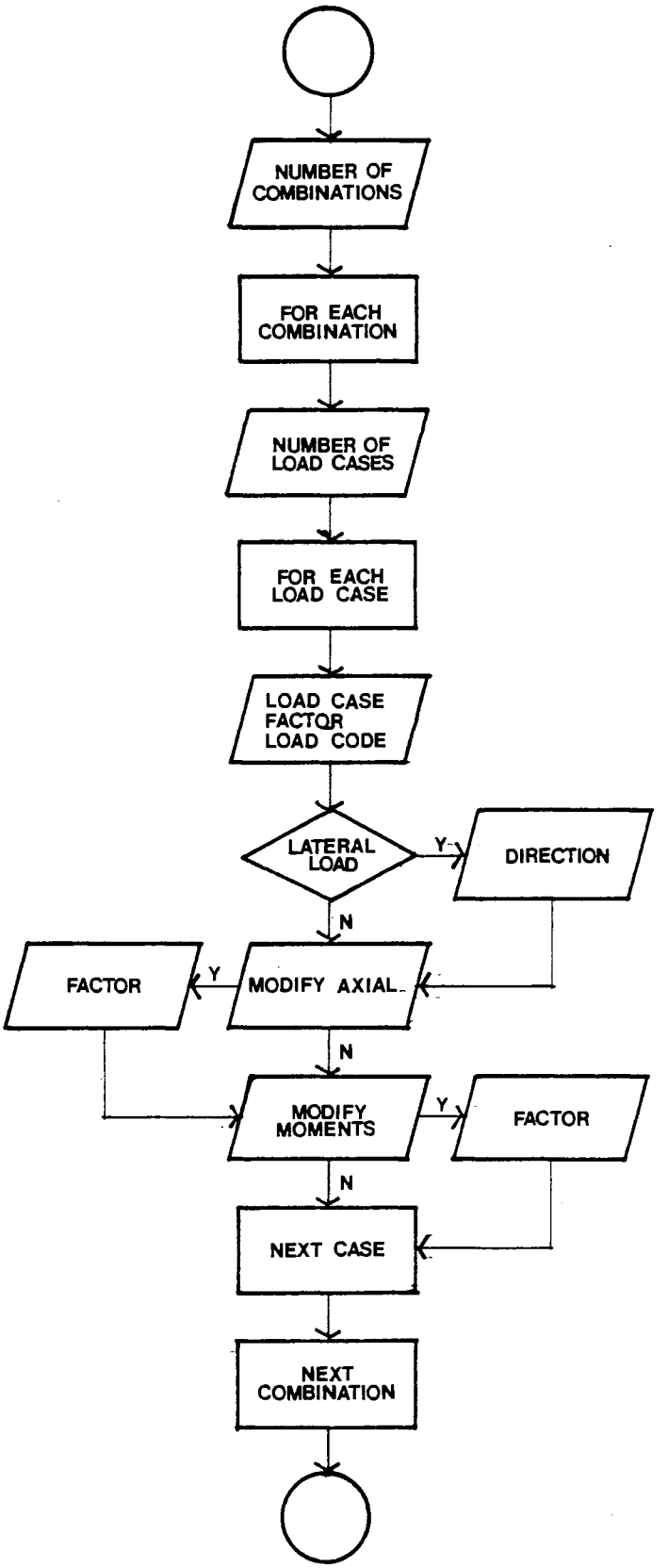
NUMBER OF COMBINATIONS
FOR EACH COMBINATION
NUMBER OF LOAD CASES
FOR EACH LOAD CASE
LOAD CASE FACTOR LOAD CODE
LATERAL LOAD
Y
DIRECTION
N
FACTOR
Y
MODIFY AXIAL
N
MODIFY MOMENTS
Y
FACTOR
N
NEXT CASE
NEXT COMBINATION

FIGURE 5

COMBINATIONS

For each combination, dead, live and lateral load cases are compiled individually with applicable factors applied, then added together to complete the combination. Combined dead, gravity and lateral loads are used for evaluation of slenderness effects. Figure 6 is a flowchart for the Combinations Program.

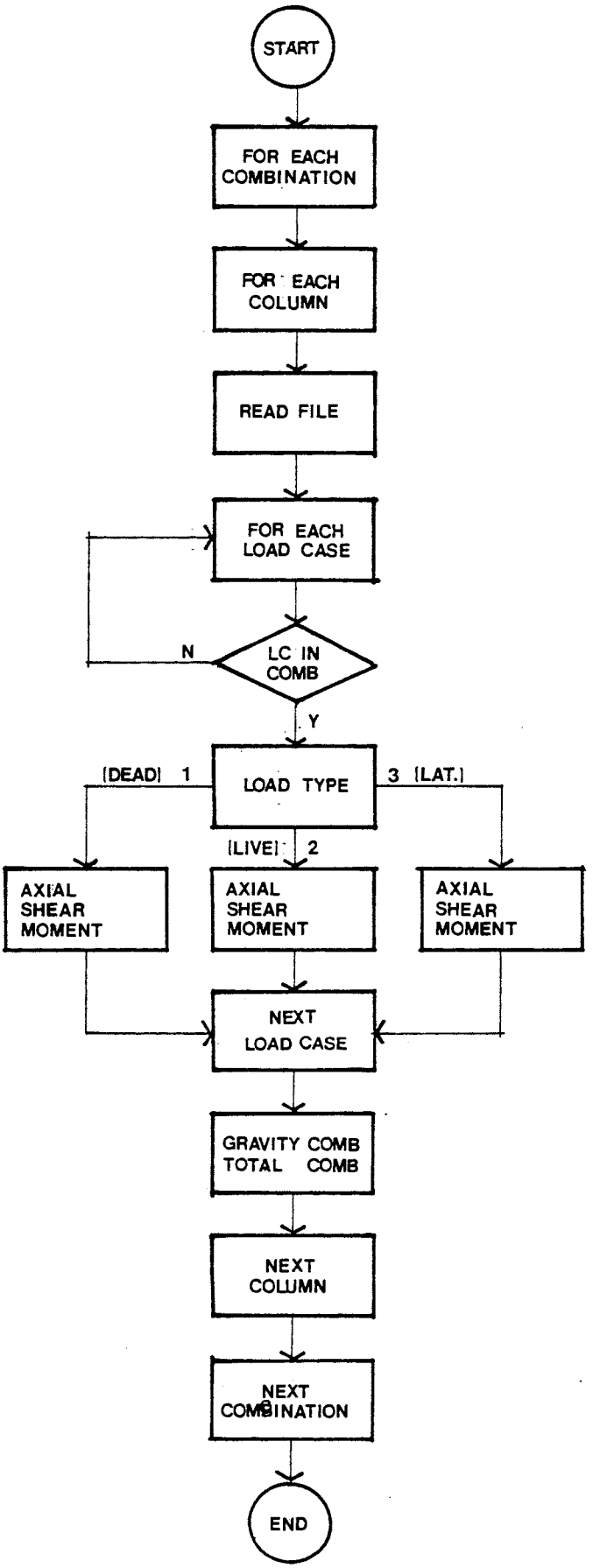
START
FOR EACH COMBINATION
FOR EACH COLUMN
READ FILE
FOR EACH LOAD CASE
N
LC IN COMB
Y
[DEAD] 1
LOAD TYPE
3 [LAT.]
[LIVE] 2
AXIAL SHEAR MOMENT
AXIAL SHEAR MOMENT
AXIAL SHEAR MOMENT
NEXT LOAD CASE
GRAVITY COMB TOTAL COMB
NEXT COLUMN
NEXT COMBINATION
END

FIGURE 6

SLENDERNESS EFFECTS

Slenderness effects are evaluated and moments magnified using the procedure outlined below.

The sense of the axial force at the i-end of the column is checked; if it is negative, the column is in tension and slenderness effects need not be calculated.

If the column is braced in the direction under consideration then the slenderness ratio is compared with the limits of ACI 10.11.4.1 and 10.11.4.3. If the slenderness ratio is between these limits, the column is slender and the moment magnifier for braced cases is calculated.

If the column is unbraced in the direction under consideration then the slenderness ratio is compared with the limits of ACI 10.11.4.2 and 10.11.4.3. If the ratio is between these limits, the column is slender and the moment magnifier for the braced condition is calculated. If the slenderness ratio, in either case, is greater than the upper limit specified by ACI 10.11.4.3 then the moment magnifier method cannot be used and a message is displayed on the CRT screen describing the violation.

If the slenderness ratio is smaller than the lower limit the column is considered short and slenderness effects need not be calculated. However, if the column is unbraced the contribution of the column to frame stability must be determined.

The solution sequence used to evaluate slenderness effects is illustrated in the flowchart in Figure 7.

The sidesway magnification factor (Ds) is calculated at one of two places in the program. In the first loop, (see Figure 7) the sidesway factor is set equal to one unless the column is unbraced and subjected to lateral loads. The sidesway factor is initialized to zero when program execution begins, so that when the second loop is entered, two possibilities for the value of Ds exist: one or zero. If the value of Ds is one, then moments are magnified; if it is zero, then the factor is calculated before proceeding to magnification of moments.

For each axis, moments at each end of the member are magnified by the same magnification factor. In addition, if the column is slender, moments required to satisfy the minimum eccentricity requirements of ACI 10.11.5.4 and 10.11.5.5 are magnified. This set of six moments is stored for use in the design program.

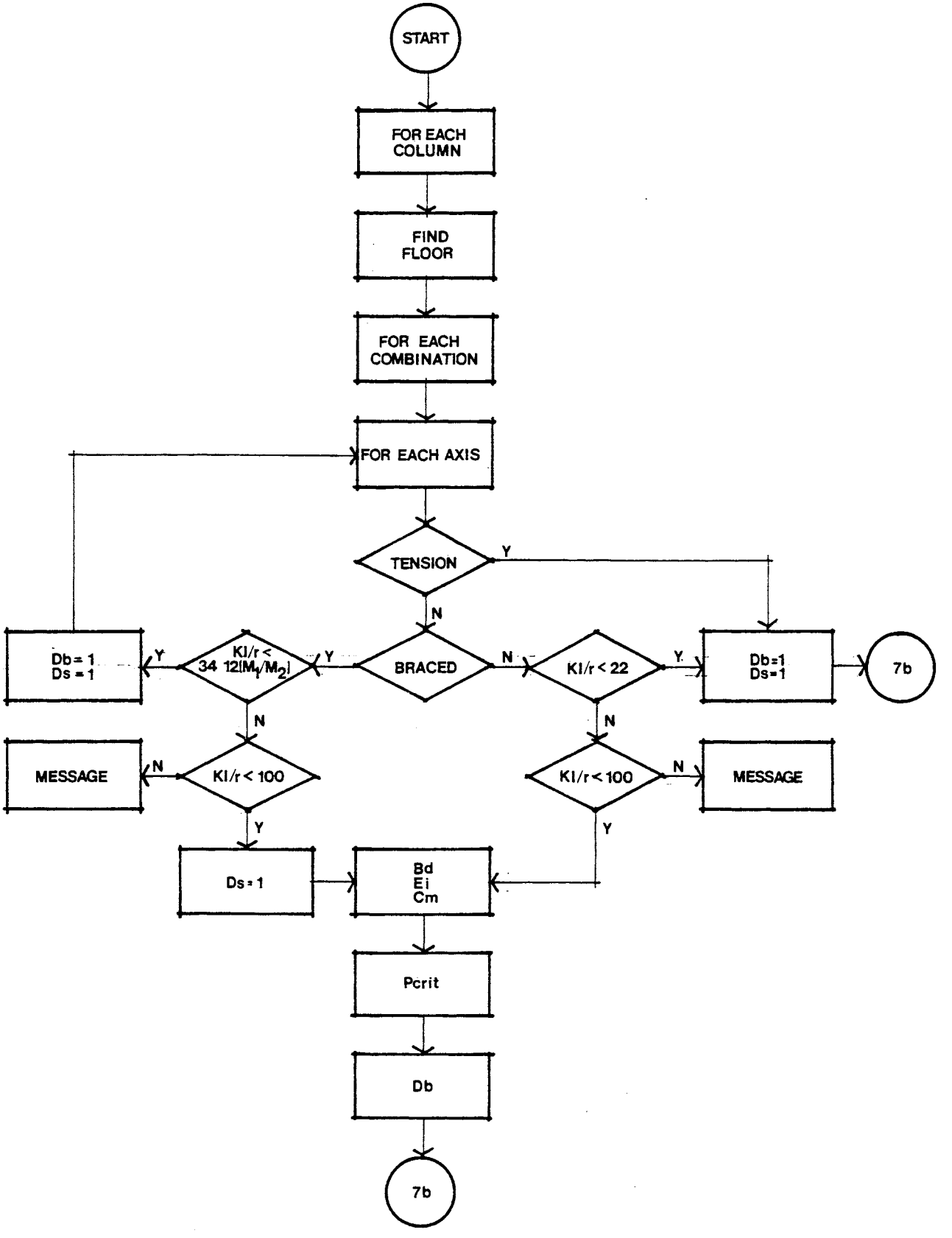
START
FOR EACH COLUMN
FIND FLOOR
FOR EACH COMBINATION
FOR EACH AXIS
TENSION
Y
N
BRACED
Y
N
Db = 1
Ds = 1
Y
Kl/r < 34 12|M1/M2|
Y
Kl/r < 22
Y
Db=1
Ds=1
7b
N
N
MESSAGE
N
Kl/r < 100
Kl/r < 100
N
MESSAGE
Y
Y
Ds = 1
Bd
Ei
Cm
Pcrit
Db
7b

FIGURE 7a.

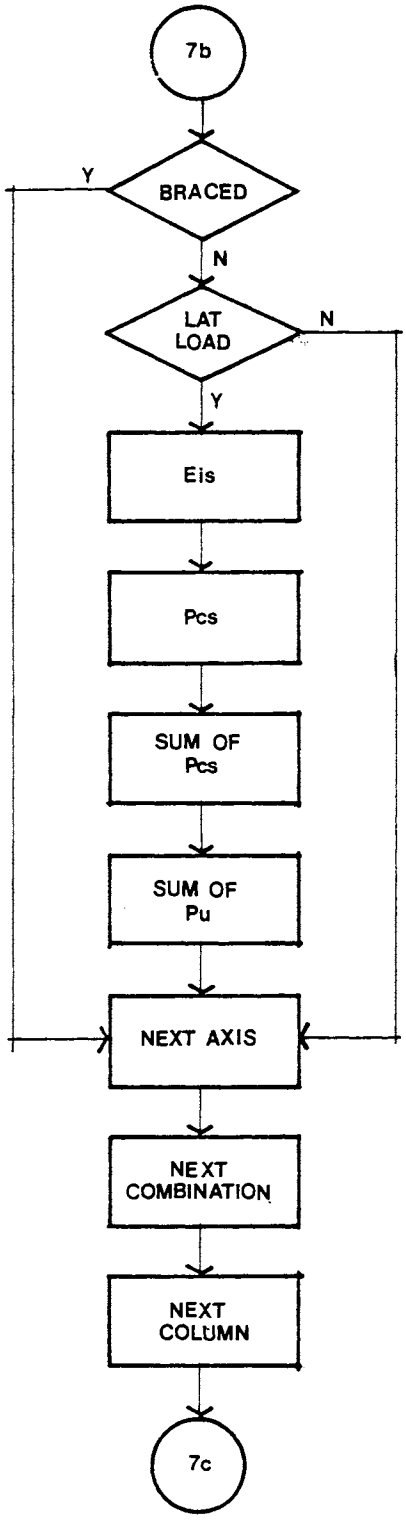

FIGURE 7b

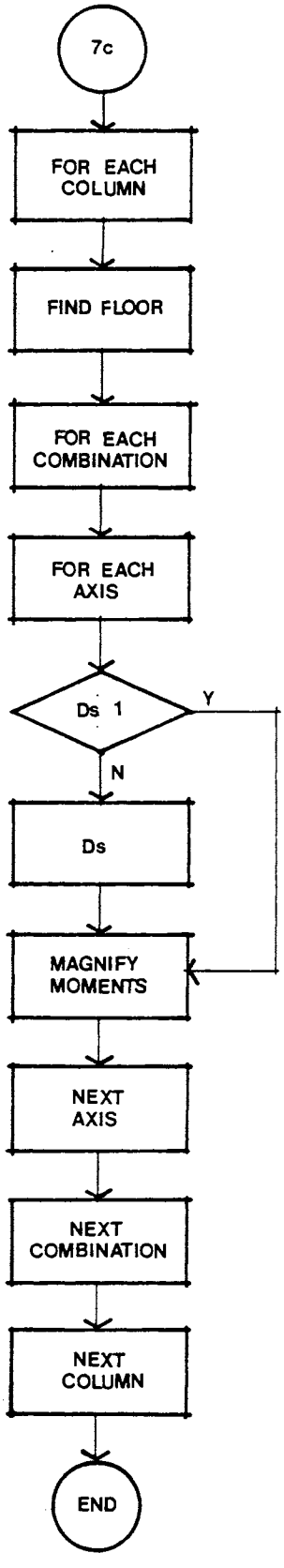

FIGURE 7c

COLUMN DESIGN

The Design Program allows the user to design columns in any sequence desired. After the column to be designed is input, 3 load conditions are displayed:

1) Maximum axial load with corresponding moments and the load combination.
2) Maximum moment about the y-axis with corresponding axial load, moment about the z-axis and the load combination where this occurs.
3) Maximum moment about the z-axis with corresponding axial load, moment about the y-axis and the load combination where this occurs.

Steel yield strength (Fy) is then input followed by the desired corner bar size. Finally, quantity and size of y and z-face reinforcing is input, initiating the column capacity check.

Fiftieth points on the interaction found between zero axial load and the maximum permitted by ACI 10.3.5.3 are found by incrementing the neutral axis position. In capacity calculations, strains are assumed to be linear and a maximum compressive concrete strain of .003 is used in accordance with ACI 10.2.3. Concrete stresses are calculated using an equivalent rectangular distribution in accordance with ACI 10.2.7. Steel strains are limited to a maximum

value of .002069. When the strains in the steel exceed this value stresses are assumed to be independant of strains and the maximum value specified (Fy) is used.

The Parme contour method is used to check the adequacy of the column in biaxial bending. The contour to be used is found by searching for the axial capacity nearest, but not greater than, the applied axial load. Then a linear interpolation is made to find the moment capacity about each axis. Moments are checked at each end of members subjected to biaxial bending as recommended in the commentary of ACI 318-83.

If the column is adequate a design summary is displayed and the user may obtain a print out of this information or proceed to the column of his choice. Final column designs are stored for documentation at a later time.

OUTPUT

Data required for documentation or verification of intermediate results may be obtained using one of four output programs. All data is output to the high speed printer.

Program one:

1) Basic job parameters
2) Column incidences (when frame files are used)
3) Column dimensions, properties and length data
4) Column end forces and moments (when input)
5) Combination factors

Program two:

1) Combined forces and moments

Program three:

1) Magnification factors needed for the design of flexural members
2) Magnified moments

Program four:

1) Final column designs selected for output by the user

RECOMMENDATIONS

The usefulness of the program could be improved with two relatively simple modifications: 1) It could be expanded to include other column shapes and bar arrangements. 2) Given axial forces and moments, required area of steel could be calculated and design suggestions made, reducing the effort required of the designer.

The accuracy of slenderness calculations would be improved, if the effect of reinforcing is included in the stiffness calculation. This modification could be made with the second mentiond above or the user could input the necessary reinforcing data.

The scope of the program could be enlarged to include flexural members resulting in a more general post processing program.

BIBLIOGRAPHY

1. Building code requirements for reinforced concrete. (ACI 318-83) American Concrete Institute, Detroit, Michigan,1983.

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3. CRSI Handbook. Concrete Reinforcing Steel Institute, 1984.

4. Neville, Gerald B. Notes on ACI 318-83 Building code requirements for reinforced concrete with design applications. Portland Cement Association, Skokie, Illinois, 1984.

5. Council on tall buildings and urban habitat. Structural design of tall concrete and masonry buildings. ASCE , 1978.

6. Wang, Chu-Kia and Salmon, Charles G. Reinforced concrete design. 4th edition, Harper & Row, New York, 1983.

APPENDIX A

User Guide

Appendix A contains loading information for each program, an input/output summary and an example problem for demonstration of program use.

Loading Information

Program	Program name for loading
Input	"BWIPT:CS80,7"
Data echo	"BWECHO:CS80,7"
Combination	"BWCOMB:CS80,7"
Output of combined forces	"BWOUT1:CS80,7"
Moment magnification	"BWMAG:CS80,7"
Output of magnification data	"BWOUT2:CS80,7"
Checking program	"BWCOL:CS80,7"
Output of final design	"BWOUT3:CS80,7"

Input/Output Summary

"BWIPT:CS80.7" (input)

The following data is required for program use:

Number of load cases

Number of load combinations

Number of columns (total)

Number of floors - supported by columns

Column incidences- when frame files are used (see report)

Column dimensions

width - measured in the y-direction (see report)

depth - measured in the z-direction (see report)

F'c (Psi)

Weight of concrete (Pcf)

Braced column in z-plane (see report)

Braced column in y-plane (see report)

Ky - for the calculation of sidesway magnification factor

Kz - for the calculation of sidesway magnification factor

Ly - unbraced length in z-plane

Lz - unbraced length in y-plane

Live load reduction factor(for each column)

less than or equal to 1.0

Load factor - (1.4,1.7,1.3 etc.)

Load codes - 1=dead

2=live

3=lateral

Direction of lateral load 1=z, 2=y

Modification factors for axial forces (see report)

Modification factors for moments

"BWCOL:CS80,7" checking program

Fy - longitudinal reinforcing

Corner bar size

additional reinforcing

in y-face, quantity and size

in z-face, quantity and size

input of a valid bar size is required even when no bars are present

(see example)

Output summary

Data echo - selected data from the Input Program is reflected

(see example)

Output 1 - combined ultimate axial forces, shear and moments

user may specify units

Output 2 - factor for magnification of column and beam

moments , including those required by ACI 10.11.5.4 and

10.11.5.5.

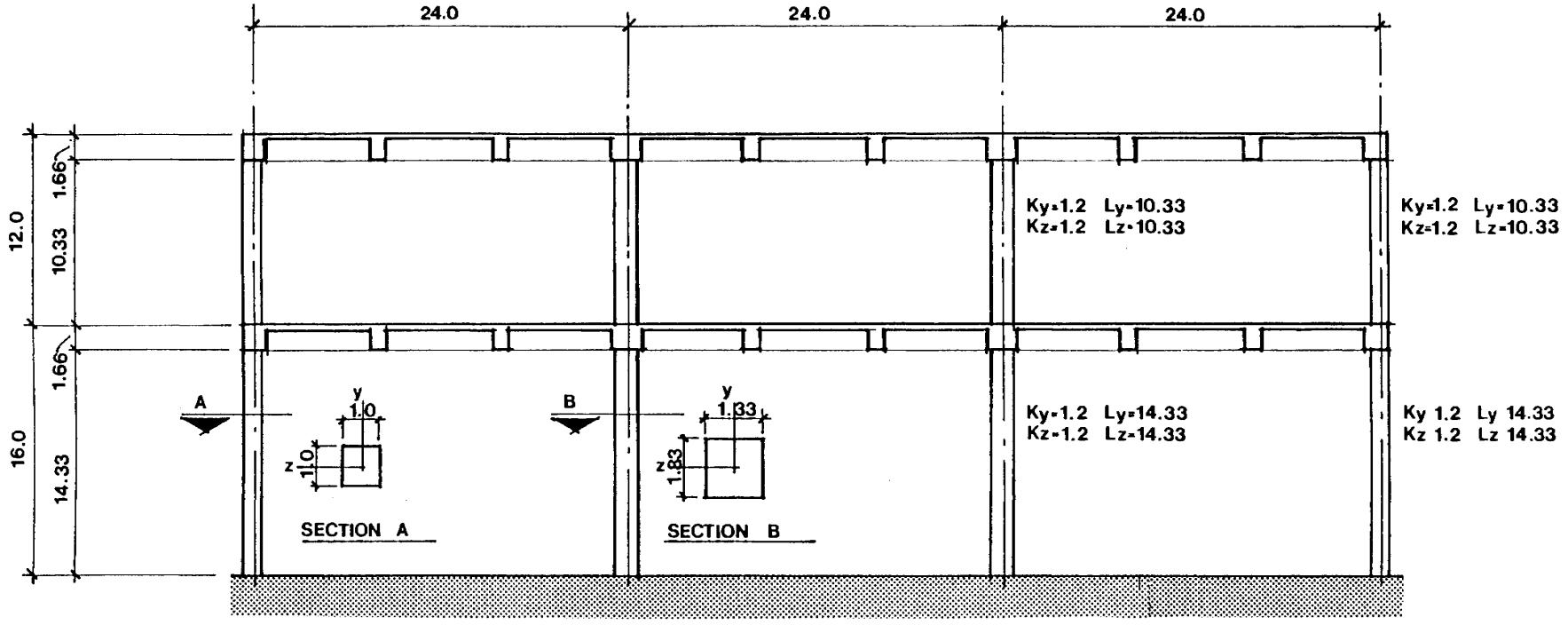
Output 3 - final column design as input in the checking

program.

EXAMPLE PROBLEM

The concrete frame of Figure 8a was analyzed using the frame program. Results of analysis for the load cases shown in Figure 8b appear on pages 25 - 29.

The post-processing programs were run in the print all mode to demonstrate program use which begins on page 30.



(Span in other direction = 30.0')

Concrete

F'c = Psi
Wt = 145 Pcf
E = 3644147.43 Psi
Fy = 60 (primary)
Fy = 40 (stirrups & ties)

Figure ( ) data for example problem

Loads

Dead 60 Psf
Live 80 Psf
Wind 25 Psf

All columns unbraced in z-direction,
braced in the y-direction

FIGURE 8a

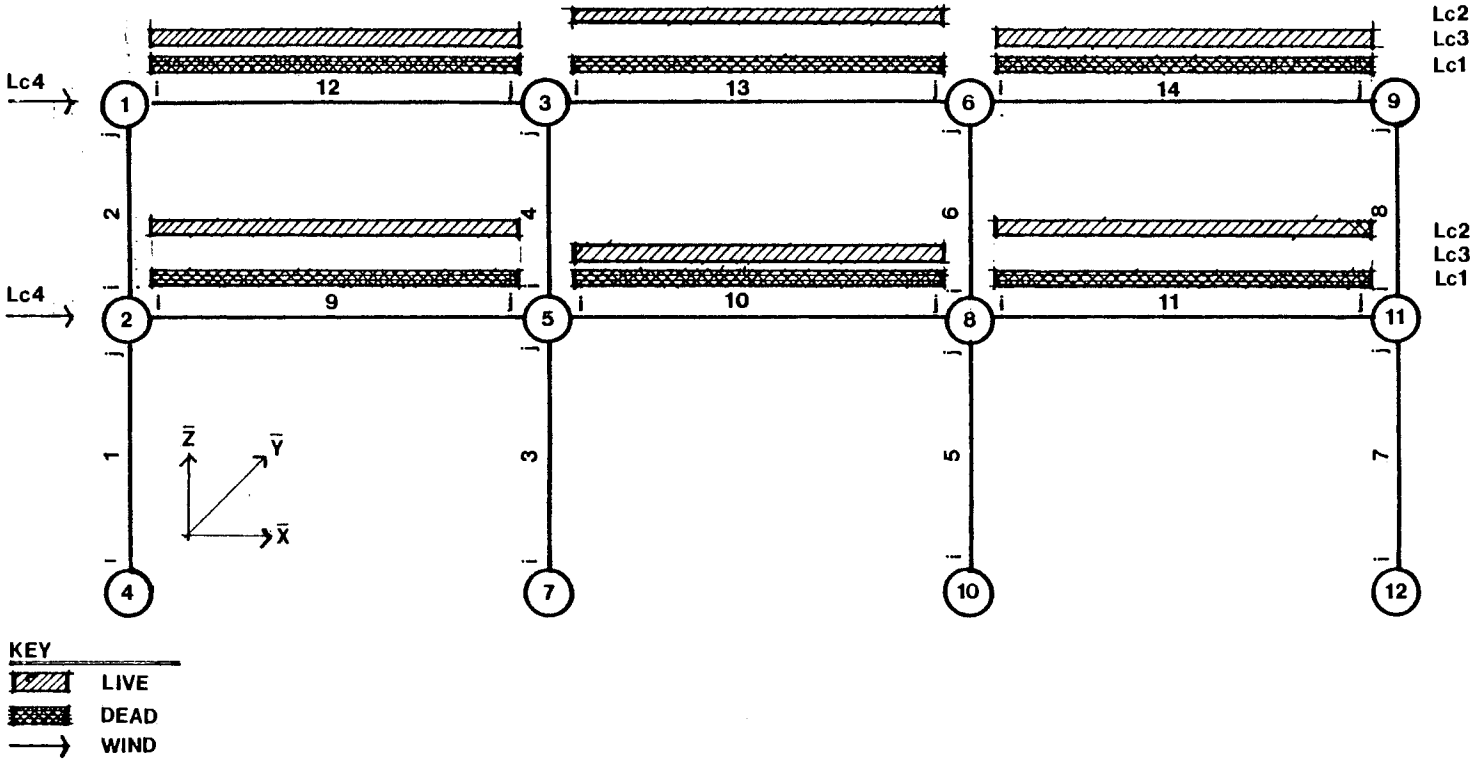

Lc2
Lc3
Lc1
Lc4
12
13
14
1
3
6
9
2
4
6
8
Lc2
Lc3
Lc1
Lc4
9
10
11
2
5
8
11
1
3
5
7
Z
Y
X
4
7
10
12
KEY
LIVE
DEAD
WIND

FIGURE 8b

EXAMPLE

JOINT COORDINATES, UNITS FEET

JOINT	-X-	-Y-	-Z-	<----JOINT SUPPORT DATA----->>> REL	ALFA	BETA	GAMA
1	0.0000	0.0000	27.4200				
2	0.0000	0.0000	15.4200				
3	24.0000	0.0000	27.4200				
4	0.0000	0.0000	0.0000	S 000000	0.0000	0.0000	0.0000
5	24.0000	0.0000	15.4200				
6	48.0000	0.0000	27.4200				
7	24.0000	0.0000	0.0000	S 000000	0.0000	0.0000	0.0000
8	48.0000	0.0000	15.4200				
9	72.0000	0.0000	27.4200				
10	48.0000	0.0000	0.0000	S 000000	0.0000	0.0000	0.0000
11	72.0000	0.0000	15.4200				
12	72.0000	0.0000	0.0000	S 000000	0.0000	0.0000	0.0000

SECTION PROPERTY CATALOG, UNITS INCHES POUNDS

CONSTANTS: E = 3.644E+06 G = 1.544E+06

TYPE	A(X)	A(Y)	A(Z)	I(X)	I(Y)	I(Z)	DESCRIPTION
1	144.00	96.00	96.00	1.000E+06	1005.67	1005.67	12X12 COL
2	256.00	168.96	168.96	1.000E+06	3178.40	3178.40	16X16 COL
3	616.00	406.56	406.56	1.000E+06	15935.00	15935.00	GIRDER

MEMBER INCIDENCES, UNITS FEET DEGREES

MBR	Jnt1	Jnt2	Jnt3	Jnt4	CAT#	ALFA	BETA	GAMA	LENGTH	LE-REL	RE-REL
1	4	2			1	0.000	270.000	0.000	15.420	000000	000000
2	2	1			1	0.000	270.000	0.000	12.000	000000	000000
3	7	5			2	0.000	270.000	0.000	15.420	000000	000000
4	5	3			2	0.000	270.000	0.000	12.000	000000	000000
5	10	8			2	0.000	270.000	0.000	15.420	000000	000000
6	8	6			2	0.000	270.000	0.000	12.000	000000	000000
7	12	11			1	0.000	270.000	0.000	15.420	000000	000000
8	11	9			1	0.000	270.000	0.000	12.000	000000	000000
9	2	5			3	0.000	0.000	0.000	24.000	000000	000000
10	5	8			3	0.000	0.000	0.000	24.000	000000	000000
11	8	11			3	0.000	0.000	0.000	24.000	000000	000000
12	1	3			3	0.000	0.000	0.000	24.000	000000	000000
13	3	6			3	0.000	0.000	0.000	24.000	000000	000000
14	6	9			3	0.000	0.000	0.000	24.000	000000	000000

INACTIVE MEMBER LIST

NONE

LOADING UNITS: LOADS.....FEET KIPS

SETTLEMENT...INCHES DEGREES

SELFWEIGHT...FEET POUNDS

LOADS SUP.DEF.	LC#	a or b	PX DX	PY DY	PZ DZ	MX 0X	MY 0Y	MZ 0Z
LIST	12 -14							
MBR C F G	1	.333	0.000	0.000	-21.000	0.000	0.000	0.000
MBR C F G	1	.666	0.000	0.000	-21.000	0.000	0.000	0.000
LIST	9 -11							
MBR C F G	1	.333	0.000	0.000	19.800	0.000	0.000	0.000
MBR C F G	1	.333	0.000	0.000	-39.600	0.000	0.000	0.000
MBR C F G	1	.666	0.000	0.000	-19.800	0.000	0.000	0.000
LIST	9 -14							
MBR UNI G	1		0.000	0.000	-.600	0.000	0.000	0.000

EXAMPLE 2

LOADS SUP.DEF.	LC#	a or b	PX DX	PY DY	PZ DZ	MX 0X	MY 0Y	MZ 0Z
LIST	1 9							
JNT F&M G	1		0.000	0.000	-15.900	0.000	0.000	0.000
LIST	3 6							
JNT F&M G	1		0.000	0.000	-23.700	0.000	0.000	0.000

```
   LIST        2    11
JNT F&M G  1              0.000      0.000    -17.100      0.000      0.000      0.000
   LIST        5     8
JNT F&M G  1              0.000      0.000    -24.300      0.000      0.000      0.000
   LIST        4    12
JNT F&M G  1              0.000      0.000     -2.150      0.000      0.000      0.000
   LIST        7    10
JNT F&M G  1              0.000      0.000     -3.820      0.000      0.000      0.000
   LIST       13
MBR C F G  2     .333      0.000      0.000     -6.000      0.000      0.000      0.000
MBR C F G  2     .666      0.000      0.000     -6.000      0.000      0.000      0.000
   LIST        9    11
MBR C F G  2     .333      0.000      0.000    -19.200      0.000      0.000      0.000
MBR C F G  2     .666      0.000      0.000    -19.200      0.000      0.000      0.000
   LIST        3     6
JNT F&M G  2              0.000      0.000     -3.000      0.000      0.000      0.000
   LIST        2     5     8    11
JNT F&M G  2              0.000      0.000     -9.600      0.000      0.000      0.000
   LIST       12    14
MBR C F G  3     .333      0.000      0.000     -6.000      0.000      0.000      0.000
MBR C F G  3     .666      0.000      0.000     -6.000      0.000      0.000      0.000
   LIST       10
MBR C F G  3     .333      0.000      0.000    -19.200      0.000      0.000      0.000
MBR C F G  3     .666      0.000      0.000    -19.200      0.000      0.000      0.000
   LIST        1     3     6     9
JNT F&M G  3              0.000      0.000     -3.000      0.000      0.000      0.000
   LIST        5     8
JNT F&M G  3              0.000      0.000     -9.600      0.000      0.000      0.000
   LIST        1
JNT F&M G  4              7.500      0.000      0.000      0.000      0.000      0.000
   LIST        2
JNT F&M G  4             10.500      0.000      0.000      0.000      0.000      0.000
```

EXAMPLE

COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM

DEFORMATIONS UNITS: INCHES DEGREES

JOINT	LC	DX	DY	DZ	ΘX	ΘY	ΘZ
1	1	7.645E-04	0.000E+00	-3.738E-02	0.0000E+00	1.1679E-01	0.0000E+00
	2	2.234E-04	0.000E+00	-8.882E-03	0.0000E+00	-1.6457E-02	0.0000E+00
	3	1.949E-04	0.000E+00	-4.600E-03	0.0000E+00	3.9599E-02	0.0000E+00
	4	4.373E-01	0.000E+00	1.160E-03	0.0000E+00	3.2695E-03	0.0000E+00
2	1	-3.459E-04	0.000E+00	-2.697E-02	0.0000E+00	9.7816E-02	0.0000E+00
	2	-3.912E-05	0.000E+00	-9.056E-03	0.0000E+00	9.8692E-02	0.0000E+00
	3	-4.557E-05	0.000E+00	-2.302E-03	0.0000E+00	-1.9897E-02	0.0000E+00
	4	3.463E-01	0.000E+00	9.908E-04	0.0000E+00	1.0303E-02	0.0000E+00
3	1	2.642E-04	0.000E+00	-4.707E-02	0.0000E+00	-2.6927E-02	0.0000E+00
	2	3.140E-05	0.000E+00	-9.605E-03	0.0000E+00	2.5475E-02	0.0000E+00
	3	1.492E-04	0.000E+00	-9.478E-03	0.0000E+00	-2.8896E-02	0.0000E+00
	4	4.365E-01	0.000E+00	2.122E-04	0.0000E+00	5.6283E-03	0.0000E+00
5	1	1.469E-05	0.000E+00	-3.375E-02	0.0000E+00	-1.8563E-02	0.0000E+00
	2	1.217E-05	0.000E+00	-8.117E-03	0.0000E+00	-6.4337E-02	0.0000E+00
	3	2.844E-05	0.000E+00	-7.992E-03	0.0000E+00	4.7689E-02	0.0000E+00
	4	3.451E-01	0.000E+00	1.833E-04	0.0000E+00	2.0336E-02	0.0000E+00
6	1	9.811E-05	0.000E+00	-4.707E-02	0.0000E+00	2.7020E-02	0.0000E+00
	2	1.238E-04	0.000E+00	-9.609E-03	0.0000E+00	-2.5455E-02	0.0000E+00
	3	-3.325E-05	0.000E+00	-9.474E-03	0.0000E+00	2.8905E-02	0.0000E+00
	4	4.360E-01	0.000E+00	-2.117E-04	0.0000E+00	5.6450E-03	0.0000E+00
8	1	1.241E-04	0.000E+00	-3.375E-02	0.0000E+00	1.8649E-02	0.0000E+00
	2	6.696E-05	0.000E+00	-8.123E-03	0.0000E+00	6.4370E-02	0.0000E+00
	3	2.589E-05	0.000E+00	-7.986E-03	0.0000E+00	-4.7640E-02	0.0000E+00
	4	3.444E-01	0.000E+00	-1.834E-04	0.0000E+00	2.0319E-02	0.0000E+00
9	1	-4.022E-04	0.000E+00	-3.733E-02	0.0000E+00	-1.1670E-01	0.0000E+00
	2	-6.814E-05	0.000E+00	-8.869E-03	0.0000E+00	1.6444E-02	0.0000E+00
	3	-7.899E-05	0.000E+00	-4.593E-03	0.0000E+00	-3.9562E-02	0.0000E+00
	4	4.359E-01	0.000E+00	-1.161E-03	0.0000E+00	3.3024E-03	0.0000E+00
11	1	4.847E-04	0.000E+00	-2.694E-02	0.0000E+00	-9.7732E-02	0.0000E+00
	2	1.183E-04	0.000E+00	-9.042E-03	0.0000E+00	-9.8594E-02	0.0000E+00
	3	9.989E-05	0.000E+00	-2.298E-03	0.0000E+00	1.9882E-02	0.0000E+00
	4	3.443E-01	0.000E+00	-9.907E-04	0.0000E+00	1.0268E-02	0.0000E+00

MEMBER FORCES AND MOMENTS UNITS: FEET KIPS

MEMB#	LC	END	PX	PY	PZ	MX	MY	MZ
1	1	4	76.49	0.00	-1.09	0.00	5.58	0.00
		2	-76.49	0.00	1.09	0.00	11.22	0.00
	2	4	25.68	0.00	-1.10	0.00	5.61	0.00
		2	-25.68	0.00	1.10	0.00	11.30	0.00
	3	4	6.53	0.00	.22	0.00	-1.13	0.00
		2	-6.53	0.00	-.22	0.00	-2.28	0.00
	4	4	-2.81	0.00	2.27	0.00	-17.79	0.00
		2	2.81	0.00	-2.27	0.00	-17.19	0.00
2	1	2	37.91	0.00	-3.90	0.00	22.70	0.00
		1	-37.91	0.00	3.90	0.00	24.10	0.00
	2	2	-.63	0.00	-1.50	0.00	13.24	0.00
		1	.63	0.00	1.50	0.00	4.72	0.00
	3	2	8.37	0.00	-.36	0.00	-.07	0.00
		1	-8.37	0.00	.36	0.00	4.34	0.00
	4	2	-.62	0.00	1.07	0.00	-6.18	0.00
		1	.62	0.00	-1.07	0.00	-6.71	0.00
3	1	7	170.15	0.00	.65	0.00	-3.30	0.00
		5	-170.15	0.00	-.65	0.00	-6.68	0.00
	2	7	40.92	0.00	2.24	0.00	-11.45	0.00
		5	-40.92	0.00	-2.24	0.00	-23.16	0.00
	3	7	40.29	0.00	-1.66	0.00	8.48	0.00
		5	-40.29	0.00	1.66	0.00	17.16	0.00
	4	7	-.92	0.00	6.75	0.00	-53.86	0.00
		5	.92	0.00	-6.75	0.00	-50.15	0.00

EXAMPLE

COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM

MEMBER FORCES AND MOMENTS UNITS: FEET KIPS

MEMB#	LC	END	PX	PY	PZ	MX	MY	MZ
4	1	5	86.32	0.00	2.61	0.00	-14.65	0.00
		3	-86.32	0.00	-2.61	0.00	-16.61	0.00
	2	5	9.64	0.00	2.22	0.00	-23.81	0.00
		3	-9.64	0.00	-2.22	0.00	-2.80	0.00
	3	5	9.63	0.00	-1.07	0.00	15.36	0.00
		3	-9.63	0.00	1.07	0.00	-2.56	0.00
	4	5	-.19	0.00	2.67	0.00	-14.28	0.00
		3	.19	0.00	-2.67	0.00	-17.72	0.00
5	1	10	170.15	0.00	-.65	0.00	3.30	0.00
		8	-170.15	0.00	.65	0.00	6.69	0.00
	2	10	40.95	0.00	-2.24	0.00	11.44	0.00
		8	-40.95	0.00	2.24	0.00	23.16	0.00
	3	10	40.26	0.00	1.66	0.00	-8.48	0.00
		8	-40.26	0.00	-1.66	0.00	-17.15	0.00
	4	10	.92	0.00	6.73	0.00	-53.75	0.00
		8	-.92	0.00	-6.73	0.00	-50.05	0.00
6	1	8	86.31	0.00	-2.61	0.00	14.65	0.00
		6	-86.31	0.00	2.61	0.00	16.61	0.00
	2	8	9.62	0.00	-2.22	0.00	23.81	0.00
		6	-9.62	0.00	2.22	0.00	2.79	0.00
	3	8	9.64	0.00	1.07	0.00	-15.35	0.00
		6	-9.64	0.00	-1.07	0.00	2.56	0.00
	4	8	.18	0.00	2.68	0.00	-14.34	0.00
		6	-.18	0.00	-2.68	0.00	-17.77	0.00
7	1	12	76.41	0.00	1.09	0.00	-5.58	0.00
		11	-76.41	0.00	-1.09	0.00	-11.21	0.00
	2	12	25.64	0.00	1.10	0.00	-5.61	0.00
		11	-25.64	0.00	-1.10	0.00	-11.29	0.00
	3	12	6.52	0.00	-.22	0.00	1.13	0.00
		11	-6.52	0.00	.22	0.00	2.27	0.00
	4	12	2.81	0.00	2.26	0.00	-17.68	0.00
		11	-2.81	0.00	-2.26	0.00	-17.09	0.00
8	1	11	37.86	0.00	3.90	0.00	-22.70	0.00
		9	-37.86	0.00	-3.90	0.00	-24.10	0.00
	2	11	-.63	0.00	1.50	0.00	-13.24	0.00
		9	.63	0.00	-1.50	0.00	-4.72	0.00
	3	11	8.36	0.00	.36	0.00	.06	0.00
		9	-8.36	0.00	-.36	0.00	-4.34	0.00
	4	11	.62	0.00	1.08	0.00	-6.24	0.00
		9	-.62	0.00	-1.08	0.00	-6.75	0.00
9	1	2	-2.81	0.00	21.49	0.00	-33.91	0.00
		5	2.81	0.00	32.51	0.00	166.68	0.00
	2	2	-.40	0.00	16.71	0.00	-24.54	0.00
		5	.40	0.00	21.69	0.00	84.69	0.00
	3	2	-.58	0.00	-1.85	0.00	2.34	0.00
		5	.58	0.00	1.85	0.00	41.98	0.00
	4	2	9.31	0.00	-2.19	0.00	23.38	0.00
		5	-9.31	0.00	2.19	0.00	29.26	0.00
10	1	5	-.85	0.00	27.02	0.00	-145.34	0.00
		8	.85	0.00	26.98	0.00	145.33	0.00
	2	5	-.43	0.00	-.00	0.00	-37.72	0.00
		8	.43	0.00	.00	0.00	37.77	0.00
	3	5	.02	0.00	19.22	0.00	-74.50	0.00
		8	-.02	0.00	19.18	0.00	74.44	0.00
	4	5	5.23	0.00	-2.93	0.00	35.17	0.00
		8	-5.23	0.00	2.93	0.00	35.16	0.00

EXAMPLE

COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM

MEMBER FORCES AND MOMENTS UNITS: FEET KIPS

MEMB#	LC	END	PX	PY	PZ	MX	MY	MZ
11	1	8	-2.81	0.00	32.55	0.00	-166.68	0.00
		11	2.81	0.00	21.45	0.00	33.91	0.00
	2	8	-.40	0.00	21.73	0.00	-84.74	0.00
		11	.40	0.00	16.67	0.00	24.53	0.00
	3	8	-.58	0.00	1.84	0.00	-41.93	0.00
		11	.58	0.00	-1.84	0.00	-2.33	0.00
	4	8	1.17	0.00	-2.19	0.00	29.22	0.00
		11	-1.17	0.00	2.19	0.00	23.33	0.00
12	1	1	3.90	0.00	22.01	0.00	-24.10	0.00
		3	-3.90	0.00	34.39	0.00	173.26	0.00
	2	1	1.50	0.00	-.63	0.00	-4.72	0.00
		3	-1.50	0.00	.63	0.00	19.88	0.00
	3	1	.36	0.00	5.37	0.00	-4.34	0.00
		3	-.36	0.00	6.63	0.00	19.50	0.00
	4	1	6.43	0.00	-.62	0.00	6.71	0.00
		3	-6.43	0.00	.62	0.00	8.09	0.00
13	1	3	1.29	0.00	28.22	0.00	-156.65	0.00
		6	-1.29	0.00	28.18	0.00	156.65	0.00
	2	3	-.72	0.00	6.01	0.00	-17.08	0.00
		6	.72	0.00	5.99	0.00	17.06	0.00
	3	3	1.42	0.00	-.00	0.00	-16.94	0.00
		6	-1.42	0.00	.00	0.00	16.96	0.00
	4	3	3.76	0.00	-.80	0.00	9.64	0.00
		6	-3.76	0.00	.80	0.00	9.65	0.00
14	1	6	3.90	0.00	34.44	0.00	-173.26	0.00
		9	-3.90	0.00	21.96	0.00	24.10	0.00
	2	6	1.50	0.00	.63	0.00	-19.86	0.00
		9	-1.50	0.00	-.63	0.00	4.72	0.00
	3	6	.36	0.00	6.64	0.00	-19.52	0.00
		9	-.36	0.00	5.36	0.00	4.34	0.00
	4	6	1.08	0.00	-.62	0.00	8.13	0.00
		9	-1.08	0.00	.62	0.00	6.75	0.00

REACTIONS AT SUPPORTS UNITS: FEET KIPS

JOINT	LC	PX	PY	PZ	MX	MY	MZ
4	1	1.09	0.00	78.64	0.00	5.58	0.00
	2	1.10	0.00	25.68	0.00	5.61	0.00
	3	-.22	0.00	6.53	0.00	-1.13	0.00
	4	-2.27	0.00	-2.81	0.00	-17.79	0.00
7	1	-.65	0.00	173.97	0.00	-3.30	0.00
	2	-2.24	0.00	40.92	0.00	-11.45	0.00
	3	1.66	0.00	40.29	0.00	8.48	0.00
	4	-6.75	0.00	-.92	0.00	-53.86	0.00
10	1	.65	0.00	173.97	0.00	3.30	0.00
	2	2.24	0.00	40.95	0.00	11.44	0.00
	3	-1.66	0.00	40.26	0.00	-8.48	0.00
	4	-6.73	0.00	.92	0.00	-53.75	0.00
12	1	-1.09	0.00	78.56	0.00	-5.58	0.00
	2	-1.10	0.00	25.64	0.00	-5.61	0.00
	3	.22	0.00	6.52	0.00	1.13	0.00
	4	-2.26	0.00	2.81	0.00	-17.68	0.00

EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM

SUM OF ALL REACTIONS

1	.00	0.00	505.14	0.00	-.01	0.00
2	.00	0.00	133.20	0.00	-.01	0.00
3	.00	0.00	93.60	0.00	-.00	0.00
4	-18.00	0.00	.00	0.00	-143.07	0.00

```
LOAD "INPUT:CS80,7"
RUN
CHANGE EXISTING DATA?(1=YES,0=NO)NO WILL EXPUNGE DATA.
0
ARE YOU USING EXISTING FRAME FILES?
1
APPENDAGE NUMBER WHERE FRAME FILES EXIST?
11
EXAMPLE .
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM
THERE ARE 4 LOAD CASES.
TOTAL NUMBER OF COLUMNS TO BE DESIGNED?
8
TOTAL NUMBER OF COLUMNS= 8
IS THIS CORRECT?(1=YES,0=NO)
1
NUMBER OF FLOORS? (SUPPORTED BY COLUMNS.)
2
NUMBER OF FLOORS= 2
IS THIS CORRECT?(1=YES,0=NO)
1
WHICH FLOOR NUMBER IS ROOF?
2
LIST COLUMNS SUPPORTING ROOF
(0=FINISHED)
2,4,6,8
LIST COLUMNS SUPPORTING ROOF
(0=FINISHED)
0
LIST COLUMNS SUPPORTING FLOOR              1
(0=FINISHED)
1,3,5,7
LIST COLUMNS SUPPORTING FLOOR              1
(0=FINISHED)
0
FLOOR COLUMNS
 1
           1
           3
           5
           7

FLOOR COLUMNS
 2
           2
           4
           6
           8

REVIEW DATA
IS THIS CORRECT?(1=YES,0=NO)
1
COLUMN INCIDENCES. (USING MEMBERS FROM FRAME FILE.)
INPUT I-END MEMBER AND J-END MEMBER FOR EACH COLUMN.
I-END MEMBER MUST BE AT BOTTOM OF COLUMN.
COLUMN I-END J-END

INPUT I-END MEMBER, J-END MEMBER FOR COLUMN NUMBER          1 ?
1,1
    1       1      1
INPUT I-END MEMBER, J-END MEMBER FOR COLUMN NUMBER          2 ?
2,2
    2       2      2
INPUT I-END MEMBER, J-END MEMBER FOR COLUMN NUMBER          3 ?
3,3
    3       3      3
```

```
INPUT I-END MEMBER, J-END MEMBER FOR COLUMN NUMBER           4 ?
4,4
    4       4      4
INPUT I-END MEMBER, J-END MEMBER FOR COLUMN NUMBER           5 ?
5,5
    5       5      5
INPUT I-END MEMBER, J-END MEMBER FOR COLUMN NUMBER           6 ?
6,6
    6       6      6
INPUT I-END MEMBER, J-END MEMBER FOR COLUMN NUMBER           7 ?
7,7
    7       7      7
INPUT I-END MEMBER, J-END MEMBER FOR COLUMN NUMBER           8 ?
8,8
    8       8      8
IS THIS CORRECT?(1=YES,0=NO)
1
SPECIFY LENGTH UNITS (0=Inches,1=Feet)
1
SPECIFY FORCE UNITS (0=Lbs.,1=Kips)
1
INPUT UNITS ARE Feet AND Kips
IS THIS CORRECT?(1=YES,0=NO)
1
COLUMN LIST WITH SAME DIMS. & ORIENTATION?(0=FINISHED)
1-2,7-8
COLUMNS              1-2,7-8LENGTH UNITS Feet
WIDTH(Z-FACE),DEPTH(Y-FACE)?
1.0,1.0
COLUMN LIST WITH SAME DIMS. & ORIENTATION?(0=FINISHED)
3-6
COLUMNS              3-6LENGTH UNITS Feet
WIDTH(Z-FACE),DEPTH(Y-FACE)?
1.33,1.33
COLUMN LIST WITH SAME DIMS. & ORIENTATION?(0=FINISHED)
0
COLUMN WIDTH(Z-FACE) DEPTH(Y-FACE) (
    1      1.00          1.00
    2      1.00          1.00
    3      1.33          1.33
    4      1.33          1.33
    5      1.33          1.33
    6      1.33          1.33
    7      1.00          1.00
    8      1.00          1.00
IS THIS CORRECT?(1=YES,0=NO)
1
F'c CONSTANT?(1=YES,0=NO)
1
F'c And WEIGHT OF CONCRETE?(Psi,Pcf)
4000,145
COLUMN F'c(Psi Ec(Psi)
    1      4000  3644.15E03
    2      4000  3644.15E03
    3      4000  3644.15E03
    4      4000  3644.15E03
    5      4000  3644.15E03
    6      4000  3644.15E03
    7      4000  3644.15E03
    8      4000  3644.15E03
IS THIS CORRECT?(1=YES,0=NO)
1
MEMBER LIST FOR MEMBERS BRACED IN Z-PLANE.(-1=NONE,0=DONE)
-1
THERE ARE NO MEMBERS BRACED IN THE Z-DIRECTION?
IS THIS CORRECT?
```

```
1
MEMBER LIST FOR COLUMNS BRACED IN Y-PLANE.(-1=NONE,0=DONE)
1-8
COLUMNS              1-8MEMBER LIST FOR COLUMNS BRACED IN Y-PLANE.(-1=NONE,0=DONE
)
0
MEMBER LIST FOR MEMBERS WITH SAME Ky?(0=FINISHED)
1-8
COLUMNS1-8
INPUT VALUE OF KY FOR MEMBER LIST.
1.2
MEMBER LIST FOR MEMBERS WITH SAME Ky?(0=FINISHED)
0
MEMBER LIST FOR MEMBERS WITH SAME Kz?(0=FINISHED)
1-8
COLUMNS1-8
INPUT VALUE OF Kz FOR MEMBER LIST.
1.2
MEMBER LIST FOR MEMBERS WITH SAME Kz?(0=FINISHED)
0
COLUMN K(y) K(z)
================
    1   1.20 1.20
    2   1.20 1.20
    3   1.20 1.20
    4   1.20 1.20
    5   1.20 1.20
    6   1.20 1.20
    7   1.20 1.20
    8   1.20 1.20
ARE ALL VALUES CORRECT?(1=YES,0=NO)
1
INPUT LENGTH DATA. (UNBRACED LENGTHS)
COLUMN LIST FOR COLUMNS WITH SAME Lz?(0=FINISHED.)
1,3,5,7
COLUMNS1,3,5,7
Lz FOR COLUMN LIST.
14.33
COLUMN LIST FOR COLUMNS WITH SAME Lz?(0=FINISHED.)
2,4,6,8
COLUMNS2,4,6,8
Lz FOR COLUMN LIST.
10.33
COLUMN LIST FOR COLUMNS WITH SAME Lz?(0=FINISHED.)
0
COLUMN LIST FOR COLUMNS WITH SAME Ly?(0=FINISHED)
1,3,5,7
COLUMNS1,3,5,7
Ly FOR COLUMN LIST.
14.33
COLUMN LIST FOR COLUMNS WITH SAME Ly?(0=FINISHED)
2,4,6,8
COLUMNS2,4,6,8
Ly FOR COLUMN LIST.
10.33
COLUMN LIST FOR COLUMNS WITH SAME Ly?(0=FINISHED)
0
COLUMN   L(y)     L(z)
======================
    1   14.330   14.330
    2   10.330   10.330
    3   14.330   14.330
    4   10.330   10.330
    5   14.330   14.330
    6   10.330   10.330
    7   14.330   14.330
```

```
    8   10.330   10.330
ARE THESE VALUES CORRECT?(1=YES,0=NO)
1
LIST MEMBERS WITH SAME LIVE LOAD REDUCTIONS(0=FINISHED)?
1,7
COLUMNS1,7
LIVE LOAD REDUCTION FACTOR?
.8
LIST MEMBERS WITH SAME LIVE LOAD REDUCTIONS(0=FINISHED)?
3,5
COLUMNS3,5
LIVE LOAD REDUCTION FACTOR?
.6
LIST MEMBERS WITH SAME LIVE LOAD REDUCTIONS(0=FINISHED)?
0
COLUMN L.L.R.
    1   .800
    2  1.000
    3   .600
    4  1.000
    5   .600
    6  1.000
    7   .800
    8  1.000
ARE THESE VALUES CORRECT?(1=YES,0=NO)
1
TOTAL NUMBER OF LOAD COMBINATIONS?
8
LOAD COMBINATION 1 NUMBER OF LOAD CASES TO BE COMBINED?
1
LOAD CASE 1
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
1,1.4,1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
COMBINATION   1
LOAD CASE  FACTOR  TYPE
     1      1.40    1
IS THIS DATA CORRECT?(1=YES,0=NO)
1
LOAD COMBINATION 2 NUMBER OF LOAD CASES TO BE COMBINED?
2
LOAD CASE 1
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
1,.9,1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 2
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
4,1.1,3
DIRECTION IN WHICH LATERAL LOAD IS APPLIED?(Y=2,Z=1)
1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
COMBINATION   2
LOAD CASE  FACTOR  TYPE
     1       .90    1
     4      1.10    3
IS THIS DATA CORRECT?(1=YES,0=NO)
1
```

```
LOAD COMBINATION 3 NUMBER OF LOAD CASES TO BE COMBINED?
2
LOAD CASE 1
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
1,1.4,1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 2
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
2,1.7,2
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
COMBINATION   3
LOAD CASE  FACTOR  TYPE
     1      1.40    1
     2      1.70    2
IS THIS DATA CORRECT?(1=YES,0=NO)
1
LOAD COMBINATION 4 NUMBER OF LOAD CASES TO BE COMBINED?
3
LOAD CASE 1
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
1,1.05,1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 2
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
2,1.27,2
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 3
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
4,.98,3
DIRECTION IN WHICH LATERAL LOAD IS APPLIED?(Y=2,Z=1)
1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
COMBINATION   4
LOAD CASE  FACTOR  TYPE
     1      1.05    1
     2      1.27    2
     4       .98    3
IS THIS DATA CORRECT?(1=YES,0=NO)
1
LOAD COMBINATION 5 NUMBER OF LOAD CASES TO BE COMBINED?
2
LOAD CASE 1
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
1,1.4,1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 2
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
3,1.7,2
```

```
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
COMBINATION   5
LOAD CASE  FACTOR  TYPE
     1      1.40    1
     3      1.70    2
IS THIS DATA CORRECT?(1=YES,0=NO)
1
LOAD COMBINATION 6 NUMBER OF LOAD CASES TO BE COMBINED?
3
LOAD CASE 1
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
1,1.05,1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 2
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
3,1.27,2
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 3
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
4,.98,3
DIRECTION IN WHICH LATERAL LOAD IS APPLIED?(Y=2,Z=1)
1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
COMBINATION   6
LOAD CASE  FACTOR  TYPE
     1      1.05    1
     3      1.27    2
     4       .98    3
IS THIS DATA CORRECT?(1=YES,0=NO)
1
LOAD COMBINATION 7 NUMBER OF LOAD CASES TO BE COMBINED?
3
LOAD CASE 1
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
1,1.4,1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 2
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
2,1.7,2
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 3
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
3,1.7,2
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
COMBINATION   7
```

```
LOAD CASE  FACTOR  TYPE
     1      1.40    1
     2      1.70    2
     3      1.70    2
IS THIS DATA CORRECT?(1=YES,0=NO)
1
LOAD COMBINATION 8 NUMBER OF LOAD CASES TO BE COMBINED?
4
LOAD CASE 1
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
1,1.05,1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
2,1.27,2
EXTRA INPUT RESPONSES IGNORED
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 2
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
2,1.27,2
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 3
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
3,1.27,2
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
LOAD CASE 4
LOAD CASE,LOAD FACTOR,CODE?(1,2,3)
4,.98,3
DIRECTION IN WHICH LATERAL LOAD IS APPLIED?(Y=2,Z=1)
1
MODIFY AXIAL LOADS FOR THIS LOAD CASE?(1=YES,0=NO)
0
MODIFY MOMENTS FOR THIS LOAD CASE?(1=YES,0=NO)
0
COMBINATION   8
LOAD CASE  FACTOR  TYPE
     1      1.05    1
     2      1.27    2
     3      1.27    2
     4       .98    3
IS THIS DATA CORRECT?(1=YES,0=NO)
1
1.............ECHO OF DATA.
2.........LOAD COMBINATIONS.
3.........TERMINATE PROGRAM.
```

```
LOAD "BWECHO:CS80,7"
RUN
ARE FRAME FILES USED?(1=YES,0=NO)
1
APPENDAGE NUMBER WHERE INPUT DATA EXISTS?
11
EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM
REFLECT ALL DATA?(1=YES,0=NO)
0
OUTPUT LENGTH UNITS DESIRED?(0=Inches,1=Feet)
1
OUTPUT FORCE UNITS DESIRED?(0=Lbs.,1=Kips)
1

UNITS ARE Feet AND Kips
IS THIS CORRECT?(1=YES,0=NO)
1

DATA TO BE REFLECTED.
=====================
WANT BASIC JOB PARAMETERS?(1=YES,0=NO)
1
WANT COLUMN INCIDENCES?(1=YES,0=NO)
1
WANT COLUMN DATA?(1=YES,0=NO)
1
WANT COMBINATION DATA?(1=YES,0=NO)
1
BASIC JOB PARAMETERS.
COLUMN INCIDENCES.
COLUMN DATA.
LOAD COMBINATIONS.
IS THIS CORRECT?(1=YES,0=NO)
1
BEGINING PAGE NUMBER?
1
IS HIGH SPEED PRINTER TURNED ON?(1=YES,0=NO)
0




TURN HIGH SPEED PRINTER ON AT THIS TIME.
IS HIGH SPEED PRINTER TURNED ON?(1=YES,0=NO)
1
```

EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM

JOB PARAMETERS. UNITS Feet Kips

NO. OF FLOORS	NO. COLUMNS	NO. LOAD CASES	NO. LOAD COMBINATIONS
2	8	4	8

APPENDAGE NUMBER 1

COLUMN INCIDENCES.

COLUMN	I-END	J-END
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8

COLUMN DATA. UNITS Feet Kips

COLUMN	FLOOR	B (Ft)	H (Ft)	Igy (In^4)	Igz (In^4)	Ky	Kz	Ly (Ft)	Lz (Ft)	F'c (Ksi)	Ec (Ksi)	BRACED	LLR
1	1	1.00	1.00	1728.00	1728.00	1.20	1.20	14.33	14.33	4.0	364.4E01	Z	.80
2	2	1.00	1.00	1728.00	1728.00	1.20	1.20	10.33	10.33	4.0	364.4E01	Z	1.00
3	1	1.33	1.33	5406.92	5406.92	1.20	1.20	14.33	14.33	4.0	364.4E01	Z	.60
4	2	1.33	1.33	5406.92	5406.92	1.20	1.20	10.33	10.33	4.0	364.4E01	Z	1.00
5	1	1.33	1.33	5406.92	5406.92	1.20	1.20	14.33	14.33	4.0	364.4E01	Z	.60
6	2	1.33	1.33	5406.92	5406.92	1.20	1.20	10.33	10.33	4.0	364.4E01	Z	1.00
7	1	1.00	1.00	1728.00	1728.00	1.20	1.20	14.33	14.33	4.0	364.4E01	Z	.80
8	2	1.00	1.00	1728.00	1728.00	1.20	1.20	10.33	10.33	4.0	364.4E01	Z	1.00

LOAD COMBINATIONS.

UNITS Feet Kips

COMBINATION NUMBER 1

LOAD CASE	FACTOR	TYPE
1	1.40	DEAD

COMBINATION NUMBER 2

LOAD CASE	FACTOR	TYPE
1	.90	DEAD
4	1.10	LAT.

COMBINATION NUMBER 3

LOAD CASE	FACTOR	TYPE
1	1.40	DEAD
2	1.70	LIVE

COMBINATION NUMBER 4

LOAD CASE	FACTOR	TYPE
1	1.05	DEAD
2	1.27	LIVE
4	.98	LAT.

COMBINATION NUMBER 5

LOAD CASE	FACTOR	TYPE
1	1.40	DEAD
3	1.70	LIVE

COMBINATION NUMBER 6

LOAD CASE	FACTOR	TYPE
1	1.05	DEAD
3	1.27	LIVE
4	.98	LAT.

COMBINATION NUMBER 7

LOAD CASE	FACTOR	TYPE
1	1.40	DEAD
2	1.70	LIVE
3	1.70	LIVE

LOAD COMBINATIONS. UNITS Feet Kips

COMBINATION NUMBER 8

LOAD CASE	FACTOR	TYPE
1	1.05	DEAD
2	1.27	LIVE
3	1.27	LIVE
4	.98	LAT.

```
ECHO COMPLETE
LOAD "BWCOMB:CS80,7"
RUN
ARE FRAME FILES USED?(1=YES,0=NO)
1
APPENDAGE NUMBER WHERE JOB DATA IS STORED?
11
COMBINATIONS BEING MADE.
COMBINATIONS COMPLETED.
```

```
LOAD "BWOUT1:CSS0,7"
RUN
ARE FRAME FILES USED?(1=YES,0=NO)
1
NOTE: THIS PROGRAM PROVIDES HARD COPY OF COMBINED LOADS.
APPENDAGE NUMBER WHERE DATA IS STORED?
11
EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM
OUTPUT LENGTH UNITS DESIRED?(0=Inches,1=Feet)
1
OUTPUT FORCE UNITS DESIRED?(0=Lbs.,1=Kips)
1

UNITS ARE Feet AND Kips
IS THIS CORRECT?(1=YES,0=NO)
1
BEGINING PAGE NUMBER?
5
IS HIGH SPEED PRINTER TURNED ON?(1=YES,0=NO)
1
```

UNITS Feet Kips

COLUMN 1

	AXIAL	SHEARS				MOMENTS			
COMB.	Pu	Viy	Viz	Vjy	Vjz	Miy	Miz	Mjy	Mjz
1	107.09E00	000.00E00	-152.51E-2	000.00E00	152.51E-2	781.35E-2	000.00E00	157.03E-1	000.00E00
2	657.53E-1	000.00E00	151.50E-2	000.00E00	-151.50E-2	-145.43E-1	000.00E00	-881.81E-2	000.00E00
3	142.02E00	000.00E00	-301.69E-2	000.00E00	301.69E-2	154.49E-1	000.00E00	310.72E-1	000.00E00
4	103.66E00	000.00E00	-351.57E-4	000.00E00	351.57E-4	-586.67E-2	000.00E00	640.89E-2	000.00E00
5	115.97E00	000.00E00	-122.48E-2	000.00E00	122.48E-2	627.79E-2	000.00E00	126.08E-1	000.00E00
6	841.96E-1	000.00E00	130.37E-2	000.00E00	-130.37E-2	-127.18E-1	000.00E00	-738.42E-2	000.00E00
7	150.90E00	000.00E00	-271.67E-2	000.00E00	271.67E-2	139.14E-1	000.00E00	279.77E-1	000.00E00
8	110.29E00	000.00E00	189.16E-3	000.00E00	-189.16E-3	-701.39E-2	000.00E00	409.70E-2	000.00E00

COLUMN 2

	AXIAL	SHEARS				MOMENTS			
COMB.	Pu	Viy	Viz	Vjy	Vjz	Miy	Miz	Mjy	Mjz
1	530.68E-1	000.00E00	-545.96E-2	000.00E00	545.96E-2	317.74E-1	000.00E00	337.41E-1	000.00E00
2	334.37E-1	000.00E00	-232.81E-2	000.00E00	232.81E-2	136.23E-1	000.00E00	143.14E-1	000.00E00
3	519.95E-1	000.00E00	-800.40E-2	000.00E00	800.40E-2	542.87E-1	000.00E00	417.61E-1	000.00E00
4	383.95E-1	000.00E00	-494.28E-2	000.00E00	494.28E-2	345.88E-1	000.00E00	247.26E-1	000.00E00
5	673.04E-1	000.00E00	-606.48E-2	000.00E00	606.48E-2	316.62E-1	000.00E00	411.16E-1	000.00E00
6	498.32E-1	000.00E00	-349.41E-2	000.00E00	349.41E-2	176.86E-1	000.00E00	242.44E-1	000.00E00
7	662.31E-1	000.00E00	-860.92E-2	000.00E00	860.92E-2	541.74E-1	000.00E00	491.36E-1	000.00E00
8	490.30E-1	000.00E00	-539.49E-2	000.00E00	539.49E-2	345.03E-1	000.00E00	302.36E-1	000.00E00

COLUMN 3

	AXIAL	SHEARS				MOMENTS			
COMB.	Pu	Viy	Viz	Vjy	Vjz	Miy	Miz	Mjy	Mjz
1	238.21E00	000.00E00	906.93E-3	000.00E00	-906.93E-3	-462.65E-2	000.00E00	-935.84E-2	000.00E00
2	152.12E00	000.00E00	800.27E-2	000.00E00	-800.27E-2	-622.17E-1	000.00E00	-611.85E-1	000.00E00
3	279.95E00	000.00E00	319.63E-2	000.00E00	-319.63E-2	-163.03E-1	000.00E00	-329.83E-1	000.00E00
4	208.93E00	000.00E00	900.07E-2	000.00E00	-900.07E-2	-649.72E-1	000.00E00	-738.19E-1	000.00E00
5	279.31E00	000.00E00	-789.18E-3	000.00E00	789.18E-3	402.20E-2	000.00E00	814.71E-2	000.00E00
6	208.45E00	000.00E00	602.34E-2	000.00E00	-602.34E-2	-497.88E-1	000.00E00	-430.92E-1	000.00E00
7	321.05E00	000.00E00	150.01E-2	000.00E00	-150.01E-2	-765.42E-2	000.00E00	-154.78E-1	000.00E00
8	239.64E00	000.00E00	773.36E-2	000.00E00	-773.36E-2	-585.11E-1	000.00E00	-607.41E-1	000.00E00

COLUMN 4

	AXIAL	SHEARS				MOMENTS			
COMB.	Pu	Viy	Viz	Vjy	Vjz	Miy	Miz	Mjy	Mjz
1	120.84E00	000.00E00	364.77E-2	000.00E00	-364.77E-2	-205.16E-1	000.00E00	-232.56E-1	000.00E00
2	774.78E-1	000.00E00	527.91E-2	000.00E00	-527.91E-2	-289.01E-1	000.00E00	-344.48E-1	000.00E00
3	137.23E00	000.00E00	741.68E-2	000.00E00	-741.68E-2	-609.92E-1	000.00E00	-280.09E-1	000.00E00
4	102.69E00	000.00E00	816.55E-2	000.00E00	-816.55E-2	-596.23E-1	000.00E00	-383.63E-1	000.00E00
5	137.20E00	000.00E00	183.51E-2	000.00E00	-183.51E-2	559.04E-2	000.00E00	-276.12E-1	000.00E00
6	102.67E00	000.00E00	399.57E-2	000.00E00	-399.57E-2	-988.18E-2	000.00E00	-380.66E-1	000.00E00
7	153.59E00	000.00E00	560.42E-2	000.00E00	-560.42E-2	-348.86E-1	000.00E00	-323.64E-1	000.00E00
8	114.91E00	000.00E00	681.14E-2	000.00E00	-681.14E-2	-401.20E-1	000.00E00	-416.17E-1	000.00E00

EXHIBIT
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM

UNITS Feet Kips

COLUMN 5

	AXIAL	SHEARS				MOMENTS			
COMB.	Pu	Viy	Viz	Vjy	Vjz	Miy	Miz	Mjy	Mjz
1	238.21E00	000.00E00	-906.96E-3	000.00E00	906.96E-3	461.57E-2	000.00E00	936.96E-2	000.00E00
2	154.15E00	000.00E00	682.14E-2	000.00E00	-682.14E-2	-561.56E-1	000.00E00	-490.30E-1	000.00E00
3	279.98E00	000.00E00	-319.57E-2	000.00E00	319.57E-2	162.85E-1	000.00E00	329.94E-1	000.00E00
4	210.77E00	000.00E00	420.66E-2	000.00E00	-420.66E-2	-404.94E-1	000.00E00	-243.72E-1	000.00E00
5	279.27E00	000.00E00	788.59E-3	000.00E00	-788.59E-3	-403.31E-2	000.00E00	-812.70E-2	000.00E00
6	210.24E00	000.00E00	718.31E-2	000.00E00	-718.31E-2	-556.72E-1	000.00E00	-550.91E-1	000.00E00
7	321.05E00	000.00E00	-150.02E-2	000.00E00	150.02E-2	763.58E-2	000.00E00	154.97E-1	000.00E00
8	241.45E00	000.00E00	547.33E-2	000.00E00	-547.33E-2	-469.55E-1	000.00E00	-374.43E-1	000.00E00

COLUMN 6

	AXIAL	SHEARS				MOMENTS			
COMB.	Pu	Viy	Viz	Vjy	Vjz	Miy	Miz	Mjy	Mjz
1	120.84E00	000.00E00	-364.79E-2	000.00E00	364.79E-2	205.16E-1	000.00E00	232.58E-1	000.00E00
2	778.85E-1	000.00E00	598.46E-3	000.00E00	-598.46E-3	-258.38E-2	000.00E00	-459.77E-2	000.00E00
3	137.20E00	000.00E00	-741.62E-2	000.00E00	741.62E-2	609.91E-1	000.00E00	280.04E-1	000.00E00
4	103.03E00	000.00E00	-292.87E-2	000.00E00	292.87E-2	315.72E-1	000.00E00	357.22E-2	000.00E00
5	137.23E00	000.00E00	-183.61E-2	000.00E00	183.61E-2	-557.74E-2	000.00E00	276.11E-1	000.00E00
6	103.05E00	000.00E00	124.00E-2	000.00E00	-124.00E-2	-181.58E-1	000.00E00	327.84E-2	000.00E00
7	153.59E00	000.00E00	-560.44E-2	000.00E00	560.44E-2	348.97E-1	000.00E00	323.56E-1	000.00E00
8	115.27E00	000.00E00	-157.52E-2	000.00E00	157.52E-2	120.78E-1	000.00E00	682.36E-2	000.00E00

COLUMN 7

	AXIAL	SHEARS				MOMENTS			
COMB.	Pu	Viy	Viz	Vjy	Vjz	Miy	Miz	Mjy	Mjz
1	106.98E00	000.00E00	152.51E-2	000.00E00	-152.51E-2	-781.71E-2	000.00E00	-157.00E-1	000.00E00
2	718.62E-1	000.00E00	346.10E-2	000.00E00	-346.10E-2	-244.76E-1	000.00E00	-288.92E-1	000.00E00
3	141.85E00	000.00E00	301.62E-2	000.00E00	-301.62E-2	-154.51E-1	000.00E00	-310.59E-1	000.00E00
4	109.04E00	000.00E00	446.77E-2	000.00E00	-446.77E-2	-288.94E-1	000.00E00	-399.98E-1	000.00E00
5	115.84E00	000.00E00	122.56E-2	000.00E00	-122.56E-2	-628.66E-2	000.00E00	-126.12E-1	000.00E00
6	896.08E-1	000.00E00	313.00E-2	000.00E00	-313.00E-2	-220.48E-1	000.00E00	-262.17E-1	000.00E00
7	150.71E00	000.00E00	271.67E-2	000.00E00	-271.67E-2	-139.21E-1	000.00E00	-279.71E-1	000.00E00
8	115.66E00	000.00E00	424.40E-2	000.00E00	-424.40E-2	-277.51E-1	000.00E00	-376.91E-1	000.00E00

COLUMN 8

	AXIAL	SHEARS				MOMENTS			
COMB.	Pu	Viy	Viz	Vjy	Vjz	Miy	Miz	Mjy	Mjz
1	530.10E-1	000.00E00	545.98E-2	000.00E00	-545.98E-2	-317.76E-1	000.00E00	-337.42E-1	000.00E00
2	347.60E-1	000.00E00	470.06E-2	000.00E00	-470.06E-2	-272.88E-1	000.00E00	-291.19E-1	000.00E00
3	519.38E-1	000.00E00	800.34E-2	000.00E00	-800.34E-2	-542.76E-1	000.00E00	-417.65E-1	000.00E00
4	395.64E-1	000.00E00	705.59E-2	000.00E00	-705.59E-2	-467.54E-1	000.00E00	-379.18E-1	000.00E00
5	672.24E-1	000.00E00	606.58E-2	000.00E00	-606.58E-2	-316.71E-1	000.00E00	-411.19E-1	000.00E00
6	509.84E-1	000.00E00	560.84E-2	000.00E00	-560.84E-2	-298.66E-1	000.00E00	-374.35E-1	000.00E00
7	661.52E-1	000.00E00	860.95E-2	000.00E00	-860.95E-2	-541.72E-1	000.00E00	-491.42E-1	000.00E00
8	501.83E-1	000.00E00	750.87E-2	000.00E00	-750.87E-2	-466.76E-1	000.00E00	-434.29E-1	000.00E00

```
LOAD "BWMAG:CS80,7"
RUN
ARE FRAME FILES USED? (1=YES,0=NO)
1
APPENDAGE NUMBER WHERE JOB DATA EXISTS?
11
EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM
MAGNIFICATION OF COLUMN MOMENTS.
EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM
MAGNIFICATION COMPLETE
```

```
LOAD "BWOUT2:CS80,7"
RUN
ARE FRAME FILES USED?(1=YES,0=NO)
1
APPENDAGE NUMBER WHERE DATA EXISTS?
11
EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM
OUTPUT LENGTH UNITS?(0=Inch,1=Feet)
1
OUTPUT FORCE UNITS?(0=Inch,1=Kips)
1
UNITS ARE Feet AND Kips
IS THIS CORRECT?(1=YES,0=NO)
1
WANT OUTPUT FOR INTERMEDIATE VALUES?(1=YES,0=NO)
1
WANT OUTPUT FOR MAGNIFIED MOMENTS?(1=YES,0=NO)
1
BEGINNING PAGE NUMBER?
7
IS HIGH SPEED PRINTER TURNED ON?(1=YES,0=NO)
1
OUTPUT COMPLETE
EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM
```

EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM

MAG.VALUES UNITS Feet Kips

COLUMN 1

COMB	Bdy	Bdz	Cmy	Cmz	Pcy	Pcz	Pcys	Pczs	Klr	Dby	Dbz	Dsy	Dsz
1	1.00	0.00	.40	1.00	420.33E00	840.66E00	000.00E00	000.00E00	S1 S1	1.00	1.22	1.00	1.00
2	.69	0.00	.40	1.00	496.21E00	840.66E00	583.79E00	000.00E00	S1 S1	1.00	1.13	1.15	1.00
3	.51	0.00	.40	1.00	558.43E00	840.66E00	000.00E00	000.00E00	S1 S1	1.00	1.32	1.00	1.00
4	1.84	0.00	.40	1.00	296.25E00	840.66E00	583.79E00	000.00E00	S1 S1	1.00	1.21	1.23	1.00
5	1.25	0.00	.40	1.00	374.38E00	840.66E00	000.00E00	000.00E00	S1 S1	1.00	1.25	1.00	1.00
6	.93	0.00	.40	1.00	436.48E00	840.66E00	583.79E00	000.00E00	S1 S1	1.00	1.17	1.21	1.00
7	.56	0.00	.40	1.00	538.44E00	840.66E00	000.00E00	000.00E00	S1 S1	1.00	1.34	1.00	1.00
8	1.68	0.00	.40	1.00	313.78E00	840.66E00	583.79E00	000.00E00	S1 S1	1.00	1.23	1.27	1.00

COLUMN 2

COMB	Bdy	Bdz	Cmy	Cmz	Pcy	Pcz	Pcys	Pczs	Klr	Dby	Dbz	Dsy	Dsz
1	1.00	0.00	.40	1.00	808.87E00	161.77E01	000.00E00	000.00E00	S1 S1	1.00	1.05	1.00	1.00
2	1.52	0.00	.40	1.00	643.17E00	161.77E01	112.34E01	000.00E00	S1 S1	1.00	1.03	1.15	1.00
3	.62	0.00	.40	1.00	997.67E00	161.77E01	000.00E00	000.00E00	S1 S1	1.00	1.05	1.00	1.00
4	.73	0.00	.40	1.00	934.23E00	161.77E01	112.34E01	000.00E00	S1 S1	1.00	1.04	1.23	1.00
5	.82	0.00	.40	1.00	888.57E00	161.77E01	000.00E00	000.00E00	S1 S1	1.00	1.06	1.00	1.00
6	1.04	0.00	.40	1.00	791.54E00	161.77E01	112.34E01	000.00E00	S1 S1	1.00	1.05	1.21	1.00
7	.62	0.00	.40	1.00	996.87E00	161.77E01	000.00E00	000.00E00	S1 S1	1.00	1.06	1.00	1.00
8	.73	0.00	.40	1.00	933.27E00	161.77E01	112.34E01	000.00E00	S1 S1	1.00	1.05	1.27	1.00

COLUMN 3

COMB	Bdy	Bdz	Cmy	Cmz	Pcy	Pcz	Pcys	Pczs	Klr	Dby	Dbz	Dsy	Dsz
1	1.00	0.00	.40	1.00	131.52E01	263.04E01	000.00E00	000.00E00	S1 S1	1.00	1.15	1.00	1.00
2	.10	0.00	.40	1.00	239.85E01	263.04E01	182.67E01	000.00E00	S1 S1	1.00	1.09	1.15	1.00
3	.28	0.00	.40	1.00	204.90E01	263.04E01	000.00E00	000.00E00	S1 S1	1.00	1.18	1.00	1.00
4	.10	0.00	.40	1.00	240.20E01	263.04E01	182.67E01	000.00E00	S1 S1	1.00	1.13	1.23	1.00
5	1.15	0.00	.40	1.00	122.42E01	263.04E01	000.00E00	000.00E00	S1 S1	1.00	1.18	1.00	1.00
6	.14	0.00	.40	1.00	230.54E01	263.04E01	182.67E01	000.00E00	S1 S1	1.00	1.13	1.21	1.00
7	.60	0.00	.40	1.00	163.93E01	263.04E01	000.00E00	000.00E00	S1 S1	1.00	1.21	1.00	1.00
8	.12	0.00	.40	1.00	235.80E01	263.04E01	182.67E01	000.00E00	S1 S1	1.00	1.15	1.27	1.00

COLUMN 4

COMB	Bdy	Bdz	Cmy	Cmz	Pcy	Pcz	Pcys	Pczs	Klr	Dby	Dbz	Dsy	Dsz
1	1.00	0.00	.40	0.00	253.10E01	000.00E00	000.00E00	000.00E00	S1 Sh	1.00	1.00	1.00	1.00
2	.43	0.00	.40	0.00	352.99E01	000.00E00	351.52E01	000.00E00	S1 Sh	1.00	1.00	1.15	1.00
3	.38	0.00	.42	0.00	366.46E01	000.00E00	000.00E00	000.00E00	S1 Sh	1.00	1.00	1.00	1.00
4	.29	0.00	.42	0.00	391.63E01	000.00E00	351.52E01	000.00E00	S1 Sh	1.00	1.00	1.23	1.00
5	.84	0.00	.68	0.00	274.77E01	000.00E00	000.00E00	000.00E00	S1 Sh	1.00	1.00	1.00	1.00
6	.46	0.00	.68	0.00	347.13E01	000.00E00	351.52E01	000.00E00	S1 Sh	1.00	1.00	1.21	1.00
7	.67	0.00	.40	0.00	303.72E01	000.00E00	000.00E00	000.00E00	S1 Sh	1.00	1.00	1.00	1.00
8	.42	0.00	.40	0.00	356.70E01	000.00E00	351.52E01	000.00E00	S1 Sh	1.00	1.00	1.27	1.00

EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM

MAG.VALUES UNITS Feet Kips

COLUMN 5

COMB	Bdy	Bdz	Cmy	Cmz	Pcy	Pcz	Pcys	Pczs	Klr	Dby	Dbz	Dsy	Dsz
1	1.00	0.00	.40	1.00	131.52E01	263.04E01	000.00E00	000.00E00	Sl Sl	1.00	1.15	1.00	1.00
2	.11	0.00	.40	1.00	237.56E01	263.04E01	182.67E01	000.00E00	Sl Sl	1.00	1.09	1.15	1.00
3	.28	0.00	.40	1.00	204.86E01	263.04E01	000.00E00	000.00E00	Sl Sl	1.00	1.18	1.00	1.00
4	.17	0.00	.40	1.00	224.14E01	263.04E01	182.67E01	000.00E00	Sl Sl	1.00	1.13	1.23	1.00
5	1.15	0.00	.40	1.00	122.18E01	263.04E01	000.00E00	000.00E00	Sl Sl	1.00	1.18	1.00	1.00
6	.13	0.00	.40	1.00	233.56E01	263.04E01	182.67E01	000.00E00	Sl Sl	1.00	1.13	1.21	1.00
7	.60	0.00	.40	1.00	163.93E01	263.04E01	000.00E00	000.00E00	Sl Sl	1.00	1.21	1.00	1.00
8	.15	0.00	.40	1.00	228.80E01	263.04E01	182.67E01	000.00E00	Sl Sl	1.00	1.15	1.27	1.00

COLUMN 6

COMB	Bdy	Bdz	Cmy	Cmz	Pcy	Pcz	Pcys	Pczs	Klr	Dby	Dbz	Dsy	Dsz
1	1.00	0.00	.40	0.00	253.10E01	000.00E00	000.00E00	000.00E00	Sl Sh	1.00	1.00	1.00	1.00
2	3.25	0.00	.40	0.00	119.05E01	000.00E00	351.52E01	000.00E00	Sl Sh	1.00	1.00	1.15	1.00
3	.38	0.00	.42	0.00	366.45E01	000.00E00	000.00E00	000.00E00	Sl Sh	1.00	1.00	1.00	1.00
4	.55	0.00	.42	0.00	326.05E01	000.00E00	351.52E01	000.00E00	Sl Sh	1.00	1.00	1.23	1.00
5	.84	0.00	.68	0.00	274.75E01	000.00E00	000.00E00	000.00E00	Sl Sh	1.00	1.00	1.00	1.00
6	.96	0.00	.68	0.00	258.18E01	000.00E00	351.52E01	000.00E00	Sl Sh	1.00	1.00	1.21	1.00
7	.67	0.00	.40	0.00	303.75E01	000.00E00	000.00E00	000.00E00	Sl Sh	1.00	1.00	1.00	1.00
8	1.44	0.00	.40	0.00	207.10E01	000.00E00	351.52E01	000.00E00	Sl Sh	1.00	1.00	1.27	1.00

COLUMN 7

COMB	Bdy	Bdz	Cmy	Cmz	Pcy	Pcz	Pcys	Pczs	Klr	Dby	Dbz	Dsy	Dsz
1	1.00	0.00	.40	1.00	420.33E00	840.66E00	000.00E00	000.00E00	Sl Sl	1.00	1.22	1.00	1.00
2	.35	0.00	.40	1.00	623.02E00	840.66E00	583.79E00	000.00E00	Sl Sl	1.00	1.14	1.15	1.00
3	.51	0.00	.40	1.00	558.40E00	840.66E00	000.00E00	000.00E00	Sl Sl	1.00	1.32	1.00	1.00
4	.29	0.00	.40	1.00	649.46E00	840.66E00	583.79E00	000.00E00	Sl Sl	1.00	1.23	1.23	1.00
5	1.24	0.00	.40	1.00	374.48E00	840.66E00	000.00E00	000.00E00	Sl Sl	1.00	1.25	1.00	1.00
6	.45	0.00	.40	1.00	580.11E00	840.66E00	583.79E00	000.00E00	Sl Sl	1.00	1.18	1.21	1.00
7	.56	0.00	.40	1.00	538.43E00	840.66E00	000.00E00	000.00E00	Sl Sl	1.00	1.34	1.00	1.00
8	.31	0.00	.40	1.00	640.55E00	840.66E00	583.79E00	000.00E00	Sl Sl	1.00	1.24	1.27	1.00

COLUMN 8

COMB	Bdy	Bdz	Cmy	Cmz	Pcy	Pcz	Pcys	Pczs	Klr	Dby	Dbz	Dsy	Dsz
1	1.00	0.00	.40	1.00	808.87E00	161.77E01	000.00E00	000.00E00	Sl Sl	1.00	1.05	1.00	1.00
2	.74	0.00	.40	1.00	927.13E00	161.77E01	112.34E01	000.00E00	Sl Sl	1.00	1.03	1.15	1.00
3	.62	0.00	.40	1.00	997.58E00	161.77E01	000.00E00	000.00E00	Sl Sl	1.00	1.05	1.00	1.00
4	.54	0.00	.40	1.00	104.96E01	161.77E01	112.34E01	000.00E00	Sl Sl	1.00	1.04	1.23	1.00
5	.82	0.00	.40	1.00	888.58E00	161.77E01	000.00E00	000.00E00	Sl Sl	1.00	1.06	1.00	1.00
6	.68	0.00	.40	1.00	965.24E00	161.77E01	112.34E01	000.00E00	Sl Sl	1.00	1.05	1.21	1.00
7	.62	0.00	.40	1.00	996.85E00	161.77E01	000.00E00	000.00E00	Sl Sl	1.00	1.06	1.00	1.00
8	.54	0.00	.40	1.00	104.90E01	161.77E01	112.34E01	000.00E00	Sl Sl	1.00	1.05	1.27	1.00

COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM

MAG.VALUES UNITS Feet Kips

FLOOR 1

COMB.	SUM Puy	SUM Puz	SUM Pcsy	SUM Pcsz
2	443.88E00	000.00E00	482.09E01	000.00E00
4	632.39E00	000.00E00	482.09E01	000.00E00
6	592.50E00	000.00E00	482.09E01	000.00E00
8	707.03E00	000.00E00	482.09E01	000.00E00

FLOOR 2

COMB.	SUM Puy	SUM Puz	SUM Pcsy	SUM Pcsz
2	223.56E00	000.00E00	927.73E01	000.00E00
4	283.68E00	000.00E00	927.73E01	000.00E00
6	306.54E00	000.00E00	927.73E01	000.00E00
8	329.40E00	000.00E00	927.73E01	000.00E00

MAGNIFIED MOMENTS UNITS Feet Kips

COLUMN 1

COMB.	Miy	Miz	Mjy	Mjz	Mey	Mez
1	781.35E-2	000.00E00	157.03E-1	000.00E00	856.73E-2	104.73E-1
2	-175.06E-1	000.00E00	-116.83E-1	000.00E00	522.28E-2	595.31E-2
3	154.49E-1	000.00E00	310.72E-1	000.00E00	113.61E-1	149.76E-1
4	-988.66E-2	000.00E00	252.32E-2	000.00E00	824.18E-2	101.13E-1
5	627.79E-2	000.00E00	126.08E-1	000.00E00	927.75E-2	115.55E-1
6	-164.31E-1	000.00E00	-109.73E-1	000.00E00	668.88E-2	789.71E-2
7	139.14E-1	000.00E00	279.77E-1	000.00E00	120.72E-1	162.35E-1
8	-116.34E-1	000.00E00	-368.83E-3	000.00E00	876.47E-2	109.09E-1

COLUMN 2

COMB.	Miy	Miz	Mjy	Mjz	Mey	Mez
1	317.74E-1	000.00E00	337.41E-1	000.00E00	424.55E-2	445.42E-2
2	125.93E-1	000.00E00	131.97E-1	000.00E00	266.68E-2	275.80E-2
3	542.87E-1	000.00E00	417.61E-1	000.00E00	415.96E-2	435.97E-2
4	331.90E-1	000.00E00	232.10E-1	000.00E00	306.05E-2	318.11E-2
5	316.62E-1	000.00E00	411.16E-1	000.00E00	538.43E-2	572.46E-2
6	163.95E-1	000.00E00	228.44E-1	000.00E00	397.63E-2	417.23E-2
7	541.74E-1	000.00E00	491.36E-1	000.00E00	529.84E-2	562.76E-2
8	328.97E-1	000.00E00	284.94E-1	000.00E00	390.96E-2	410.21E-2

COLUMN 3

COMB.	Miy	Miz	Mjy	Mjz	Mey	Mez
1	-462.65E-2	000.00E00	-935.84E-2	000.00E00	214.15E-1	245.97E-1
2	-711.89E-1	000.00E00	-695.41E-1	000.00E00	136.61E-1	149.15E-1
3	-163.03E-1	000.00E00	-329.83E-1	000.00E00	251.67E-1	296.80E-1
4	-771.44E-1	000.00E00	-851.53E-1	000.00E00	187.64E-1	211.98E-1
5	402.20E-2	000.00E00	814.71E-2	000.00E00	251.10E-1	296.00E-1
6	-610.28E-1	000.00E00	-535.59E-1	000.00E00	187.23E-1	211.43E-1
7	-765.42E-2	000.00E00	-154.78E-1	000.00E00	288.62E-1	349.57E-1
8	-725.00E-1	000.00E00	-737.68E-1	000.00E00	215.22E-1	247.79E-1

COLUMN 4

COMB.	Miy	Miz	Mjy	Mjz	Mey	Mez
1	-205.16E-1	000.00E00	-232.56E-1	000.00E00	108.64E-1	000.00E00
2	-312.81E-1	000.00E00	-374.01E-1	000.00E00	696.25E-2	000.00E00
3	-609.92E-1	000.00E00	-280.09E-1	000.00E00	123.37E-1	000.00E00
4	-628.51E-1	000.00E00	-423.69E-1	000.00E00	922.79E-2	000.00E00
5	559.04E-2	000.00E00	-276.12E-1	000.00E00	123.35E-1	000.00E00
6	-128.63E-1	000.00E00	-417.65E-1	000.00E00	922.67E-2	000.00E00
7	-348.86E-1	000.00E00	-323.64E-1	000.00E00	138.08E-1	000.00E00
8	-438.30E-1	000.00E00	-462.21E-1	000.00E00	103.26E-1	000.00E00

MAGNIFIED MOMENTS UNITS Feet Kips

COLUMN 5

COMB.	Miy	Miz	Mjy	Mjz	Mey	Mez
1	461.57E-2	000.00E00	936.96E-2	000.00E00	214.15E-1	245.97E-1
2	-651.10E-1	000.00E00	-573.68E-1	000.00E00	138.72E-1	151.16E-1
3	162.85E-1	000.00E00	329.94E-1	000.00E00	251.70E-1	296.84E-1
4	-526.41E-1	000.00E00	-356.82E-1	000.00E00	189.67E-1	213.87E-1
5	-403.31E-2	000.00E00	-812.70E-2	000.00E00	251.07E-1	295.95E-1
6	-668.90E-1	000.00E00	-655.36E-1	000.00E00	189.18E-1	213.26E-1
7	763.58E-2	000.00E00	154.97E-1	000.00E00	288.62E-1	349.57E-1
8	-609.16E-1	000.00E00	-504.42E-1	000.00E00	217.28E-1	249.70E-1

COLUMN 6

COMB.	Miy	Miz	Mjy	Mjz	Mey	Mez
1	205.16E-1	000.00E00	232.58E-1	000.00E00	108.64E-1	000.00E00
2	-497.26E-2	000.00E00	-755.86E-2	000.00E00	700.46E-2	000.00E00
3	609.91E-1	000.00E00	280.04E-1	000.00E00	123.34E-1	000.00E00
4	283.31E-1	000.00E00	-444.35E-3	000.00E00	926.64E-2	000.00E00
5	-557.74E-2	000.00E00	276.11E-1	000.00E00	123.37E-1	000.00E00
6	-211.51E-1	000.00E00	-430.75E-3	000.00E00	926.78E-2	000.00E00
7	348.97E-1	000.00E00	323.56E-1	000.00E00	138.08E-1	000.00E00
8	835.39E-2	000.00E00	220.75E-2	000.00E00	103.67E-1	000.00E00

COLUMN 7

COMB.	Miy	Miz	Mjy	Mjz	Mey	Mez
1	-781.71E-2	000.00E00	-157.00E-1	000.00E00	855.82E-2	104.60E-1
2	-274.22E-1	000.00E00	-317.40E-1	000.00E00	578.64E-2	651.42E-2
3	-154.51E-1	000.00E00	-310.59E-1	000.00E00	113.48E-1	149.52E-1
4	-328.91E-1	000.00E00	-438.60E-1	000.00E00	877.38E-2	106.57E-1
5	-628.66E-2	000.00E00	-126.12E-1	000.00E00	926.72E-2	115.39E-1
6	-257.38E-1	000.00E00	-297.83E-1	000.00E00	721.55E-2	841.67E-2
7	-139.21E-1	000.00E00	-279.71E-1	000.00E00	120.57E-1	162.08E-1
8	-323.44E-1	000.00E00	-421.30E-1	000.00E00	931.11E-2	114.62E-1

COLUMN 8

COMB.	Miy	Miz	Mjy	Mjz	Mey	Mez
1	-317.76E-1	000.00E00	-337.42E-1	000.00E00	424.08E-2	444.90E-2
2	-283.27E-1	000.00E00	-302.44E-1	000.00E00	278.90E-2	286.71E-2
3	-542.76E-1	000.00E00	-417.65E-1	000.00E00	415.50E-2	435.47E-2
4	-481.63E-1	000.00E00	-394.44E-1	000.00E00	317.63E-2	327.79E-2
5	-316.71E-1	000.00E00	-411.19E-1	000.00E00	537.79E-2	571.73E-2
6	-311.68E-1	000.00E00	-388.44E-1	000.00E00	408.91E-2	426.87E-2
7	-541.72E-1	000.00E00	-491.42E-1	000.00E00	529.22E-2	562.05E-2
8	-482.96E-1	000.00E00	-451.83E-1	000.00E00	402.75E-2	419.85E-2

```
UNITS ARE Feet AND Kips
OUTPUT COMPLETE
LOAD "BWCOL:CS80,7"
RUN
ARE FRAME FILES USED?(1=YES,0=NO)
1
APPENDAGE NUMBER WHERE JOB DATA EXISTS?
11
EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM
COLUMN NUMBER TO BE DESIGNED?(0=FINISHED)
1
DESIGN OF COLUMN NUMBER  1   12 X 12
MAXIMUM AXIAL LOAD AND CORRESPONDING MOMENTS
   Pmax         Muy          Muz
150.90E00  279.77E-1  162.35E-1

MAXIMUM MOMENT ABOUT Y AND CORRESPONDING AXIAL LOAD AND MOMENT ABOUT Z-AXIS.
   Pult        Mymax         Muz
142.02E00  310.72E-1  149.76E-1

MAXIMUM MOMENT ABOUT Z AND CORRESPONDING AXIAL LOAD AND MOMENT ABOPUT Y.
   Pult         Muy          Mzmax
150.90E00  279.77E-1  162.35E-1
COLUMN  Fy  (Psi)
60000
CORNER BAR SIZE# (example 11)
6
# ADDITIONAL BARS & BAR SIZE # IN THE Z FACE (BOT OR TOP)
0,6
# ADDITIONAL BARS & BAR SIZE # IN THE Y FACE (L OR R SIDE)
0,6
COLUMN NUMBER   1              12.00X12.00
LONGITUDINAL REINFORCING         Fy= 60000
=========================================
           CORNER BARS  4-# 6    .44 SqIn.
ADDITIONAL Y-FACE BARS  0-# 6    .44 SqIn.
ADDITIONAL Z-FACE BARS  0-# 6    .44 SqIn.
=========================================
                        4       1.76 SqIn.
                                Rho=.0122

TRANSVERSE REINFORCING           Fy= 40000
=========================================
# 3 @ 12 In oc
CLEAR COVER 1.5 In.
=========================================
IS ALL THIS DATA OK >>>>========>
1
```

```
COLUMN NUMBER   1              12.00X12.00
LONGITUDINAL REINFORCING         Fy= 60000
=========================================
           CORNER BARS   4-# 6    .44 SqIn.
ADDITIONAL Y-FACE BARS   0-# 6    .44 SqIn.
ADDITIONAL Z-FACE BARS   0-# 6    .44 SqIn.
=========================================
Isey=   24.75            4       1.76 SqIn.
Isez=   24.75                   Rho=.0122

TRANSVERSE REINFORCING           Fy= 40000
=========================================
# 3 @ 12 In oc
CLEAR COVER 1.5 In.
=========================================
WANT HARDCOPY OF THIS?(1=YES,0=NO)
0
READY FOR ANOTHER COLUMN?(1=YES,0=NO)
1
COLUMN NUMBER TO BE DESIGNED?(0=FINISHED)
2
COLUMN  Fy  (Psi)
60000
CORNER BAR SIZE# (example 11)
6
# ADDITIONAL BARS & BAR SIZE # IN THE Z FACE (BOT OR TOP)
0,6
# ADDITIONAL BARS & BAR SIZE # IN THE Y FACE (L OR R SIDE)
0,6
IS ALL THIS DATA OK >>>>========>
1
WOULD YOU LIKE TO ABANDON THIS COLUMN?
0
COLUMN  Fy  (Psi)
60000
CORNER BAR SIZE# (example 11)
6
# ADDITIONAL BARS & BAR SIZE # IN THE Z FACE (BOT OR TOP)
0,6
# ADDITIONAL BARS & BAR SIZE # IN THE Y FACE (L OR R SIDE)
0,6
IS ALL THIS DATA OK >>>>========>
0
COLUMN  Fy  (Psi)
EDIT
CONT
CONT NOT ALLOWED WHILE WAITING FOR INPUT
60000
CORNER BAR SIZE# (example 11)
6
# ADDITIONAL BARS & BAR SIZE # IN THE Z FACE (BOT OR TOP)
2,6
# ADDITIONAL BARS & BAR SIZE # IN THE Y FACE (L OR R SIDE)
0,6
IS ALL THIS DATA OK >>>>========>
1
```

```
COLUMN NUMBER   2              12.00X12.00
LONGITUDINAL REINFORCING         Fy= 60000
=========================================
           CORNER BARS   4-# 6    .44 SqIn.
ADDITIONAL Y-FACE BARS   2-# 6    .44 SqIn.
ADDITIONAL Z-FACE BARS   0-# 6    .44 SqIn.
=========================================
Isey=   49.50            8       3.52 SqIn.
Isez=   27.50                   Rho=.0244

TRANSVERSE REINFORCING           Fy= 40000
=========================================
# 3 @ 12 In oc
CLEAR COVER 1.5 In.
=========================================
WANT HARDCOPY OF THIS?(1=YES,0=NO)
0
READY FOR ANOTHER COLUMN?(1=YES,0=NO)
1
COLUMN NUMBER TO BE DESIGNED?(0=FINISHED)
3
COLUMN  Fy  (Psi)
60000
CORNER BAR SIZE# (example 11)
8
# ADDITIONAL BARS & BAR SIZE # IN THE Z FACE (BOT OR TOP)
0,8
# ADDITIONAL BARS & BAR SIZE # IN THE Y FACE (L OR R SIDE)
0,8
IS ALL THIS DATA OK >>>>========>
1
```

```
COLUMN NUMBER   3                15.96X15.96
LONGITUDINAL REINFORCING           Fy= 60000
=========================================
           CORNER BARS   4-# 8    .79 SqIn.
ADDITIONAL Y-FACE BARS   0-# 8    .79 SqIn.
ADDITIONAL Z-FACE BARS   0-# 8    .79 SqIn.
=========================================
Isey=    99.27            4       3.16 SqIn.
Isez=    99.27                   Rho=.0124

TRANSVERSE REINFORCING             Fy= 40000
=========================================
# 3 @ 15.96 In oc
CLEAR COVER 1.5 In.
=========================================
WANT HARDCOPY OF THIS?(1=TES,0=NO)
0
READY FOR ANOTHER COLUMN?(1=YES,0=NO)
1
COLUMN NUMBER TO BE DESIGNED?(0=FINISHED)
4
COLUMN  Fy  (Psi)
60000
CORNER BAR SIZE# (example 11)
8
# ADDITIONAL BARS & BAR SIZE # IN THE Z FACE (BOT OR TOP)
0,8
# ADDITIONAL BARS & BAR SIZE # IN THE Y FACE (L OR R SIDE)
0,8
IS ALL THIS DATA OK >>>>========>
1
```

```
COLUMN NUMBER   4                15.96X15.96
LONGITUDINAL REINFORCING           Fy= 60000
=========================================
          CORNER BARS   4-# 8    .79 SqIn.
ADDITIONAL Y-FACE BARS  0-# 8    .79 SqIn.
ADDITIONAL Z-FACE BARS  0-# 8    .79 SqIn.
=========================================
Isey=   99.27            4       3.16 SqIn.
Isez=   99.27                   Rho=.0124

TRANSVERSE REINFORCING             Fy= 40000
=========================================
# 3 @ 15.96 In oc
CLEAR COVER 1.5 In.
=========================================
WANT HARDCOPY OF THIS?(1=TES,0=NO)
0
READY FOR ANOTHER COLUMN?(1=YES,0=NO)
0
```

```
LOAD "BWOUT3:CS80,7"
RUN
ARE FRAME FILES USED?(1=YES,0=NO)
1
```

```
APPENDAGE NUMBER WHERE DATA EXISTS?
11
EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM
OUTPUT LENGTH UNITS DESIRED?(0=Inches,1=Feet)
1
OUTPUT FORCE UNITS DESIRED?(0=Lbs.,1=Kips)
1




UNITS ARE Feet AND Kips
IS THIS CORRECT?(1=YES,0=NO)
1
BEGINNING PAGE NUMBER?
12
IS HIGH SPEED PRINTER TURNED ON?(1=YES,0=NO)
1
```

```
EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM
LIST COLUMNS FOR WHICH OUTPUT IS DESIRED?(0=FINISHED)
1-8
LIST COLUMNS FOR WHICH OUTPUT IS DESIRED?(0=FINISHED)
0
OUTPUT COMPLETE
```

EXAMPLE
COLUMN FORCES AND MOMENTS FROM FRAME PROGRAM

FINAL COLUMN DESIGNS. UNITS Feet Kips

```
COLUMN NUMBER   1                1.00X 1.00
LONGITUDINAL REINFORCING          Fy= 60000
=========================================
           CORNER BARS  4-# 6
ADDITIONAL Y-FACE BARS  0-# 6    .44 SqIn.
ADDITIONAL Z-FACE BARS  0-# 6    .44 SqIn.
=========================================
Isey=   24.75            4       1.76 SqIn.
Isez=   24.75                    Rho=.0122

TRANSVERSE REINFORCING             Fy=40000
=========================================
# 3 @ 12 In oc
CLEAR COVER 1.5 In
=========================================

COLUMN NUMBER   2                1.00X 1.00
LONGITUDINAL REINFORCING          Fy= 60000
=========================================
           CORNER BARS  4-# 6
ADDITIONAL Y-FACE BARS  2-# 6    .44 SqIn.
ADDITIONAL Z-FACE BARS  0-# 6    .44 SqIn.
=========================================
Isey=   49.50            8       3.52 SqIn.
Isez=   27.50                    Rho=.0244

TRANSVERSE REINFORCING             Fy=40000
=========================================
# 3 @ 12 In oc
CLEAR COVER 1.5 In
=========================================

COLUMN NUMBER   3                1.33X 1.33
LONGITUDINAL REINFORCING          Fy= 60000
=========================================
           CORNER BARS  4-# 8
ADDITIONAL Y-FACE BARS  0-# 8    .79 SqIn.
ADDITIONAL Z-FACE BARS  0-# 8    .79 SqIn.
=========================================
Isey=   99.27            4       3.16 SqIn.
Isez=   99.27                    Rho=.0124

TRANSVERSE REINFORCING             Fy=40000
=========================================
# 3 @ 15.96 In oc
CLEAR COVER 1.5 In
=========================================
```

EXAMPLE
COLUMN FORCES AND MOMENTS FROM FINAL PROGRAM

FINAL COLUMN DESIGNS. UNITS Feet Kips

COLUMN NUMBER 4 1.33% 1.33
COLUMN NOT DESIGNED YET.

COLUMN NUMBER 5 1.33% 1.33
COLUMN NOT DESIGNED YET.

COLUMN NUMBER 6 1.33% 1.33
COLUMN NOT DESIGNED YET.

COLUMN NUMBER 7 1.00% 1.00
COLUMN NOT DESIGNED YET.

COLUMN NUMBER 8 1.00% 1.00
COLUMN NOT DESIGNED YET.

APPENDIX B

File Descriptions

TEMP (1 Record) Real

Job data

Created in the Input Program. Used in all programs

Serial

Temp (9), Title$, Comment$

- Temp (1) Input length units code (U1; 1=feet, 0=inch)
- Temp (2) Input force units code (U2; 1=kips, 0=lbs.)
- Temp (3) Changes mode code (Ch; 1=changes, 0=no changes)
- Temp (4) Number of load cases (Nlc)
- Temp (5) Number of columns (Sum)
- Temp (6) Number of floors (Flr)
- Temp (7) Floor number corresponding to roof (Rn)
- Temp (8) Number of load combinations (Nlco)
- Temp (9) Frame files (Ff; 1=used, 0=not used)

Title$ (69) Job title, input or read from frame files.

Comment$ (69) Comments, input or read from frame files.

NCOL (Flr, Sum x (2)) Integer

Contains relationship of columns to floors.

Created in the Input Program and used in the program for moment magnification.

Serial

Ncol (Flr, Sum)

1=Column in floor

2=Column not in floor

CINC (Sum, 4) Integer

Contains relationship of column to frame members.

Created in the Input Program and used in the Combinations Program.

Serial

Col (Sum, 2)

- I-end member, j-end member

COLP (Sum, 17 x (8)) Real

Column dimensions and properties.

Created in the Input Program and used in programs for magnification and design.

Serial

Cor (Sum, 17)

- Cor (1) - width (z-face)
- Cor (2) - depth (y-face)
- Cor (3) Ly
- Cor (4) Lz
- Cor (5) Ky
- Cor (6) Kz
- Cor (7) Igy
- Cor (8) Igz
- Cor (9) F'c
- Cor (10) Ec
- Cor (11) Isey
- Cor (12) Isez
- Cor (13) 1=braced, 0=unbraced (in z-direction)
- Cor (14) 1=braced, 0=unbraced (in y-direction)
- Cor (15)
- Cor (16) ry
- Cor (17) rz

LRED (Sum, 4) Short

Live load reduction factors

Created in the Input Program and used in the Combinations Program.

Serial

Llr (Sum)

FEMP (Sum, 96 x Nlc) Real

End forces and moments input by user

Created in the Input Program and used in the Combinations Program.

Random

Fepm (12, Nlc)

LCTC (Number of load cases, (2) x Nlco) Integer

Load cases to be combined for each combination.

Created in the Input Program. Used in the Combinations Program.

Serial

A (Nlc, Nlco)

1=load case included in combination

0=load case not included

MODP (Sum, Nlc x Nlco x (8)) Real

Modification factors for axial forces

Created in the Input Program and used in the Combinations Program.

Serial

Pa (Sum, Nlc, Nlco)

MODM (Sum, Nlc x Nlco x (8)) Real

Modification factors for moments

Created in the Input Program and used in the Combinations Program

Serial

Pm (Sum, Nlc, Nlco)

LFAC (Nlc, Nlco x (4)) Short

Load factors

Created in the Input Program and used in the Combinations Program.

Serial

Fc (Nlc, Nlco)

LOCO (Nlc, (2) x Nlco) Integer

Load tupe code

Created in the Input Program. Used in the Combinations Program.

Serial

Lodcod (Nlc, Nlco)

1=dead

2=live

3=lateral

SWCD (Nlco,2) Integer

Direction of lateral loads

Created in the Input Program and used in the Magnification Program.

Serial

Scd (Nlco)

0=no lateral load

1=z-direction

2=y-direction

COMA (Sum, Nlco x 24) Real

Combined axial loads

Created in the Combinations program and used in the Magnification and Check Programs.

Serial

Coma (Sum, 3, Nlco)

- Coma (1) axial force due to gravity load
- Coma (2) axial force due to lateral loads
- Coma (3) total axial force

COMD (Sum, Nlco x 48) Real

Moments due to dead loads

Created in the Combinations Program and used in the Magnification Program.

Serial

Comlod (Sum, 6,Nlco)

- Comlod (1) Pix
- Comlod (2) Miy
- Comlod (3) Miz
- Comlod (4) Pjx
- Comlod (5) Mjy
- Comlod (6) Mjz

COMG (Sum, Nlco x (32)) Real

Moments due to gravity loads

Created in the Combinations Program and used in the Magnification Program.

Serial

Comg (Sum, 4, Nlco)

- Comg (1) Miy
- Comg (2) Miz
- Comg (3) Mjy
- Comg (4) Mjz

COML (Sum, Nlc x (48)) Real

Axial forces and moments due to lateral loads

Created in the Combinations Program and used in the Magnification Program.

Serial

Coml (Sum, 6, Nlco)

- Coml (1) Pix
- Coml (2) Miy
- Coml (3) Miz
- Coml (4) Pjx
- Coml (5) Mjy
- Coml (6) Mjz

COTM (Sum, Nlco x (32)) Real

Total combined moments

Created in the Combinations Program.

Serial

Ct (Sum, 4, Nlco)

- Ct (1) Miy
- Ct (2) Miz
- Ct (3) Mjy
- Ct (4) Mjz

COMM (Sum, Nlco x (48)) Real

Magnified moments

Created in the Modification Porgram.

Serial

Ctm (Sum, 6, Nlco)

- Ctm (1) Miy
- Ctm (2) Miz
- Ctm (3) Mjy
- Ctm (4) Mjz
- Ctm (5) Mey
- Ctm (6) Mez

MGDT (Sum, Nlco x 144)

Intermediate magnification values

Created in the Magnification Program.

Serial

Md (Sum, 18, Nlco)

-Md (1) Bdy

-Md (2) Bdz

-Md (3) Cmy

-Md (4) Cmz

-Md (5) Eiy

-Md (6) Eiz

-Md (7) Eisy

-Md (8) Eisz

-Md (9) Pcy

-Md (10) Pcz

-Md (11) Pcsy

-Md (12) Pcsz

-Md (13) Kl/r(y) code 1=slender 0=short

-Md (14) Kl/r(z) code 1-slender 0=short

-Md (15) Dby

-Md (16) Dbz

+Md (17) Dsy

-Md (18) Dsz

SPCS (Flr, Nlco x (16)) Real

Sum of Pcrit for each floor. (sidesway case)

Created in the Magnification Program.

Serial

Spcs (Flr, 2, Nlco)

- Spcs (1) y-axis

- Spcs (2) z-axis

SUPU (Flr, Nlco x (16)) Real

Sum of axial forces for each floor

Created in the Magnification Program.

Serial

Spu (Flr, 2, Nlco)

- Spu (1) y-axis

- Spu (2) z-axis

DSGN (Sum,88) Real

Final design data

Created in the Check Program.

Random

Des (11)

- Des (1) corner bar size
- Des (2) number of
- Des (3) size of
- Des (4) number of
- Des (5) size of
- Des (6) total number of
- Des (7) Fy
- Des (8) 1=design computed 0=design not computed
- Des (9) tie size
- Des (10) tie spacing
- Des (11) clear cover