



บรรณานุกรม

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การผนวกรวม

ภาคผนวก ก

วิธีการป้อนข้อมูลและการแสดงตัวอย่างข้อมูล

### ก-1 ความนำ

โปรแกรมที่ใช้สำหรับวิเคราะห์โครงสร้าง ชนิดโครงข้อแข็งและผนังต้านแรงเฉือนนี้ เขียนขึ้นเพื่อใช้กับเครื่องไมโครคอมพิวเตอร์ IBM-PC โดยเขียนโปรแกรมเป็นภาษาเบสิก การนำโปรแกรมนี้ไปใช้กับเครื่องไมโครคอมพิวเตอร์ชนิดอื่น คำสั่งบางคำสั่งที่ใช้ในโปรแกรมอาจจะต้องเปลี่ยนแปลงให้เหมาะสมกับเครื่องชนิดนั้น ๆ รายละเอียดของโปรแกรมสามารถดูได้จากภาคผนวก ข

### ก-2 การป้อนข้อมูลและการบันทึกผล

ในการป้อนข้อมูล จะเป็นการตอบคำถามที่ปรากฏบนจอภาพของไมโครคอมพิวเตอร์ตามที่โปรแกรมคอมพิวเตอร์ถามและให้ผู้ใช้เป็นผู้ตอบโดยการกดทางแป้นพิมพ์ ข้อมูลต่าง ๆ ที่ผู้ใช้ป้อนเสร็จแล้ว สามารถที่จะบันทึกลงบนแผ่นจานแม่เหล็ก โดยที่ผู้ใช้จะเป็นผู้กำหนดชื่อของแฟ้มข้อมูล สำหรับปัญหาหนึ่ง ๆ นั้น จะมีแฟ้มข้อมูลทั้งหมด 2 แฟ้มข้อมูลด้วยกัน แฟ้มข้อมูลแรกเป็นชุดของข้อมูลที่ผู้ใช้เป็นผู้ป้อนเข้าไป อันได้แก่ ลักษณะและรูปทรงของโครงสร้าง ขนาดของชิ้นส่วนต่าง ๆ และขนาดของแรงกระทำ แฟ้มข้อมูลนี้จะมีต่อท้ายจากที่ผู้ใช้งานกำหนดเป็น .INP ส่วนแฟ้มข้อมูลหลังจะมีชื่อเหมือนกับแฟ้มข้อมูลแรก เนื่องจากเป็นข้อมูลของปัญหาเดียวกันเพียงแต่จะมีชื่อต่อท้ายเป็น .OUT แฟ้มข้อมูลนี้เป็นข้อมูลที่ได้จากการวิเคราะห์ หรือ ประมวลผลจากไมโครคอมพิวเตอร์แล้ว อันประกอบด้วยชุดของผลลัพธ์ต่าง ๆ ซึ่งจะบันทึกเป็นรูปแบบของรายงาน โดยที่ผู้ใช้สามารถจะนำไปพิมพ์ออกเครื่องพิมพ์ หรือให้แสดงผลบนจอภาพได้ตามต้องการ

### ก-3 ลำดับของการป้อนข้อมูล

การป้อนข้อมูลจะกระทำตามลำดับต่าง ๆ ดังต่อไปนี้

1. ป้อนข้อมูลเกี่ยวกับชื่อของงาน โดยมีความยาวไม่เกิน 25 ตัวอักษร (NAME\$)

2. บ่อนข้อมูลเกี่ยวกับคุณสมบัติทั่วไปของโครงข้อแข็ง
  - 2.1 จำนวนของชั้นทั้งหมด (NS)
  - 2.2 จำนวนของช่วงคานทั้งหมด โดยรวมคานเชื่อมด้วย (NB)
  - 2.3 โมดูลัสยืดหยุ่นของชิ้นส่วนย่อยในโครงข้อแข็ง (E)
  - 2.4 ตอบคำถามว่ายอมรับชุดข้อมูลนี้หรือไม่ โดยตอบ Y(es) หรือ N(o)
3. บ่อนข้อมูลชนิดของคานเชื่อว่าเป็นคานเชื่อมชนิดที่ 1, 2 หรือ 3 โดยที่
  - 3.1 คานเชื่อมชนิดที่ 1 เป็นจุดหมุนที่ปลายทั้งสอง
  - 3.2 คานเชื่อมชนิดที่ 2 เป็นจุดยึดแน่นที่ปลายทั้งสอง
  - 3.3 คานเชื่อมชนิดที่ 3 เป็นจุดยึดแน่นที่ปลายด้านโครงข้อแข็งและจุดหมุนที่ผนังด้านแรงเฉือน
4. บ่อนข้อมูลเกี่ยวกับความสูงของชั้น
  - 4.1 ความสูงของชั้นแต่ละชั้น (H(I))  
ข้อมูลชุดนี้จะมีจำนวนเท่ากับจำนวนชั้นของโครงสร้าง (NS)
  - 4.2 ตอบคำถามว่ายอมรับชุดข้อมูลชุดนี้หรือไม่ โดยตอบ Y(es) หรือ N(o)
5. บ่อนข้อมูลเกี่ยวกับความยาวของช่วงคาน
  - 5.1 ความยาวของช่วงคานแต่ละช่วง (L(J))  
จำนวนของข้อมูลชุดนี้จะเท่ากับจำนวนช่วงคานทั้งหมด (NB)
  - 5.2 ตอบคำถามว่ายอมรับชุดข้อมูลชุดนี้หรือไม่ โดยตอบ Y(es) หรือ N(o)
6. บ่อนข้อมูลเกี่ยวกับโมเมนต์อินเนอร์เซียของเสา

### 6.1 โมเมนต์อินเนอร์เซียของเสาแต่ละต้น ( $MIC(I, J)$ )

ข้อมูลชุดนี้มีจำนวนเท่ากับผลคูณของจำนวนชั้นทั้งหมดกับจำนวนช่วงคานทั้งหมด (NS.NB) การกำหนดชื่อต่าง ๆ ของชั้นส่วนย่อยสามารถดูได้จากหัวข้อที่ 2.3 ในบทที่ 2

### 6.2 ตอบคำถามว่ายอมรับชุดข้อมูลชุดนี้หรือไม่ โดยตอบ Y(es) หรือ N(o)

เนื่องจากชุดข้อมูลนี้มีจำนวนมาก คำถามนี้จะถามทุก ๆ ชุดของข้อมูลแต่ละชั้น

## 7. บ่อนข้อมูลเกี่ยวกับโมเมนต์อินเนอร์เซียของคาน

### 7.1 โมเมนต์อินเนอร์เซียของคานแต่ละตัว ( $MIB(I, J)$ )

จำนวนของข้อมูลชุดนี้จะเท่ากับผลคูณของจำนวนชั้นทั้งหมดกับจำนวนช่วงคานทั้งหมด (NS.NB) การกำหนดชื่อต่าง ๆ ของชั้นส่วนย่อยดูได้จากหัวข้อที่ 2.3 ในบทที่ 2

### 7.2 ตอบคำถามว่ายอมรับชุดข้อมูลชุดนี้หรือไม่ โดยตอบ Y(es) หรือ N(o)

เนื่องจากชุดข้อมูลชุดนี้มีจำนวนมาก คำถามนี้จะถามทุก ๆ ชุดของข้อมูลแต่ละชั้น

## 8. บ่อนข้อมูลเกี่ยวกับสภาพขอบเขตที่ฐานของเสา

### 8.1 สภาพขอบเขตที่ฐานของเสาแต่ละต้น ( $KS(J)$ )

สภาพขอบเขตที่ฐานของเสาแต่ละต้นจะแทนด้วยค่าสถิติเฟนสของการหมุนที่ฐานของเสา สำหรับสภาพขอบเขตที่ฐานของเสาเป็นแบบจุดหมุน นั่นคือ ไม่มีความต้านทานต่อการหมุนจะใช้ค่า  $KS(J)$  เท่ากับศูนย์ สำหรับสภาพขอบเขตที่ฐานของเสาเป็นแบบจุดยึดแน่นจะใช้ค่า  $KS(J)$  เท่ากับจำนวนมาก ๆ ในที่นี้แนะนำให้ใช้  $1 \times 10^{20}$  สำหรับสภาพขอบเขตที่ยอมให้หมุนได้บางส่วนก็แล้วแต่ดุลยพินิจของผู้ใช้งาน จำนวนทั้งหมดของข้อมูลชุดนี้จะเท่ากับจำนวนช่วงคานทั้งหมด (NB)

8.2 ตอบคำถามว่ายอมรับข้อมูลชุดนี้หรือไม่ โดยตอบ Y(es) หรือ N(o)

9. บ่อนข้อมูลเกี่ยวกับคุณสมบัติของผนังด้านแรงเฉือน

9.1 โมดูลัสยืดหยุ่นของผนังด้านแรงเฉือน (ESW)

9.2 โมเมนต์อินเนอร์เซีย (IS)

9.3 ระยะห่างจากแกนสะเทินของผนังด้านแรงเฉือนถึงตำแหน่งที่ยึดต่อกับคานเชื่อม (L)

ในกรณีที่คานเชื่อมเป็นชนิดที่ 1 จะไม่ต้องบ่อนข้อมูลนี้เข้าไป จะบ่อนเฉพาะกรณีที่คานเชื่อมเป็นแบบชนิดที่ 2 หรือ 3 เท่านั้น

9.4 สภาพขอบเขตที่ฐานของผนังด้านแรงเฉือน (KS)

สภาพขอบเขตนี้ จะแทนด้วยค่าสัมประสิทธิ์ของการหมุนที่ฐานของผนังด้านแรงเฉือน ซึ่งมีความหมายเหมือนกับสภาพขอบเขตที่ฐานของเสาตั้งที่ได้กล่าวมาแล้วในหัวข้อ 7.1

9.5 ตอบคำถามว่ายอมรับข้อมูลชุดนี้หรือไม่ โดยตอบ Y(es) หรือ N(o)

10. บ่อนข้อมูลเกี่ยวกับแรงกระทำด้านข้าง

10.1 แรงกระทำด้านข้างที่ระดับพื้นของชั้นต่าง ๆ (P(I))

ข้อมูลชุดนี้มีจำนวนเท่ากับ จำนวนชั้นของโครงสร้าง (NS)

10.2 ตอบคำถามว่ายอมรับข้อมูลชุดนี้หรือไม่ โดยตอบ Y(es) หรือ N(o)

11. บ่อนข้อมูลค่าแตกต่างของการทำซ้ำ มีหน่วยเป็นเปอร์เซ็นต์

ก-4 ตัวอย่างบ่อนข้อมูล

แสดงตัวอย่างการบ่อนข้อมูลในตัวอย่างที่ 1 (หัวข้อ 3.3)

PROJECT NAME (MAXIMUM 25 CHARACTERS) = Example 1

==INPUT FRAME PROPERTIES==

TOTAL NUMBER OF STORIES = 25

TOTAL NUMBER OF BAYS (LINK BEAM INCLUDED) = 4

MODULUS OF ELASTICITY (FRAME) = 2.1E5

DO YOU ACCEPT THESE DATA Y/N

INPUT LINKING CONDITIONS  
=====

< 1 > (FRAME) HINGED ----- HINGED (SHEAR WALL)

< 2 > (FRAME) FIXED ----- FIXED (SHEAR WALL)

< 3 > (FRAME) FIXED ----- HINGED (SHEAR WALL)

SELECT 1,2 OR 3 :

INPUT STOREY HEIGHT  
=====

HEIGHT OF COLUMN AT FLOOR # 1 400

HEIGHT OF COLUMN AT FLOOR # 2 300

HEIGHT OF COLUMN AT FLOOR # 3 300

HEIGHT OF COLUMN AT FLOOR # 4 300

HEIGHT OF COLUMN AT FLOOR # 5 300

HEIGHT OF COLUMN AT FLOOR # 6 300

HEIGHT OF COLUMN AT FLOOR # 7 300

HEIGHT OF COLUMN AT FLOOR # 8 300

HEIGHT OF COLUMN AT FLOOR # 9 300



HEIGHT OF COLUMN AT FLOOR # 10 300  
HEIGHT OF COLUMN AT FLOOR # 11 300  
HEIGHT OF COLUMN AT FLOOR # 12 300  
HEIGHT OF COLUMN AT FLOOR # 13 300  
HEIGHT OF COLUMN AT FLOOR # 14 300  
HEIGHT OF COLUMN AT FLOOR # 15 300  
HEIGHT OF COLUMN AT FLOOR # 16 300  
HEIGHT OF COLUMN AT FLOOR # 17 300  
HEIGHT OF COLUMN AT FLOOR # 18 300  
HEIGHT OF COLUMN AT FLOOR # 19 300  
HEIGHT OF COLUMN AT FLOOR # 20 300  
HEIGHT OF COLUMN AT FLOOR # 21 300  
HEIGHT OF COLUMN AT FLOOR # 22 300  
HEIGHT OF COLUMN AT FLOOR # 23 300  
HEIGHT OF COLUMN AT FLOOR # 24 300  
HEIGHT OF COLUMN AT FLOOR # 25 300

DO YOU ACCEPT THESE DATA Y/N

INPUT SPAN LENGTH

=====

LENGTH OF SPAN # 1 = 400  
LENGTH OF SPAN # 2 = 400  
LENGTH OF SPAN # 3 = 400  
LENGTH OF SPAN # 4 = 400

DO YOU ACCEPT THESE DATA Y/N

## INPUT MOMENT OF INERTIA OF COLUMN

=====

MOMENT OF INERTIA OF COLUMN 1 , 1 3200000

MOMENT OF INERTIA OF COLUMN 1 , 2 3200000

MOMENT OF INERTIA OF COLUMN 1 , 3 3200000

MOMENT OF INERTIA OF COLUMN 1 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 2 , 1 3200000

MOMENT OF INERTIA OF COLUMN 2 , 2 3200000

MOMENT OF INERTIA OF COLUMN 2 , 3 3200000

MOMENT OF INERTIA OF COLUMN 2 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 3 , 1 3200000

MOMENT OF INERTIA OF COLUMN 3 , 2 3200000

MOMENT OF INERTIA OF COLUMN 3 , 3 3200000

MOMENT OF INERTIA OF COLUMN 3 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 4 , 1 3200000

MOMENT OF INERTIA OF COLUMN 4 , 2 3200000

MOMENT OF INERTIA OF COLUMN 4 , 3 3200000

MOMENT OF INERTIA OF COLUMN 4 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 5 , 1 3200000

MOMENT OF INERTIA OF COLUMN 5 , 2 3200000

MOMENT OF INERTIA OF COLUMN 5 , 3 3200000

MOMENT OF INERTIA OF COLUMN 5 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 6 , 1 3200000

MOMENT OF INERTIA OF COLUMN 6 , 2 3200000

MOMENT OF INERTIA OF COLUMN 6 , 3 3200000

MOMENT OF INERTIA OF COLUMN 6 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 7 , 1 3200000

MOMENT OF INERTIA OF COLUMN 7 , 2 3200000

MOMENT OF INERTIA OF COLUMN 7 , 3 3200000

MOMENT OF INERTIA OF COLUMN 7 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 8 , 1 3200000

MOMENT OF INERTIA OF COLUMN 8 , 2 3200000

MOMENT OF INERTIA OF COLUMN 8 , 3 3200000

MOMENT OF INERTIA OF COLUMN 8 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 9 , 1 3200000

MOMENT OF INERTIA OF COLUMN 9 , 2 3200000

MOMENT OF INERTIA OF COLUMN 9 , 3 3200000

MOMENT OF INERTIA OF COLUMN 9 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 10 , 1 3200000

MOMENT OF INERTIA OF COLUMN 10 , 2 3200000

MOMENT OF INERTIA OF COLUMN 10 , 3 3200000

MOMENT OF INERTIA OF COLUMN 10 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 11 , 1 2600000

MOMENT OF INERTIA OF COLUMN 11 , 2 2600000

MOMENT OF INERTIA OF COLUMN 11 , 3 2600000

MOMENT OF INERTIA OF COLUMN 11 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 12 , 1 2600000

MOMENT OF INERTIA OF COLUMN 12 , 2 2600000

MOMENT OF INERTIA OF COLUMN 12 , 3 2600000

MOMENT OF INERTIA OF COLUMN 12 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 13 , 1 2600000

MOMENT OF INERTIA OF COLUMN 13 , 2 2600000

MOMENT OF INERTIA OF COLUMN 13 , 3 2600000

MOMENT OF INERTIA OF COLUMN 13 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 14 , 1 2600000

MOMENT OF INERTIA OF COLUMN 14 , 2 2600000

MOMENT OF INERTIA OF COLUMN 14 , 3 2600000

MOMENT OF INERTIA OF COLUMN 14 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 15 , 1 2600000

MOMENT OF INERTIA OF COLUMN 15 , 2 2600000

MOMENT OF INERTIA OF COLUMN 15 , 3 2600000

MOMENT OF INERTIA OF COLUMN 15 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 16 , 1 2600000

MOMENT OF INERTIA OF COLUMN 16 , 2 2600000

MOMENT OF INERTIA OF COLUMN 16 , 3 2600000

MOMENT OF INERTIA OF COLUMN 16 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N



MOMENT OF INERTIA OF COLUMN 17 , 1 2600000

MOMENT OF INERTIA OF COLUMN 17 , 2 2600000

MOMENT OF INERTIA OF COLUMN 17 , 3 2600000

MOMENT OF INERTIA OF COLUMN 17 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 18 , 1 2600000

MOMENT OF INERTIA OF COLUMN 18 , 2 2600000

MOMENT OF INERTIA OF COLUMN 18 , 3 2600000

MOMENT OF INERTIA OF COLUMN 18 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 19 , 1 2600000

MOMENT OF INERTIA OF COLUMN 19 , 2 2600000

MOMENT OF INERTIA OF COLUMN 19 , 3 2600000

MOMENT OF INERTIA OF COLUMN 19 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 20 , 1 2600000

MOMENT OF INERTIA OF COLUMN 20 , 2 2600000

MOMENT OF INERTIA OF COLUMN 20 , 3 2600000

MOMENT OF INERTIA OF COLUMN 20 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 21 , 1 2600000

MOMENT OF INERTIA OF COLUMN 21 , 2 2600000

MOMENT OF INERTIA OF COLUMN 21 , 3 2600000

MOMENT OF INERTIA OF COLUMN 21 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 22 , 1 2600000

MOMENT OF INERTIA OF COLUMN 22 , 2 2600000

MOMENT OF INERTIA OF COLUMN 22 , 3 2600000

MOMENT OF INERTIA OF COLUMN 22 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 23 , 1 2600000

MOMENT OF INERTIA OF COLUMN 23 , 2 2600000

MOMENT OF INERTIA OF COLUMN 23 , 3 2600000

MOMENT OF INERTIA OF COLUMN 23 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 24 , 1 2600000

MOMENT OF INERTIA OF COLUMN 24 , 2 2600000

MOMENT OF INERTIA OF COLUMN 24 , 3 2600000

MOMENT OF INERTIA OF COLUMN 24 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF COLUMN 25 , 1 2600000  
MOMENT OF INERTIA OF COLUMN 25 , 2 2600000  
MOMENT OF INERTIA OF COLUMN 25 , 3 2600000  
MOMENT OF INERTIA OF COLUMN 25 , 4 2600000

DO YOU ACCEPT THESE DATA Y/N

INPUT MOMENT OF INERTIA OF BEAM

=====

MOMENT OF INERTIA OF BEAM 1 , 1 4000000  
MOMENT OF INERTIA OF BEAM 1 , 2 4000000  
MOMENT OF INERTIA OF BEAM 1 , 3 4000000  
MOMENT OF INERTIA OF BEAM 1 , 4 4000000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 2 , 1 4000000  
MOMENT OF INERTIA OF BEAM 2 , 2 4000000  
MOMENT OF INERTIA OF BEAM 2 , 3 4000000  
MOMENT OF INERTIA OF BEAM 2 , 4 4000000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 3 , 1 4000000  
MOMENT OF INERTIA OF BEAM 3 , 2 4000000  
MOMENT OF INERTIA OF BEAM 3 , 3 4000000  
MOMENT OF INERTIA OF BEAM 3 , 4 4000000

DO YOU ACCEPT THESE DATA Y/N



MOMENT OF INERTIA OF BEAM 4 , 1 4000000

MOMENT OF INERTIA OF BEAM 4 , 2 4000000

MOMENT OF INERTIA OF BEAM 4 , 3 4000000

MOMENT OF INERTIA OF BEAM 4 , 4 4000000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 5 , 1 4000000

MOMENT OF INERTIA OF BEAM 5 , 2 4000000

MOMENT OF INERTIA OF BEAM 5 , 3 4000000

MOMENT OF INERTIA OF BEAM 5 , 4 4000000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 6 , 1 4000000

MOMENT OF INERTIA OF BEAM 6 , 2 4000000

MOMENT OF INERTIA OF BEAM 6 , 3 4000000

MOMENT OF INERTIA OF BEAM 6 , 4 4000000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 7 , 1 4000000

MOMENT OF INERTIA OF BEAM 7 , 2 4000000

MOMENT OF INERTIA OF BEAM 7 , 3 4000000

MOMENT OF INERTIA OF BEAM 7 , 4 4000000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 8 , 1 4000000

MOMENT OF INERTIA OF BEAM 8 , 2 4000000

MOMENT OF INERTIA OF BEAM 8 , 3 4000000

MOMENT OF INERTIA OF BEAM 8 , 4 4000000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 9 , 1 4000000

MOMENT OF INERTIA OF BEAM 9 , 2 4000000

MOMENT OF INERTIA OF BEAM 9 , 3 4000000

MOMENT OF INERTIA OF BEAM 9 , 4 4000000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 10 , 1 4000000

MOMENT OF INERTIA OF BEAM 10 , 2 4000000

MOMENT OF INERTIA OF BEAM 10 , 3 4000000

MOMENT OF INERTIA OF BEAM 10 , 4 4000000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 11 , 1 3200000

MOMENT OF INERTIA OF BEAM 11 , 2 3200000

MOMENT OF INERTIA OF BEAM 11 , 3 3200000

MOMENT OF INERTIA OF BEAM 11 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 12 , 1 3200000

MOMENT OF INERTIA OF BEAM 12 , 2 3200000

MOMENT OF INERTIA OF BEAM 12 , 3 3200000

MOMENT OF INERTIA OF BEAM 12 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 13 , 1 3200000

MOMENT OF INERTIA OF BEAM 13 , 2 3200000

MOMENT OF INERTIA OF BEAM 13 , 3 3200000

MOMENT OF INERTIA OF BEAM 13 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 14 , 1 3200000

MOMENT OF INERTIA OF BEAM 14 , 2 3200000

MOMENT OF INERTIA OF BEAM 14 , 3 3200000

MOMENT OF INERTIA OF BEAM 14 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 15 , 1 3200000

MOMENT OF INERTIA OF BEAM 15 , 2 3200000

MOMENT OF INERTIA OF BEAM 15 , 3 3200000

MOMENT OF INERTIA OF BEAM 15 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 16 , 1 3200000

MOMENT OF INERTIA OF BEAM 16 , 2 3200000

MOMENT OF INERTIA OF BEAM 16 , 3 3200000

MOMENT OF INERTIA OF BEAM 16 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 17 , 1 3200000

MOMENT OF INERTIA OF BEAM 17 , 2 3200000

MOMENT OF INERTIA OF BEAM 17 , 3 3200000

MOMENT OF INERTIA OF BEAM 17 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 18 , 1 3200000

MOMENT OF INERTIA OF BEAM 18 , 2 3200000

MOMENT OF INERTIA OF BEAM 18 , 3 3200000

MOMENT OF INERTIA OF BEAM 18 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 19 , 1 3200000

MOMENT OF INERTIA OF BEAM 19 , 2 3200000

MOMENT OF INERTIA OF BEAM 19 , 3 3200000

MOMENT OF INERTIA OF BEAM 19 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 20 , 1 3200000

MOMENT OF INERTIA OF BEAM 20 , 2 3200000

MOMENT OF INERTIA OF BEAM 20 , 3 3200000

MOMENT OF INERTIA OF BEAM 20 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 21 , 1 3200000

MOMENT OF INERTIA OF BEAM 21 , 2 3200000

MOMENT OF INERTIA OF BEAM 21 , 3 3200000

MOMENT OF INERTIA OF BEAM 21 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 22 , 1 3200000

MOMENT OF INERTIA OF BEAM 22 , 2 3200000

MOMENT OF INERTIA OF BEAM 22 , 3 3200000

MOMENT OF INERTIA OF BEAM 22 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 23 , 1 3200000

MOMENT OF INERTIA OF BEAM 23 , 2 3200000

MOMENT OF INERTIA OF BEAM 23 , 3 3200000

MOMENT OF INERTIA OF BEAM 23 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 24 , 1 3200000

MOMENT OF INERTIA OF BEAM 24 , 2 3200000

MOMENT OF INERTIA OF BEAM 24 , 3 3200000

MOMENT OF INERTIA OF BEAM 24 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

MOMENT OF INERTIA OF BEAM 25 , 1 3200000

MOMENT OF INERTIA OF BEAM 25 , 2 3200000

MOMENT OF INERTIA OF BEAM 25 , 3 3200000

MOMENT OF INERTIA OF BEAM 25 , 4 3200000

DO YOU ACCEPT THESE DATA Y/N

INPUT SPRING CONSTANT AT COLUMN BASE

=====

SPRING CONSTANT AT COLUMN BASE 1 = 1E20

SPRING CONSTANT AT COLUMN BASE 2 = 1E20

SPRING CONSTANT AT COLUMN BASE 3 = 1E20

SPRING CONSTANT AT COLUMN BASE 4 = 1E20

DO YOU ACCEPT THESE DATA Y/N

## INPUT SHEAR WALL PROPERTIES

=====

MODULUS OF ELASTICITY (SHEAR WALL) 2.1E5

MOMENT OF INERTIA OF SHEAR WALL 3.6E8

SPRING CONSTANT AT SHEAR WALL BASE 1E20

DO YOU ACCEPT THESE DATA Y/N

## INPUT LATERAL LOADS

=====

LATERAL LOAD AT FLOOR NUMBER	25	3000
LATERAL LOAD AT FLOOR NUMBER	24	6000
LATERAL LOAD AT FLOOR NUMBER	23	6000
LATERAL LOAD AT FLOOR NUMBER	22	6000
LATERAL LOAD AT FLOOR NUMBER	21	6000
LATERAL LOAD AT FLOOR NUMBER	20	6000
LATERAL LOAD AT FLOOR NUMBER	19	6000
LATERAL LOAD AT FLOOR NUMBER	18	6000
LATERAL LOAD AT FLOOR NUMBER	17	6000
LATERAL LOAD AT FLOOR NUMBER	16	6000
LATERAL LOAD AT FLOOR NUMBER	15	6000
LATERAL LOAD AT FLOOR NUMBER	14	6000
LATERAL LOAD AT FLOOR NUMBER	13	6000
LATERAL LOAD AT FLOOR NUMBER	12	6000
LATERAL LOAD AT FLOOR NUMBER	11	6000
LATERAL LOAD AT FLOOR NUMBER	10	6000
LATERAL LOAD AT FLOOR NUMBER	9	6000

LATERAL LOAD AT FLOOR NUMBER	3	6000
LATERAL LOAD AT FLOOR NUMBER	7	6000
LATERAL LOAD AT FLOOR NUMBER	6	6000
LATERAL LOAD AT FLOOR NUMBER	5	6000
LATERAL LOAD AT FLOOR NUMBER	4	6000
LATERAL LOAD AT FLOOR NUMBER	3	6000
LATERAL LOAD AT FLOOR NUMBER	2	6000
LATERAL LOAD AT FLOOR NUMBER	1	6000

DO YOU ACCEPT THESE DATA Y/N

TOLERANCE USED IN TERMINATION % 1

ก-5 แสดงผลลัพธ์ของตัวอย่างที่ 1



PROJECT : Example 1

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## GENERAL PROPERTIES

=====

## FRAME PROPERTIES :

TOTAL NUMBER OF STORIES	25
TOTAL NUMBER OF BAYS	4
MODULUS OF ELASTICITY	2.100E+05

## ROTATIONAL SPRING STIFFNESS :

AT COLUMN BASE	STIFFNESS
1 , 1	1.000E+20
1 , 2	1.000E+20
1 , 3	1.000E+20
1 , 4	1.000E+20

## SHEAR WALL PROPERTIES :

MOMENT OF INERTIA	3.6000E+08
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MODULUS OF ELASTICITY	2.100E+05
-----------------------	-----------

## ROTATIONAL SPRING STIFFNESS :

AT SHEAR WALL BASE	1.000E+20
-----------------------	-----------

LINKING CONDITION : HINGED AT BOTH ENDS

PROPERTIES OF BEAMS AND COLUMNS

=====

COLUMN NUMBER	COLUMN HEIGHT	MOMENT OF INERTIA	BEAM NUMBER	BEAM LENGTH	MOMENT OF INERTIA
1 , 1	400.00	3.2000E+06	1 , 1	400.00	4.0000E+06
1 , 2	400.00	3.2000E+06	1 , 2	400.00	4.0000E+06
1 , 3	400.00	3.2000E+06	1 , 3	400.00	4.0000E+06
1 , 4	400.00	3.2000E+06	1 , 4	400.00	4.0000E+06
2 , 1	300.00	3.2000E+06	2 , 1	400.00	4.0000E+06
2 , 2	300.00	3.2000E+06	2 , 2	400.00	4.0000E+06
2 , 3	300.00	3.2000E+06	2 , 3	400.00	4.0000E+06
2 , 4	300.00	3.2000E+06	2 , 4	400.00	4.0000E+06
3 , 1	300.00	3.2000E+06	3 , 1	400.00	4.0000E+06
3 , 2	300.00	3.2000E+06	3 , 2	400.00	4.0000E+06
3 , 3	300.00	3.2000E+06	3 , 3	400.00	4.0000E+06
3 , 4	300.00	3.2000E+06	3 , 4	400.00	4.0000E+06
4 , 1	300.00	3.2000E+06	4 , 1	400.00	4.0000E+06
4 , 2	300.00	3.2000E+06	4 , 2	400.00	4.0000E+06
4 , 3	300.00	3.2000E+06	4 , 3	400.00	4.0000E+06
4 , 4	300.00	3.2000E+06	4 , 4	400.00	4.0000E+06
5 , 1	300.00	3.2000E+06	5 , 1	400.00	4.0000E+06
5 , 2	300.00	3.2000E+06	5 , 2	400.00	4.0000E+06
5 , 3	300.00	3.2000E+06	5 , 3	400.00	4.0000E+06
5 , 4	300.00	3.2000E+06	5 , 4	400.00	4.0000E+06
6 , 1	300.00	3.2000E+06	6 , 1	400.00	4.0000E+06
6 , 2	300.00	3.2000E+06	6 , 2	400.00	4.0000E+06
6 , 3	300.00	3.2000E+06	6 , 3	400.00	4.0000E+06
6 , 4	300.00	3.2000E+06	6 , 4	400.00	4.0000E+06
7 , 1	300.00	3.2000E+06	7 , 1	400.00	4.0000E+06
7 , 2	300.00	3.2000E+06	7 , 2	400.00	4.0000E+06
7 , 3	300.00	3.2000E+06	7 , 3	400.00	4.0000E+06
7 , 4	300.00	3.2000E+06	7 , 4	400.00	4.0000E+06
8 , 1	300.00	3.2000E+06	8 , 1	400.00	4.0000E+06
8 , 2	300.00	3.2000E+06	8 , 2	400.00	4.0000E+06
8 , 3	300.00	3.2000E+06	8 , 3	400.00	4.0000E+06
8 , 4	300.00	3.2000E+06	8 , 4	400.00	4.0000E+06
9 , 1	300.00	3.2000E+06	9 , 1	400.00	4.0000E+06
9 , 2	300.00	3.2000E+06	9 , 2	400.00	4.0000E+06
9 , 3	300.00	3.2000E+06	9 , 3	400.00	4.0000E+06
9 , 4	300.00	3.2000E+06	9 , 4	400.00	4.0000E+06
10 , 1	300.00	3.2000E+06	10 , 1	400.00	4.0000E+06
10 , 2	300.00	3.2000E+06	10 , 2	400.00	4.0000E+06
10 , 3	300.00	3.2000E+06	10 , 3	400.00	4.0000E+06
10 , 4	300.00	3.2000E+06	10 , 4	400.00	4.0000E+06
11 , 1	300.00	2.6000E+06	11 , 1	400.00	3.2000E+06



11 , 2	300.00	2.6000E+06	11 , 2	400.00	3.2000E+06
11 , 3	300.00	2.6000E+06	11 , 3	400.00	3.2000E+06
11 , 4	300.00	2.6000E+06	11 , 4	400.00	3.2000E+06
12 , 1	300.00	2.6000E+06	12 , 1	400.00	3.2000E+06
12 , 2	300.00	2.6000E+06	12 , 2	400.00	3.2000E+06
12 , 3	300.00	2.6000E+06	12 , 3	400.00	3.2000E+06
12 , 4	300.00	2.6000E+06	12 , 4	400.00	3.2000E+06
13 , 1	300.00	2.6000E+06	13 , 1	400.00	3.2000E+06
13 , 2	300.00	2.6000E+06	13 , 2	400.00	3.2000E+06
13 , 3	300.00	2.6000E+06	13 , 3	400.00	3.2000E+06
13 , 4	300.00	2.6000E+06	13 , 4	400.00	3.2000E+06
14 , 1	300.00	2.6000E+06	14 , 1	400.00	3.2000E+06
14 , 2	300.00	2.6000E+06	14 , 2	400.00	3.2000E+06
14 , 3	300.00	2.6000E+06	14 , 3	400.00	3.2000E+06
14 , 4	300.00	2.6000E+06	14 , 4	400.00	3.2000E+06
15 , 1	300.00	2.6000E+06	15 , 1	400.00	3.2000E+06
15 , 2	300.00	2.6000E+06	15 , 2	400.00	3.2000E+06
15 , 3	300.00	2.6000E+06	15 , 3	400.00	3.2000E+06
15 , 4	300.00	2.6000E+06	15 , 4	400.00	3.2000E+06
16 , 1	300.00	2.6000E+06	16 , 1	400.00	3.2000E+06
16 , 2	300.00	2.6000E+06	16 , 2	400.00	3.2000E+06
16 , 3	300.00	2.6000E+06	16 , 3	400.00	3.2000E+06
16 , 4	300.00	2.6000E+06	16 , 4	400.00	3.2000E+06
17 , 1	300.00	2.6000E+06	17 , 1	400.00	3.2000E+06
17 , 2	300.00	2.6000E+06	17 , 2	400.00	3.2000E+06
17 , 3	300.00	2.6000E+06	17 , 3	400.00	3.2000E+06
17 , 4	300.00	2.6000E+06	17 , 4	400.00	3.2000E+06
18 , 1	300.00	2.6000E+06	18 , 1	400.00	3.2000E+06
18 , 2	300.00	2.6000E+06	18 , 2	400.00	3.2000E+06
18 , 3	300.00	2.6000E+06	18 , 3	400.00	3.2000E+06
18 , 4	300.00	2.6000E+06	18 , 4	400.00	3.2000E+06
19 , 1	300.00	2.6000E+06	19 , 1	400.00	3.2000E+06
19 , 2	300.00	2.6000E+06	19 , 2	400.00	3.2000E+06
19 , 3	300.00	2.6000E+06	19 , 3	400.00	3.2000E+06
19 , 4	300.00	2.6000E+06	19 , 4	400.00	3.2000E+06
20 , 1	300.00	2.6000E+06	20 , 1	400.00	3.2000E+06
20 , 2	300.00	2.6000E+06	20 , 2	400.00	3.2000E+06
20 , 3	300.00	2.6000E+06	20 , 3	400.00	3.2000E+06
20 , 4	300.00	2.6000E+06	20 , 4	400.00	3.2000E+06
21 , 1	300.00	2.6000E+06	21 , 1	400.00	3.2000E+06
21 , 2	300.00	2.6000E+06	21 , 2	400.00	3.2000E+06
21 , 3	300.00	2.6000E+06	21 , 3	400.00	3.2000E+06
21 , 4	300.00	2.6000E+06	21 , 4	400.00	3.2000E+06
22 , 1	300.00	2.6000E+06	22 , 1	400.00	3.2000E+06
22 , 2	300.00	2.6000E+06	22 , 2	400.00	3.2000E+06
22 , 3	300.00	2.6000E+06	22 , 3	400.00	3.2000E+06
22 , 4	300.00	2.6000E+06	22 , 4	400.00	3.2000E+06

PROJECT : Example 1

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23 , 1	300.00	2.6000E+06	23 , 1	400.00	3.2000E+06
23 , 2	300.00	2.6000E+06	23 , 2	400.00	3.2000E+06
23 , 3	300.00	2.6000E+06	23 , 3	400.00	3.2000E+06
23 , 4	300.00	2.6000E+06	23 , 4	400.00	3.2000E+06
24 , 1	300.00	2.6000E+06	24 , 1	400.00	3.2000E+06
24 , 2	300.00	2.6000E+06	24 , 2	400.00	3.2000E+06
24 , 3	300.00	2.6000E+06	24 , 3	400.00	3.2000E+06
24 , 4	300.00	2.6000E+06	24 , 4	400.00	3.2000E+06
25 , 1	300.00	2.6000E+06	25 , 1	400.00	3.2000E+06
25 , 2	300.00	2.6000E+06	25 , 2	400.00	3.2000E+06
25 , 3	300.00	2.6000E+06	25 , 3	400.00	3.2000E+06
25 , 4	300.00	2.6000E+06	25 , 4	400.00	3.2000E+06

## LATERAL LOADS

=====

FLOOR NUMBER	LOAD
1	6000.00
2	6000.00
3	6000.00
4	6000.00
5	6000.00
6	6000.00
7	6000.00
8	6000.00
9	6000.00
10	6000.00
11	6000.00
12	6000.00
13	6000.00
14	6000.00
15	6000.00
16	6000.00
17	6000.00
18	6000.00
19	6000.00
20	6000.00
21	6000.00
22	6000.00
23	6000.00
24	6000.00
25	3000.00

## SHEAR WALL RESULTS

=====

FLOOR	HORIZONTAL DEFLECTIONS	SLOPES	SHEAR WALL SHEARS	SHEAR WALL MOMENTS
25	3.6671E+00	2.7934E-04		0.0000E+00
24	3.6185E+00	2.8448E-04	-1.9740E+04	-5.9221E+06
23	3.5682E+00	2.9798E-04	-9.5572E+03	-8.7893E+06
22	3.5125E+00	3.1752E-04	-6.2978E+03	-1.0679E+07
21	3.4484E+00	3.4227E-04	-3.4123E+03	-1.1702E+07
20	3.3737E+00	3.7137E-04	-1.4920E+03	-1.2150E+07
19	3.2867E+00	4.0405E-04	-2.1232E+02	-1.2214E+07
18	3.1863E+00	4.3949E-04	6.1612E+02	-1.2029E+07
17	3.0717E+00	4.7683E-04	1.1582E+03	-1.1681E+07
16	2.9426E+00	5.1516E-04	1.5823E+03	-1.1207E+07
15	2.7992E+00	5.5348E-04	2.0306E+03	-1.0597E+07
14	2.6419E+00	5.9064E-04	2.6529E+03	-9.8016E+06
13	2.4716E+00	6.2531E-04	3.6103E+03	-8.7185E+06
12	2.2897E+00	6.5588E-04	5.0148E+03	-7.2140E+06
11	2.0981E+00	6.8009E-04	7.5896E+03	-4.9371E+06
10	1.8995E+00	6.9613E-04	7.7653E+03	-2.6075E+06
9	1.6961E+00	7.0940E-04	-6.9517E+03	-4.6930E+06
8	1.4875E+00	7.2349E-04	-1.3338E+02	-4.7330E+06
7	1.2738E+00	7.3460E-04	2.9378E+03	-3.8517E+06
6	1.0565E+00	7.3948E-04	7.0975E+03	-1.7224E+06
5	8.3796E-01	7.3335E-04	1.2376E+04	1.9904E+06
4	6.2275E-01	7.0928E-04	1.9702E+04	7.9010E+06
3	4.1787E-01	6.5698E-04	3.0193E+04	1.6959E+07
2	2.3427E-01	5.6075E-04	4.6154E+04	3.0805E+07
1	8.8501E-02	3.9878E-04	6.6150E+04	5.0650E+07
0	0.0000E+00	0.0000E+00	1.2433E+05	1.0038E+08

## FRAME RESULTS

=====

JOINT	SLOPE	TOP MOMENT	BOTTOM MOMENT	LEFT MOMENT	RIGHT MOMENT
0 , 1	1.3560E-14	-1.3569E+06	0.0000E+00	0.0000E+00	0.0000E+00
0 , 2	1.6416E-14	-1.6425E+06	0.0000E+00	0.0000E+00	0.0000E+00
0 , 3	1.6416E-14	-1.6425E+06	0.0000E+00	0.0000E+00	0.0000E+00
0 , 4	1.3560E-14	-1.3569E+06	0.0000E+00	0.0000E+00	0.0000E+00
1 , 1	2.5993E-04	-2.4373E+06	-4.8349E+05	0.0000E+00	2.9181E+06
1 , 2	1.7492E-04	-3.7132E+06	-1.0547E+06	2.5611E+06	2.2040E+06
1 , 3	1.7492E-04	-3.7132E+06	-1.0547E+06	2.2040E+06	2.5610E+06
1 , 4	2.5993E-04	-2.4374E+06	-4.8353E+05	2.9181E+06	0.0000E+00
2 , 1	3.9376E-04	-2.6451E+06	-1.8378E+06	0.0000E+00	4.4793E+06
2 , 2	2.7899E-04	-4.2691E+06	-3.2470E+06	3.9973E+06	3.5152E+06
2 , 3	2.7899E-04	-4.2691E+06	-3.2470E+06	3.5152E+06	3.9973E+06
2 , 4	3.9376E-04	-2.6451E+06	-1.8378E+06	4.4793E+06	0.0000E+00
3 , 1	4.5810E-04	-2.8590E+06	-2.3569E+06	0.0000E+00	5.2137E+06
3 , 2	3.2514E-04	-4.6921E+06	-4.0623E+06	4.6552E+06	4.0968E+06
3 , 3	3.2514E-04	-4.6920E+06	-4.0623E+06	4.0968E+06	4.6552E+06
3 , 4	4.5810E-04	-2.8591E+06	-2.3569E+06	5.2136E+06	0.0000E+00
4 , 1	4.9435E-04	-2.9301E+06	-2.6966E+06	0.0000E+00	5.6272E+06
4 , 2	3.5111E-04	-4.8735E+06	-4.5757E+06	5.0256E+06	4.4240E+06
4 , 3	3.5111E-04	-4.8735E+06	-4.5757E+06	4.4240E+06	5.0256E+06
4 , 4	4.9435E-04	-2.9301E+06	-2.6967E+06	5.6272E+06	0.0000E+00
5 , 1	5.0942E-04	-2.9334E+06	-2.8626E+06	0.0000E+00	5.8000E+06
5 , 2	3.6211E-04	-4.9153E+06	-4.8242E+06	5.1813E+06	4.5626E+06
5 , 3	3.6211E-04	-4.9153E+06	-4.8242E+06	4.5626E+06	5.1813E+06
5 , 4	5.0943E-04	-2.9334E+06	-2.8625E+06	5.8001E+06	0.0000E+00
6 , 1	5.1144E-04	-2.8911E+06	-2.9244E+06	0.0000E+00	5.8235E+06
6 , 2	3.6367E-04	-4.8689E+06	-4.9083E+06	5.2029E+06	4.5823E+06
6 , 3	3.6368E-04	-4.8689E+06	-4.9083E+06	4.5823E+06	5.2029E+06
6 , 4	5.1144E-04	-2.8910E+06	-2.9244E+06	5.8235E+06	0.0000E+00
7 , 1	5.0546E-04	-2.8267E+06	-2.9179E+06	0.0000E+00	5.7559E+06
7 , 2	3.5951E-04	-4.7732E+06	-4.8876E+06	5.1429E+06	4.5299E+06
7 , 3	3.5951E-04	-4.7732E+06	-4.8876E+06	4.5299E+06	5.1429E+06
7 , 4	5.0549E-04	-2.8265E+06	-2.9177E+06	5.7560E+06	0.0000E+00
8 , 1	4.9445E-04	-2.7415E+06	-2.8761E+06	0.0000E+00	5.6312E+06
8 , 2	3.5186E-04	-4.6449E+06	-4.8074E+06	5.0323E+06	4.4335E+06
8 , 3	3.5187E-04	-4.6448E+06	-4.8074E+06	4.4336E+06	5.0324E+06
8 , 4	4.9444E-04	-2.7414E+06	-2.8760E+06	5.6312E+06	0.0000E+00
9 , 1	4.8532E-04	-2.7328E+06	-2.7824E+06	0.0000E+00	5.5282E+06
9 , 2	3.4561E-04	-4.6093E+06	-4.6729E+06	4.9414E+06	4.3546E+06
9 , 3	3.4560E-04	-4.6093E+06	-4.6729E+06	4.3546E+06	4.9415E+06
9 , 4	4.8534E-04	-2.7326E+06	-2.7822E+06	5.5284E+06	0.0000E+00

10 , 1	4.5348E-04	-2.2443E+06	-2.8754E+06	0.0000E+00	5.1283E+06
10 , 2	3.1404E-04	-3.7404E+06	-4.7507E+06	4.5426E+06	3.9570E+06
10 , 3	3.1405E-04	-3.7403E+06	-4.7507E+06	3.9570E+06	4.5426E+06
10 , 4	4.5348E-04	-2.2443E+06	-2.8754E+06	5.1282E+06	0.0000E+00
11 , 1	4.6269E-04	-2.0074E+06	-2.2108E+06	0.0000E+00	4.2199E+06
11 , 2	3.3057E-04	-3.4261E+06	-3.6802E+06	3.7760E+06	3.3321E+06
11 , 3	3.3056E-04	-3.4261E+06	-3.6802E+06	3.3321E+06	3.7760E+06
11 , 4	4.6269E-04	-2.0074E+06	-2.2108E+06	4.2200E+06	0.0000E+00
12 , 1	4.3918E-04	-1.9163E+06	-2.0929E+06	0.0000E+00	4.0052E+06
12 , 2	3.1367E-04	-3.2616E+06	-3.4876E+06	3.5835E+06	3.1617E+06
12 , 3	3.1366E-04	-3.2616E+06	-3.4876E+06	3.1617E+06	3.5835E+06
12 , 4	4.3918E-04	-1.9163E+06	-2.0929E+06	4.0052E+06	0.0000E+00
13 , 1	4.1433E-04	-1.7805E+06	-2.0067E+06	0.0000E+00	3.7781E+06
13 , 2	2.9577E-04	-3.0441E+06	-3.3267E+06	3.3797E+06	2.9814E+06
13 , 3	2.9577E-04	-3.0441E+06	-3.3267E+06	2.9814E+06	3.3797E+06
13 , 4	4.1431E-04	-1.7806E+06	-2.0069E+06	3.7779E+06	0.0000E+00
14 , 1	3.8494E-04	-1.6371E+06	-1.8874E+06	0.0000E+00	3.5105E+06
14 , 2	2.7491E-04	-2.8058E+06	-3.1200E+06	3.1408E+06	2.7711E+06
14 , 3	2.7490E-04	-2.8059E+06	-3.1201E+06	2.7711E+06	3.1408E+06
14 , 4	3.8495E-04	-1.6372E+06	-1.8874E+06	3.5106E+06	0.0000E+00
15 , 1	3.5316E-04	-1.4852E+06	-1.7528E+06	0.0000E+00	3.2205E+06
15 , 2	2.5216E-04	-2.5530E+06	-2.8886E+06	2.8811E+06	2.5418E+06
15 , 3	2.5216E-04	-2.5530E+06	-2.8886E+06	2.5418E+06	2.8810E+06
15 , 4	3.5312E-04	-1.4855E+06	-1.7531E+06	3.2202E+06	0.0000E+00
16 , 1	3.1973E-04	-1.3297E+06	-1.6069E+06	0.0000E+00	2.9160E+06
16 , 2	2.2839E-04	-2.2920E+06	-2.6395E+06	2.6090E+06	2.3021E+06
16 , 3	2.2837E-04	-2.2921E+06	-2.6396E+06	2.3020E+06	2.6090E+06
16 , 4	3.1974E-04	-1.3298E+06	-1.6069E+06	2.9160E+06	0.0000E+00
17 , 1	2.8577E-04	-1.1738E+06	-1.4533E+06	0.0000E+00	2.6061E+06
17 , 2	2.0408E-04	-2.0305E+06	-2.3805E+06	2.3316E+06	2.0571E+06
17 , 3	2.0408E-04	-2.0305E+06	-2.3805E+06	2.0571E+06	2.3315E+06
17 , 4	2.8572E-04	-1.1741E+06	-1.4536E+06	2.6058E+06	0.0000E+00
18 , 1	2.5203E-04	-1.0221E+06	-1.2967E+06	0.0000E+00	2.2987E+06
18 , 2	1.8008E-04	-1.7742E+06	-2.1178E+06	2.0569E+06	1.8152E+06
18 , 3	1.8006E-04	-1.7743E+06	-2.1179E+06	1.8151E+06	2.0569E+06
18 , 4	2.5204E-04	-1.0221E+06	-1.2968E+06	2.2987E+06	0.0000E+00
19 , 1	2.1960E-04	-8.7860E+05	-1.1402E+06	0.0000E+00	2.0028E+06
19 , 2	1.5688E-04	-1.5317E+06	-1.8586E+06	1.7921E+06	1.5814E+06
19 , 3	1.5689E-04	-1.5317E+06	-1.8586E+06	1.5814E+06	1.7920E+06
19 , 4	2.1956E-04	-8.7884E+05	-1.1404E+06	2.0026E+06	0.0000E+00
20 , 1	1.8939E-04	-7.4878E+05	-9.8857E+05	0.0000E+00	1.7276E+06
20 , 2	1.3538E-04	-1.3104E+06	-1.6100E+06	1.5461E+06	1.3646E+06
20 , 3	1.3538E-04	-1.3105E+06	-1.6100E+06	1.3646E+06	1.5461E+06
20 , 4	1.8939E-04	-7.4874E+05	-9.8866E+05	1.7276E+06	0.0000E+00
21 , 1	1.6256E-04	-6.3772E+05	-8.4642E+05	0.0000E+00	1.4831E+06
21 , 2	1.1628E-04	-1.1207E+06	-1.3800E+06	1.3276E+06	1.1721E+06
21 , 3	1.1628E-04	-1.1207E+06	-1.3800E+06	1.1721E+06	1.3276E+06



21 ,	4	1.6256E-04	-6.3775E+05	-8.4640E+05	1.4831E+06	0.0000E+00
22 ,	1	1.4063E-04	-5.5577E+05	-7.1754E+05	0.0000E+00	1.2828E+06
22 ,	2	1.0053E-04	-9.7401E+05	-1.1780E+06	1.1481E+06	1.0133E+06
22 ,	3	1.0053E-04	-9.7397E+05	-1.1780E+06	1.0134E+06	1.1481E+06
22 ,	4	1.4063E-04	-5.5565E+05	-7.1761E+05	1.2828E+06	0.0000E+00
23 ,	1	1.2347E-04	-4.8956E+05	-6.1824E+05	0.0000E+00	1.1281E+06
23 ,	2	8.8791E-05	-8.6818E+05	-1.0167E+06	1.0115E+06	8.9499E+05
23 ,	3	8.8784E-05	-8.6816E+05	-1.0167E+06	8.9496E+05	1.0117E+06
23 ,	4	1.2353E-04	-4.8924E+05	-6.1790E+05	1.1284E+06	0.0000E+00
24 ,	1	1.2130E-04	-5.7771E+05	-4.9747E+05	0.0000E+00	1.1063E+06
24 ,	2	8.6648E-05	-9.5652E+05	-8.7598E+05	9.8985E+05	8.7349E+05
24 ,	3	8.6670E-05	-9.5636E+05	-8.7585E+05	8.7356E+05	9.8994E+05
24 ,	4	1.2128E-04	-5.7756E+05	-4.9740E+05	1.1062E+06	0.0000E+00
25 ,	1	8.4088E-05	0.0000E+00	-7.1316E+05	0.0000E+00	7.3081E+05
25 ,	2	4.9326E-05	0.0000E+00	-1.0924E+06	6.1401E+05	4.9721E+05
25 ,	3	4.9326E-05	0.0000E+00	-1.0923E+06	4.9720E+05	6.1426E+05
25 ,	4	8.4164E-05	0.0000E+00	-7.1268E+05	7.3131E+05	0.0000E+00

## SHEARS AND AXIAL FORCES IN COLUMNS

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## STOREY 1

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
1 , 1	4.1598E+05	4.5969E+03	
1 , 2	7.0884E+04	6.7391E+03	2.2672E+04
1 , 3	-7.0885E+04	6.7391E+03	
1 , 4	-4.1598E+05	4.5970E+03	

## STOREY 2

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
2 , 1	4.0228E+05	1.4237E+04	
2 , 2	6.8206E+04	2.3187E+04	7.4850E+04
2 , 3	-6.8207E+04	2.3188E+04	
2 , 4	-4.0228E+05	1.4238E+04	

## STOREY 3

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
3 , 1	3.8109E+05	1.6662E+04	
3 , 2	6.4591E+04	2.7760E+04	8.8846E+04
3 , 3	-6.4592E+04	2.7761E+04	
3 , 4	-3.8109E+05	1.6662E+04	

## STOREY 4

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
4 , 1	3.5642E+05	1.8515E+04	
4 , 2	6.0402E+04	3.0889E+04	9.8807E+04
4 , 3	-6.0404E+04	3.0889E+04	
4 , 4	-3.5642E+05	1.8515E+04	

## STOREY 5

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
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5 , 1	3.2979E+05	1.9316E+04	
5 , 2	5.5890E+04	3.2333E+04	1.0330E+05
5 , 3	-5.5892E+04	3.2333E+04	
5 , 4	-3.2979E+05	1.9316E+04	

STOREY 6  
=====

COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
6 , 1	3.0233E+05	1.9546E+04	
6 , 2	5.1250E+04	3.2766E+04	1.0462E+05
6 , 3	-5.1251E+04	3.2766E+04	
6 , 4	-3.0234E+05	1.9546E+04	

STOREY 7  
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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
7 , 1	2.7477E+05	1.9397E+04	
7 , 2	4.6596E+04	3.2555E+04	1.0390E+05
7 , 3	-4.6597E+04	3.2555E+04	
7 , 4	-2.7477E+05	1.9396E+04	

STOREY 8  
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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
8 , 1	2.4752E+05	1.9053E+04	
8 , 2	4.1998E+04	3.1979E+04	1.0206E+05
8 , 3	-4.1999E+04	3.1979E+04	
8 , 4	-2.4752E+05	1.9052E+04	

STOREY 9  
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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
9 , 1	2.2086E+05	1.8460E+04	
9 , 2	3.7507E+04	3.1107E+04	9.9133E+04
9 , 3	-3.7507E+04	3.1107E+04	
9 , 4	-2.2086E+05	1.8459E+04	

STOREY 10  
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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
10 , 1	1.9469E+05	1.8735E+04	
10 , 2	3.3106E+04	3.1241E+04	9.9952E+04
10 , 3	-3.3106E+04	3.1241E+04	
10 , 4	-1.9469E+05	1.8734E+04	

STOREY 11

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
11 , 1	1.7051E+05	1.4866E+04	
11 , 2	2.3714E+04	2.4751E+04	7.9235E+04
11 , 3	-2.3713E+04	2.4751E+04	
11 , 4	-1.7051E+05	1.4866E+04	

STOREY 12

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
12 , 1	1.5052E+05	1.3664E+04	
12 , 2	2.5384E+04	2.3042E+04	7.3410E+04
12 , 3	-2.5384E+04	2.3042E+04	
12 , 4	-1.5052E+05	1.3663E+04	

STOREY 13

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
13 , 1	1.3155E+05	1.3054E+04	
13 , 2	2.2221E+04	2.1938E+04	6.9985E+04
13 , 3	-2.2221E+04	2.1938E+04	
13 , 4	-1.3155E+05	1.3055E+04	

STOREY 14

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
14 , 1	1.1366E+05	1.2187E+04	
14 , 2	1.9234E+04	2.0508E+04	6.5390E+04
14 , 3	-1.9234E+04	2.0508E+04	
14 , 4	-1.1366E+05	1.2187E+04	

STOREY 15

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
15 , 1	9.7027E+04	1.1246E+04	
15 , 2	1.6461E+04	1.8927E+04	6.0347E+04
15 , 3	-1.6461E+04	1.8927E+04	
15 , 4	-9.7027E+04	1.1247E+04	

STOREY 16

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
16 , 1	8.1773E+04	1.0241E+04	
16 , 2	1.3916E+04	1.7243E+04	5.4969E+04
16 , 3	-1.3917E+04	1.7243E+04	
16 , 4	-8.1774E+04	1.0242E+04	

STOREY 17

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
17 , 1	6.7960E+04	9.2047E+03	
17 , 2	1.1613E+04	1.5503E+04	4.9418E+04
17 , 3	-1.1614E+04	1.5504E+04	
17 , 4	-6.7962E+04	9.2060E+03	

STOREY 18

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
18 , 1	5.5616E+04	8.1637E+03	
18 , 2	9.5547E+03	1.3756E+04	4.3842E+04
18 , 3	-9.5570E+03	1.3757E+04	
18 , 4	-5.5618E+04	8.1650E+03	

STOREY 19

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
19 , 1	4.4727E+04	7.1448E+03	
19 , 2	7.7413E+03	1.2047E+04	3.8384E+04
19 , 3	-7.7436E+03	1.2047E+04	
19 , 4	-4.4729E+04	7.1456E+03	

## STOREY 20

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
20 , 1	3.5240E+04	6.1785E+03	
20 , 2	6.1610E+03	1.0427E+04	3.3212E+04
20 , 3	-6.1640E+03	1.0427E+04	
20 , 4	-3.5243E+04	6.1796E+03	

## STOREY 21

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
21 , 1	2.7055E+04	5.2977E+03	
21 , 2	4.7998E+03	8.9483E+03	2.8492E+04
21 , 3	-4.8030E+03	8.9486E+03	
21 , 4	-2.7059E+04	5.2975E+03	

## STOREY 22

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
22 , 1	2.0029E+04	4.5307E+03	
22 , 2	3.6334E+03	7.6754E+03	2.4412E+04
22 , 3	-3.6365E+03	7.6752E+03	
22 , 4	-2.0032E+04	4.5310E+03	

## STOREY 23

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
23 , 1	1.3951E+04	3.9637E+03	
23 , 2	2.6229E+03	6.6860E+03	2.1298E+04
23 , 3	-2.6260E+03	6.6860E+03	
23 , 4	-1.3955E+04	3.9621E+03	

## STOREY 24

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
24 , 1	8.6024E+03	3.3778E+03	
24 , 2	1.7487E+03	5.9017E+03	1.8557E+04
24 , 3	-1.7507E+03	5.9011E+03	
24 , 4	-8.6044E+03	3.3766E+03	

STOREY 25

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COLUMN NUMBER	AXIAL FORCES	COLUMN SHEARS	FRAME STORY SHEAR
25 , 1	3.3620E+03	4.4225E+03	
25 , 2	3.7602E+02	6.9492E+03	2.2740E+04
25 , 3	-8.7790E+02	6.9484E+03	
25 , 4	-3.3639E+03	4.4204E+03	

TOLERANCE USED FOR TERMINATION = 1.00 %

CONVERGENT SOLUTION AFTER 25 CYCLES OF ITERATION



ภาคผนวก ข

รายละเอียดของโปรแกรมคอมพิวเตอร์



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1000 REM *****
1010 REM **
1020 REM ** AN APPROXIMATE ANALYSIS OF PLANE FRAME-SHEARWALL **
1030 REM **
1040 REM ** STRUCTURES SUBJECTED TO LATERAL LOADS **
1050 REM **
1060 REM *****
1070 KEY OFF : CLEAR
1080 DIM AX(30,6),VC(30,6),SW(30),S1(30,6)
1090 DIM KS(6),RW(31),MIC(30,6),MIB(30,6),IP(30),IM(30)
1100 DIM SC(31,6),SB(30,6),H(30),LB(6),P(30),BD(30,1)
1110 DIM FS(30),FD(30),IS(30),ID(30),SF(31,8),HD(30)
1120 DIM TMC(30,6),BMC(30,6),LMB(30,6),RMB(30,6),V(30)
1130 CLS
1140 LOCATE 5
1150 A$="AN APPROXIMATE ANALYSIS OF PLANE FRAME-SHEAR WALL"
1160 GOSUB 1580
1170 A$ = "BY"
1180 LOCATE 7: GOSUB 1580
1190 A$="MR. CHALERMKIAT ISSARANGKURA"
1200 LOCATE 9: GOSUB 1580
1210 A$="DEPARTMENT OF CIVIL ENGINEERING"
1220 LOCATE 12: GOSUB 1580
1230 A$="GRADUATE SCHOOL"
1240 LOCATE 15: GOSUB 1580
1250 A$="CHULALONGKORN UNIVERSITY"
1260 LOCATE 18: GOSUB 1580
1270 LOCATE 22
1280 COLOR 23
1290 PRINT TAB( 28);"PRESS ANY KEY TO CONTINUE ";
1300 COLOR 7
1310 A$=""
1320 A$ = INKEY$
1330 IF A$ = "" THEN GOTO 1320
1340 CLS
1350 LOCATE 5
1360 A$ = "= INPUT MENU ="
1370 GOSUB 1580
1380 LOCATE 10
1390 BB = 26
1400 PRINT TAB(BB)"< 1 > INPUT NEW DATA"
1410 PRINT
1420 PRINT TAB(BB)"< 2 > EDIT EXISTING DATA"
1430 PRINT
1440 PRINT TAB(BB)"< 3 > INPUT EXISTING DATA"
1450 PRINT
1460 PRINT TAB(BB)"< 4 > EXIT TO SYSTEM"
1470 LOCATE 22
1480 PRINT TAB(22);"SELECT 1,2,3 OR 4 : ";
1490 I$ = ""
1500 I$ = INKEY$

```

```

1510 IF I$ = "" THEN GOTO 1500
1520 IF I$ <> "1" AND I$ <> "2" AND I$ <> "3" AND I$ <> "4" GOTO 1500
1530 IF I$ = "1" THEN GOTO 1610
1540 IF I$ = "2" THEN K$ = "EDIT" :GOTO 6550
1550 IF I$ = "3" THEN GOTO 6550
1560 CLS
1570 END
1580 REM CENTER STRING A$
1590 B = INT (40 - (LEN (A$) / 2)):IF B = < 0 THEN B = 1
1600 LOCATE ,B: PRINT A$: RETURN
1610 REM *****
1620 REM ** **
1630 REM ** PROGRAM INPUT 1 **
1640 REM ** **
1650 REM *****
1660 REM
1670 REM
1680 REM INPUT NEW DATA
1690 REM
1700 REM
1710 CLS
1720 LOCATE 3:PRINT
1730 INPUT "PROJECT NAME (MAXIMUM 25 CHARACTERS) = ";NAMES
1740 CLS
1750 LOCATE 1
1760 PRINT
1770 PRINT "==INPUT FRAME PROPERTIES=="
1780 PRINT
1790 INPUT "TOTAL NUMBER OF STORIES = ";NS
1800 PRINT
1810 INPUT "TOTAL NUMBER OF BAYS(LINK BEAM INCLUDED) = ";NB
1820 PRINT
1830 INPUT "MODULUS OF ELASTICITY (FRAME) = ";E
1840 PRINT
1850 LOCATE 23
1860 PRINT "DO YOU ACCEPT THESE DATA Y/N ";
1870 A$ = "":A$ = INKEY$
1880 IF A$ = "" THEN GOTO 1870
1890 IF A$ <> "Y" AND A$ <> "N" AND A$ <> "y" AND A$ <> "n" THEN 1870
1900 IF A$ = "N" OR A$ = "n" THEN GOTO 1740
1910 GOSUB 3510
1920 BB = 25
1930 LOCATE ,BB
1940 PRINT "INPUT LINKING CONDITIONS"
1950 LOCATE ,BB
1960 PRINT "======"
1970 LOCATE 8
1980 PRINT TAB(10);"< 1 > (FRAME) HINGED ----- HINGED (SHEAR WALL)"
1990 PRINT
2000 PRINT TAB(10);"< 2 > (FRAME) FIXED ----- FIXED (SHEAR WALL)"
2010 PRINT
2020 PRINT TAB(10);"< 3 > (FRAME) FIXED ----- HINGED (SHEAR WALL)"
2030 LOCATE 20
2040 PRINT " SELECT 1,2 OR 3 : ";

```

```

2050 I$ = "" : I$ = INKEY$
2060 IF I$ = "" THEN GOTO 2050
2070 IF I$ = "1" THEN M$ = "HINGE"
2080 IF I$ = "2" THEN M$ = "FIX"
2090 IF I$ = "3" THEN M$ = "FIX-HINGE"
2100 IF I$ <> "1" AND I$ <> "2" AND I$ <> "3" THEN 2050
2110 CLS
2120 LOCATE 1
2130 TOF = 2
2140 PRINT "INPUT STOREY HEIGHT "
2150 PRINT "=====
2160 PRINT
2170 FOR I = 1 TO NS
2180 PRINT "HEIGHT OF COLUMN AT FLOOR # ";I;
2190 INPUT " ";TEMP$
2200 IF TEMP$ <> "/" THEN 2230
2210 H(I)= VAL(TEMP1$)
2220 GOTO 2240
2230 H(I) = VAL(TEMP$)
2240 TEMP1$ = STR$(H(I))
2250 TOF = TOF + 2
2260 IF TOF >= 23 THEN TOF = 23
2270 LOCATE TOF,32 : PRINT " = ";H(I);"
2280 PRINT
2290 NEXT I
2300 PRINT
2310 GOSUB 6490
2320 IF A$ = "N" OR A$ = "n" THEN GOTO 2110
2330 CLS
2340 LOCATE 2
2350 PRINT "INPUT SPAN LENGTH"
2360 PRINT "=====
2370 PRINT
2380 FOR J = 1 TO NB
2390 PRINT
2400 PRINT "LENGTH OF SPAN # ";J;" = ";
2410 INPUT " ";LB(J)
2420 NEXT J
2430 PRINT
2440 GOSUB 6490
2450 IF A$ = "N" OR A$ = "n" THEN GOTO 2330
2460 PRINT
2470 FOR I = 1 TO NS
2480 CLS
2490 LOCATE 2
2500 TOF = 3
2510 PRINT "INPUT MOMENT OF INERTIA OF COLUMN"
2520 PRINT "=====
2530 PRINT
2540 FOR J = 1 TO NB
2550 PRINT "MOMENT OF INERTIA OF COLUMN ";I;" ";J;
2560 INPUT " ";TEMP$
2570 IF TEMP$ <> "/" THEN 2600
2580 MIC(I,J) = VAL(TEMP1$)

```

```

2590 GOTO 2610
2600 MIC(I,J) = VAL(TEMP$)
2610 TEMP1$ = STR$(MIC(I,J))
2620 TOF = TOF + 2
2630 IF TOF >= 25 THEN TOF = 25
2640 LOCATE TOF,37 : PRINT " = ";MIC(I,J);"
2650 PRINT
2660 NEXT J
2670 PRINT
2680 GOSUB 6490
2690 IF A$ = "N" OR A$ = "n" THEN GOTO 2480
2700 NEXT I
2710 FOR I = 1 TO NS
2720 CLS
2730 LOCATE 2
2740 PRINT "INPUT MOMENT OF INERTIA OF BEAM"
2750 PRINT "===== "
2760 PRINT
2770 TOF = 3
2780 FOR J = 1 TO NB
2790 PRINT "MOMENT OF INERTIA OF BEAM ";I;",";J;
2800 INPUT " ";TEMP$
2810 IF TEMP$ <> "/" THEN 2840
2820 MIB(I,J) = VAL(TEMP1$)
2830 GOTO 2850
2840 MIB(I,J) = VAL(TEMP$)
2850 TEMP1$ = STR$(MIB(I,J))
2860 TOF = TOF+2
2870 LOCATE TOF,35 : PRINT " = ";MIB(I,J);"
2880 PRINT
2890 NEXT J
2900 PRINT
2910 GOSUB 6490
2920 IF A$ = "N" OR A$ = "n" THEN GOTO 2720
2930 NEXT I
2940 CLS
2950 LOCATE 2
2960 PRINT "INPUT SPRING CONSTANT AT COLUMN BASE"
2970 PRINT "===== "
2980 PRINT
2990 FOR J = 1 TO NB
3000 PRINT "SPRING CONSTANT AT COLUMN BASE ";J;" = ";
3010 INPUT " ";KS(J)
3020 PRINT
3030 NEXT J
3040 GOSUB 6490
3050 IF A$ = "N" OR A$ = "n" THEN GOTO 2940
3060 CLS
3070 LOCATE 2
3080 PRINT "INPUT SHEAR WALL PROPERTIES"
3090 PRINT "===== "
3100 PRINT
3110 INPUT "MODULUS OF ELASTICITY (SHEAR WALL) ";ESW
3120 PRINT

```

```

3130 INPUT "MOMENT OF INERTIA OF SHEAR WALL ";IS
3140 PRINT
3150 IF M$ = "HINGE" THEN 3190
3160 PRINT
3170 PRINT "DISTANCE FROM NEUTRAL AXIS OF "
3180 INPUT "SHEAR WALL TO OUTER FIBER AT FRAME END ";DH
3190 PRINT
3200 INPUT "SPRING CONSTANT AT SHEAR WALL BASE ";KS
3210 IF KS =< 0 THEN 3200
3220 PRINT
3230 GOSUB 6490
3240 IF A$ = "N" OR A$ = "n" THEN GOTO 3060
3250 REM
3260 REM ==INPUT LATERAL LOADS==
3270 REM
3280 GOSUB 3510
3290 LOCATE ,BB
3300 PRINT "INPUT LATERAL LOADS "
3310 LOCATE ,BB
3320 PRINT "===== "
3330 PRINT : PRINT : PRINT
3340 FOR I = NS TO 1 STEP - 1
3350 PRINT "LATERAL LOAD AT FLOOR NUMBER ";
3360 PRINT USING"###";I;
3370 PRINT SPC(9);
3380 INPUT " ";P(I)
3390 PRINT
3400 NEXT I
3410 PRINT
3420 LOCATE 24
3430 PRINT "DO YOU ACCEPT THESE DATA Y/N ";
3440 A$ = "" : A$ = INKEY$
3450 IF A$ = "" THEN GOTO 3440
3460 IF A$ <> "Y" AND A$ <> "N" AND A$ <> "n" AND A$ <> "y" THEN 3440
3470 IF A$ = "N" OR A$ = "n" THEN GOTO 3280
3480 GOSUB 3510
3490 INPUT " TOLERANCE USED IN TERMINATION % ";EPP
3500 GOTO 5890
3510 CLS
3520 LOCATE 2
3530 RETURN
3540 REM *****
3550 REM **
3560 REM ** PROGRAM INPUT 2 **
3570 REM **
3580 REM *****
3590 REM
3600 REM EDIT EXISTING DATA
3610 REM
3620 CLS
3630 LOCATE 3 :PRINT
3640 PRINT "PROJECT : ";NAME$
3650 TEMP$ = NAME$
3660 GOSUB 5810

```

```

3670 NAMES$ = TEMP$
3680 CLS
3690 LOCATE 1
3700 PRINT
3710 PRINT "TOTAL NUMBER OF STORIES = ";NS
3720 TEMP = NS
3730 GOSUB 5730
3740 NS = TEMP
3750 PRINT
3760 PRINT "TOTAL NUMBER OF BAYS = ";NB
3770 TEMP = NB
3780 GOSUB 5730
3790 NB = TEMP
3800 PRINT
3810 PRINT "MODULUS OF ELASTICITY (FRAME) = ";E
3820 TEMP = E
3830 GOSUB 5730
3840 E = TEMP
3850 PRINT
3860 LOCATE 23
3870 PRINT "DO YOU ACCEPT THESE DATA Y/N ";
3880 A$ = "":A$ = INKEY$
3890 IF A$ = "" THEN GOTO 3880
3900 IF A$ < > "Y" AND A$ < > "N" AND A$ <> "y" AND A$ <> "n" THEN 3880
3910 IF A$ = "N" OR A$ = "n" THEN GOTO 3680
3920 GOSUB 5640
3930 BB = 25
3940 LOCATE ,BB
3950 PRINT "EDIT LINKING CONDITIONS"
3960 LOCATE ,BB
3970 PRINT "======"
3980 LOCATE 8
3990 PRINT TAB(10);"< 1 > (FRAME) HINGED ----- HINGED (SHEAR WALL)"
4000 PRINT
4010 PRINT TAB(10);"< 2 > (FRAME) FIXED ----- FIXED (SHEAR WALL)"
4020 PRINT
4030 PRINT TAB(10);"< 3 > (FRAME) FIXED ----- HINGED (SHEAR WALL)"
4040 LOCATE 20
4050 IF M$ = "HINGE" THEN I$ = "1"
4060 IF M$ = "FIX" THEN I$ = "2"
4070 IF M$ = "FIX-HINGE" THEN I$ = "3"
4080 PRINT "NOW YOU USE TYPE "; I$
4090 TEMP$ = I$
4100 GOSUB 5810
4110 I$ = TEMP$
4120 IF I$ = "1" THEN M$ = "HINGE"
4130 IF I$ = "2" THEN M$ = "FIX"
4140 IF I$ = "3" THEN M$ = "FIX-HINGE"
4150 IF I$ <> "1" AND I$ <> "2" AND I$ <> "3" THEN 4090
4160 CLS
4170 LOCATE 3
4180 PRINT "EDIT STOREY HEIGHT "
4190 PRINT "======"
4200 PRINT

```

```
4210 FOR I = 1 TO NS
4220 PRINT
4230 PRINT "HEIGHT OF COLUMN AT FLOOR # ";I;" = ";
4240 PRINT " ";H(I)
4250 TEMP = H(I)
4260 GOSUB 5730
4270 H(I) = TEMP
4280 NEXT I
4290 PRINT
4300 GOSUB 5670
4310 IF A$ = "N" OR A$ = "n" THEN GOTO 4010
4320 CLS
4330 LOCATE 2
4340 PRINT "EDIT SPAN LENGTH"
4350 PRINT "===== "
4360 PRINT
4370 FOR J = 1 TO NB
4380 PRINT
4390 PRINT "LENGTH OF SPAN # ";J;" = ";
4400 PRINT " ";LB(J)
4410 TEMP = LB(J)
4420 GOSUB 5730
4430 LB(J) = TEMP
4440 NEXT J
4450 PRINT
4460 GOSUB 5670
4470 IF A$ = "N" OR A$ = "n" THEN GOTO 4320
4480 PRINT
4490 FOR I = 1 TO NS
4500 CLS
4510 LOCATE 2
4520 PRINT "EDIT MOMENT OF INERTIA OF COLUMN"
4530 PRINT "===== "
4540 PRINT
4550 FOR J = 1 TO NB
4560 PRINT "MOMENT OF INERTIA OF COLUMN ";I;" ";J;
4570 PRINT " ";MIC(I,J)
4580 TEMP = MIC(I,J)
4590 GOSUB 5730
4600 MIC(I,J) = TEMP
4610 PRINT
4620 NEXT J
4630 PRINT
4640 GOSUB 5670
4650 IF A$ = "N" OR A$ = "n" THEN GOTO 4500
4660 NEXT I
4670 FOR I = 1 TO NS
4680 CLS
4690 LOCATE 2
4700 PRINT "EDIT MOMENT OF INERTIA OF BEAM"
4710 PRINT "===== "
4720 PRINT
4730 FOR J = 1 TO NB
4740 PRINT "MOMENT OF INERTIA OF BEAM ";I;" ";J;
```

```

4750 PRINT " ";MIB(I,J)
4760 TEMP = MIB(I,J)
4770 GOSUB 5730
4780 MIB(I,J) = TEMP
4790 PRINT
4800 NEXT J
4810 PRINT
4820 GOSUB 5670
4830 IF A$ = "N" OR AS = "n" THEN GOTO 4680
4840 NEXT I
4850 CLS
4860 LOCATE 2
4870 PRINT "EDIT SPRING CONSTANT AT COLLUMN BASE"
4880 PRINT "===== "
4890 PRINT
4900 FOR J = 1 TO NE
4910 PRINT "SPRING CONSTANT AT COLUMN BASE ";J;" = ";
4920 PRINT " ";KS(J)
4930 TEMP = KS(J)
4940 GOSUB 5730
4950 KS(J) = TEMP
4960 PRINT
4970 NEXT J
4980 GOSUB 5670
4990 IF A$ = "N" OR AS = "n" THEN GOTO 4850
5000 CLS
5010 LOCATE 2
5020 PRINT "EDIT SHEAR WALL PROPERTIES"
5030 PRINT "===== "
5040 PRINT
5050 PRINT "MODULUS OF ELASTICITY ";ESW
5060 TEMP = ESW
5070 GOSUB 5730
5080 ESW = TEMP
5090 PRINT
5100 PRINT "MOMENT OF INERTIA OF SHEAR WALL ";IS
5110 TEMP = IS
5120 GOSUB 5730
5130 IS = TEMP
5140 IF M$ = "HINGE" THEN 5210
5150 PRINT
5160 PRINT "DISTANCE FROM NEUTRAL AXIS OF "
5170 PRINT "SHEAR WALL TO OUTER FIBER AT FRAME END ";DH
5180 TEMP = DH
5190 GOSUB 5730
5200 DH = TEMP
5210 PRINT
5220 PRINT "SPRING CONSTANT AT SHEAR WALL BASE ";KS
5230 TEMP = KS
5240 GOSUB 5730
5250 KS = TEMP
5260 IF KS = 0 THEN 5220
5270 PRINT
5280 GOSUB 5670

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```

5290 IF A$ = "N" OR A$ = "n" THEN GOTO 5000
5300 REM
5310 REM ==EDIT LATERAL LOADS==
5320 REM
5330 GOSUB 5640
5340 LOCATE ,BB
5350 PRINT "EDIT LATERAL LOADS "
5360 LOCATE ,BB
5370 PRINT "===== "
5380 PRINT : PRINT : PRINT
5390 FOR I = NS TO 1 STEP - 1
5400 PRINT "LATERAL LOAD AT FLOOR NUMBER ";
5410 PRINT USING"###";I;
5420 PRINT SPC(9);
5430 PRINT " ";P(I)
5440 TEMP = P(I)
5450 GOSUB 5730
5460 P(I) = TEMP
5470 PRINT
5480 NEXT I
5490 PRINT
5500 LOCATE 24
5510 PRINT "DO YOU ACCEPT THESE DATA Y/N ";
5520 A$ = "" : A$ = INKEYS
5530 IF A$ = "" THEN GOTO 5520
5540 IF A$ <> "Y" AND A$ <> "N" AND A$ <> "n" AND A$ <> "y" THEN 5520
5550 IF A$ = "N" OR A$ = "n" THEN GOTO 5330
5560 GOSUB 5640
5570 PRINT " TOLERANCE USED IN TERMINATION % ";EPP
5580 TEMP = EPP
5590 GOSUB 5730
5600 EPP = TEMP
5610 GOSUB 5670
5620 IF A$ = "N" OR A$ = "n" THEN GOTO 5560
5630 GOTO 5890
5640 CLS
5650 LOCATE 2
5660 RETURN
5670 LOCATE 23
5680 PRINT"DO YOU ACCEPT THESE DATA [Y/N] ";
5690 A$ = "" : A$ = INKEYS
5700 IF A$ = "" THEN GOTO 5690
5710 IF A$ <> "Y" AND A$ <> "N" AND A$ <> "n" AND A$ <> "y" THEN 5690
5720 RETURN
5730 REM SUBROUTINE FOR CHANGING DATA
5740 PRINT
5750 PRINT "change this data [y/n] ";
5760 PRINT
5770 GOSUB 5690
5780 IF A$ = "N" OR A$ = "n" THEN GOTO 5800
5790 INPUT"change to ";TEMP
5800 RETURN
5810 REM SUBROUTINE FOR CHANGING DATA
5820 PRINT

```

```

5830 PRINT "change this type [y/n] ";
5840 PRINT
5850 GOSUB 5690
5860 IF A$ = "N" OR A$ = "n" THEN GOTO 5880
5870 INPUT"change to ";TEMP$
5880 RETURN
5890 CLS
5900 LOCATE 2
5910 PRINT "DO YOU WANT TO SAVE THE DATA TO DISK FILE Y/N ";
5920 GOSUB 6510
5930 IF A$ = "N" OR A$ = "n" THEN GOTO 7190
5940 CLS
5950 LOCATE 3
5960 PRINT "SAVE STRUCTURAL PROPERTIES TO THE DISK FILE "
5970 PRINT "===== "
5980 LOCATE 9
5990 INPUT "FILE NAME [.INP] : ";F$
6000 LOCATE 11
6010 PRINT "IS FILE NAME CORRECT ? Y/N ";
6020 PRINT
6030 GOSUB 6510
6040 IF A$ = "N" OR A$ = "n" THEN GOTO 5940
6050 LOCATE 13
6060 PRINT "INSERT THE DATA DISKEETE IN DRIVE B:"
6070 LOCATE 15
6080 PRINT"STRIKE ANY KEY WHEN READY";
6090 A$ = "" : A$ = INKEY$ : IF A$ = "" THEN GOTO 6090
6100 F$ = "B:" + F$
6110 OPEN "O",#1,F$,20
6120 CLOSE #1
6130 KILL F$
6140 OPEN "O",#1,F$,20
6150 PRINT#1, NAMES$
6160 PRINT#1, NS
6170 PRINT#1, NB
6180 PRINT#1, E
6190 FOR I = 1 TO NS
6200 PRINT#1, H(I)
6210 NEXT I
6220 FOR J = 1 TO NB
6230 PRINT#1, LB(J)
6240 NEXT J
6250 FOR I = 1 TO NS
6260 FOR J = 1 TO NB
6270 PRINT#1, MIC(I,J)
6280 NEXT J
6290 NEXT I
6300 FOR I = 1 TO NS
6310 FOR J = 1 TO NB
6320 PRINT#1,MIB(I,J)
6330 NEXT J
6340 NEXT I
6350 FOR J = 1 TO NB
6360 PRINT#1, KS(J)

```

```

6370 NEXT J
6380 PRINT#1, ESW
6390 PRINT#1, IS
6400 PRINT#1, DH
6410 PRINT#1, KS
6420 PRINT#1, M$
6430 FOR I = 1 TO NS
6440 PRINT#1, P(I)
6450 NEXT I
6460 PRINT#1, EPP
6470 CLOSE# 1
6480 GOTO 7190
6490 LOCATE 23
6500 PRINT "DO YOU ACCEPT THESE DATA Y/N ";
6510 A$ = "":A$ = INKEY$
6520 IF A$ = "" THEN GOTO 6510
6530 IF A$ < > "Y" AND A$ < > "N" AND A$ <> "y" AND A$ <> "n" THEN 6510
6540 RETURN
6550 REM *****
6560 REM **
6570 REM ** PROGRAM INPUT 3 **
6580 REM ** **
6590 REM *****
6600 REM
6610 REM INPUT EXISTING DATA
6620 REM
6630 CLS
6640 LOCATE 3
6650 PRINT "INPUT DATA FROM THE FILE ON DISK"
6660 PRINT "===== "
6670 LOCATE 9
6680 INPUT "FILE NAME [.INP] : ";F$
6690 LOCATE 11
6700 PRINT "IS FILENAME CORRECT Y/N ";
6710 A$ = "": A$ = INKEY$
6720 IF A$ = "" THEN GOTO 6710
6730 IF A$ <> "N" AND A$ <> "Y" AND A$ <> "y" AND A$ <> "n" THEN GOTO 6710
6740 IF A$ = "N" OR A$ = "n" THEN GOTO 6630
6750 PRINT
6760 LOCATE 13
6770 PRINT "INSERT DATA DISKETTE IN DRIVE B: "
6780 LOCATE 15
6790 PRINT"STRIKE ANY KEY WHEN READY"
6800 A$ = "": A$ = INKEY$
6810 IF A$ = "" THEN GOTO 6800
6820 F$ = "B:" + F$
6830 ON ERROR GOTO 6630
6840 OPEN "I",#2,F$,20
6850 INPUT#2, NAME$
6860 INPUT#2, NS
6870 INPUT#2, NB
6880 INPUT#2, E
6890 FOR I = 1 TO NS
6900 INPUT#2, H(I)

```

```

6910 NEXT I
6920 FOR J = 1 TO NB
6930 INPUT#2, LB(J)
6940 NEXT J
6950 FOR I = 1 TO NS
6960 FOR J = 1 TO NB
6970 INPUT#2, MIC(I,J)
6980 NEXT J
6990 NEXT I
7000 FOR I = 1 TO NS
7010 FOR J = 1 TO NB
7020 INPUT#2, MIB(I,J)
7030 NEXT J
7040 NEXT I
7050 FOR J = 1 TO NB
7060 INPUT#2, KS(J)
7070 NEXT J
7080 INPUT#2, ESW
7090 INPUT#2, IS
7100 INPUT#2, DH
7110 INPUT#2, KS
7120 INPUT#2, MS
7130 FOR I = 1 TO NS
7140 INPUT#2, P(I)
7150 NEXT I
7160 INPUT#2, EPP
7170 CLOSE #2
7180 IF KS = "EDIT" THEN 3540
7190 REM *****
7200 REM ** **
7210 REM ** PROGRAM ITERATION **
7220 REM ** **
7230 REM *****
7240 D = DH*2
7250 EP = EPP/100
7260 FOR I = 1 TO NS
7270 FOR J = 1 TO NB
7280 SC(I,J) = MIC(I,J)*E/H(I)
7290 SB(I,J) = MIB(I,J)*E/LB(J)
7300 NEXT J
7310 NEXT I
7320 FOR I = 1 TO NS
7330 IP(I) = P(I)
7340 IM(I) = 0
7350 NEXT I
7360 KK = 0
7370 REM COMPUTE SHEAR WALL'S DEFORMATIONS
7380 GOSUB 9400
7390 GOSUB 9720
7400 FOR I = 1 TO NS
7410 FS(I) = SW(I)
7420 FD(I) = HD(I)
7430 NEXT I
7440 REM ITERATIVE PROCEDURE

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```

7450 KK = KK + 1
7460 FOR I = 1 TO NS
7470 ID(I) = HD(I)
7480 IS(I) = SW(I)
7490 NEXT I
7500 REM COMPUTE FRAME'S DEFORMATIONS
7510 FOR I = 1 TO NS
7520 RW(I) = (HD(I) - HD(I - 1)) / H(I)
7530 NEXT I
7540 IF KK < > 0 THEN 7610
7550 REM INITIALIZATION
7560 FOR I = 0 TO NS
7570 FOR J = 0 TO NB
7580 SF(I,J) = 0
7590 NEXT J
7600 NEXT I
7610 FOR I = 0 TO NS
7620 FOR J = 1 TO NB
7630 S1(I,J) = SF(I,J)
7640 NEXT J
7650 NEXT I
7660 REM COPUTE JOINT SLOPES OF COLUMN NB
7670 A = SC(1,NB) / (4 * SC(1,NB) + KS(NB))
7680 SF(0,NB) = A * (6 * RW(1) - 2 * SF(1,NB))
7690 FOR I = 1 TO NS STEP 2
7700 IF M$ = "FIX" THEN GOSUB 10230
7710 IF M$ = "FIX-HINGE" THEN GOSUB 10290
7720 IF M$ = "HINGE" THEN GOSUB 10070
7730 NEXT I
7740 FOR I = 2 TO NS STEP 2
7750 IF M$ = "FIX" THEN GOSUB 10230
7760 IF M$ = "FIX-HINGE" THEN GOSUB 10290
7770 IF M$ = "HINGE" THEN GOSUB 10070
7780 NEXT I
7790 REM COMPUTE JOINT SLOPES OF INTERIOR COLUMNS
7800 FOR J = NB - 1 TO 2 STEP - 1
7810 A = SC(1,J) / (4 * SC(1,J) + KS(J))
7820 SF(0,J) = A * (6 * RW(1) - 2 * SF(1,J))
7830 FOR I = 1 TO NS STEP 2
7840 GOSUB 10120
7850 NEXT I
7860 FOR I = 2 TO NS STEP 2
7870 GOSUB 10120
7880 NEXT I
7890 NEXT J
7900 REM COMPUTE JOINT SLOPES OF EXTERIOR COLUMN
7910 A = SC(1,1) / (4 * SC(1,1) + KS(1))
7920 SF(0,1) = A * (6 * RW(1) - 2 * SF(1,1))
7930 FOR I = 1 TO NS STEP 2
7940 GOSUB 10180
7950 NEXT I
7960 FOR I = 2 TO NS STEP 2
7970 GOSUB 10180
7980 NEXT I

```



```

7990 K3 = 0
8000 FOR I = 0 TO NS
8010 FOR J = 1 TO NB
8020 IF SF(I,J) = 0 THEN 8040
8030 IF ABS((SF(I,J)-S1(I,J))/SF(I,J))<EP THEN K3 = K3 + 1
8040 NEXT J
8050 NEXT I
8060 IF K3 < (NS + 1) * NB THEN 7610
8070 REM COMPUTE END MOMENTS IN COLUMNS
8080 FOR I = 1 TO NS
8090 FOR J = 1 TO NB
8100 TMC(I,J) = SC(I,J) * (4 * SF(I,J) + 2 * SF(I - 1,J) - 6 * RW(I))
8110 BMC(I,J) = SC(I,J) * (4 * SF(I - 1,J) + 2 * SF(I,J) - 6 * RW(I))
8120 NEXT J
8130 NEXT I
8140 IF M$ = "HINGE" THEN 8270
8150 IF M$ = "FIX-HINGE" THEN 8220
8160 REM COMPUTE END MOMENTS IN LINK BEAMS
8170 FOR I = 1 TO NS
8180 LMB(I,NB)=SB(I,NB)*(4*SF(I,NB)+2*SF(I,NB+1)+6*SF(I,NB+1)*DH/LB(NB))
8190 RMB(I,NB)=SB(I,NB)*(4*SF(I,NB+1)+2*SF(I,NB)+6*SF(I,NB+1)*DH/LB(NB))
8200 NEXT I
8210 GOTO 8310
8220 FOR I = 1 TO NS
8230 LMB(I,NB) = SB(I,NB) * (3 * SF(I,NB) + 3 * SW(I) * DH / LB(NB))
8240 RMB(I,NB) = 0
8250 NEXT I
8260 GOTO 8310
8270 FOR I = 1 TO NS
8280 RMB(I,NB) = 0
8290 LMB(I,NB) = 0
8300 NEXT I
8310 REM COMPUTE FRAME STORY SHEARS
8320 FOR I = 1 TO NS
8330 V(I) = 0
8340 NEXT I
8350 FOR I = 1 TO NS
8360 FOR J = 1 TO NB
8370 X = TMC(I,J) * H(I) / (TMC(I,J) + BMC(I,J))
8380 V(I) = V(I) - TMC(I,J) / X
8390 VC(I,J) = - TMC(I,J) / X
8400 NEXT J
8410 NEXT I
8420 REM COMPUTE INTERACTIVE FORCES & MOMENTS
8430 FOR I = 1 TO NS
8440 IF I = NS THEN IP(I) = P(I) - V(I) : GOTO 8460
8450 IP(I) = P(I) + V(I + 1) - V(I)
8460 RV = (LMB(I,NB) + RMB(I,NB)) / LB(NB)
8470 IM(I) = - RMB(I,NB) - RV * DH
8480 NEXT I
8490 REM COMPUTE SHEAR WALL'S DEFORMATIONS
8500 GOSUB 9400
8510 GOSUB 9720
8520 K1 = 0

```

```

8530 GOSUB 10350
8540 CLS
8550 LOCATE 5
8560 PRINT TAB( 30);"CYCLE NUMBER ";KK
8570 PRINT TAB( 30);"=====
8580 MAXDIF = 0
8590 IF KK =<1 THEN 8650
8600 FOR I = 1 TO NS
8610 ERF = ABS((HD(I)-ID(I))/HD(I))
8620 IF ERF > MAXDIF THEN MAXDIF = ERF
8630 IF ABS ((HD(I) - ID(I)) / HD(I)) < EP THEN K1 = K1 + 1
8640 NEXT I
8650 FOR I = 1 TO NS
8660 TL = (FD(I) - HD(I)) / ID(I)
8670 TL = (HD(I) - ID(I)) / (1 + TL)
8680 HD(I) = ID(I) + TL
8690 TL = (FS(I) - SW(I)) / IS(I)
8700 TL = (SW(I) - IS(I)) / (1 + TL)
8710 SW(I) = IS(I) + TL
8720 NEXT I
8730 IF KK = 1 THEN MAXDIF = 1
8740 LOCATE 11
8750 PRINT SPC(13);"MAXIMUM DIFFERENT DEFLECTION = ";
8760 PRINT USING "####.#";MAXDIF*100;
8770 PRINT " PERCENT"
8780 LOCATE 14
8790 PRINT SPC(13);"TOLERANCE USED FOR TERMINATION = ";
8800 PRINT USING "####.#";EP*100;
8810 PRINT " PERCENT"
8820 COLOR 23
8830 LOCATE 21:PRINT SPC(24);"=====
8840 LOCATE 22:PRINT SPC(24);"THE PROGRAM IS BEING RUN"
8850 LOCATE 23:PRINT SPC(24);"=====
8860 COLOR 7
8870 IF K1 < NS THEN 7440
8880 GOSUB 10350
8890 PRINT "CONVERGENT SOLUTION FOR TOLERANCE OF ";EP * 100;" %"
8900 PRINT
8910 PRINT "CYCLE OF ITERATION = ";KK
8920 PRINT
8930 PRINT
8940 FOR I = 1 TO NS
8950 RW(I) = (HD(I) - HD(I - 1)) / H(I)
8960 NEXT I
8970 REM COMPUTE END MOMENTS IN COLUMNS
8980 FOR I = 1 TO NS
8990 FOR J = 1 TO NB
9000 TMC(I,J)=SC(I,J)*(4*Sf(I,J)+2*Sf(I-1,J)-6*RW(I))
9010 BMC(I,J)=SC(I,J)*(4*Sf(I-1,J)+2*Sf(I,J)-6*RW(I))
9020 NEXT J
9030 NEXT I
9040 REM COMPUTE END MOMENTS IN BEAMS
9050 FOR I = 1 TO NS
9060 FOR J = 1 TO NB - 1

```

```

9070 LMB(I,J) = SB(I,J) * (4 * SF(I,J) + 2 * SF(I,J + 1))
9080 RMB(I,J) = SB(I,J) * (4 * SF(I,J + 1) + 2 * SF(I,J))
9090 NEXT J
9100 NEXT I
9110 REM COMPUTE AXIAL FORCES IN COLUMNS
9120 FOR I = 0 TO NS
9130 FOR J = 1 TO NB
9140 AX(I,J) = 0
9150 NEXT J
9160 NEXT I
9170 FOR I = NS TO 1 STEP - 1
9180 FOR J = 1 TO NB
9190 A = 0
9200 IF (LMB(I,J) + RMB(I,J)) = 0 THEN 9240
9210 X = LMB(I,J) * LB(J) / (LMB(I,J) + RMB(I,J))
9220 IF J = 1 OR J = NB THEN A = A + LMB(I,J)/X :GOTO 9240
9230 A = A - LMB(I,J) / X
9240 IF (LMB(I,J - 1) + RMB(I,J - 1)) = 0 THEN 9280
9250 X = RMB(I,J - 1) * LB(J - 1) / (LMB(I,J - 1) + RMB(I,J - 1))
9260 IF J = 1 OR J = NB THEN A = A - RMB(I,J-1)/X : GOTO 9280
9270 A = A + RMB(I,J - 1) / X
9280 IF I = NS THEN AX(I,J) = A : GOTO 9300
9290 AX(I,J) = AX(I + 1,J) + A
9300 NEXT J
9310 NEXT I
9320 LOCATE 23
9330 PRINT "PRESS RETURN KEY TO CONTINUE";
9340 AS = "" : AS = INKEYS
9350 IF AS = "" THEN GOTO 9340
9360 GOTO 10380
9370 REM =====
9380 REM == SUBROUTINE ==
9390 REM =====
9400 REM COMPUTE SHEAR WALL'S MOMENTS
9410 FOR I = 0 TO NS
9420 BD(I,0) = 0:BD(I,1) = 0
9430 NEXT I
9440 FOR I = NS TO 1 STEP - 1
9450 H = 0:DM = 0
9460 FOR J = NS TO I STEP - 1
9470 H = H + H(J)
9480 NEXT J
9490 FOR K = NS TO I STEP - 1
9500 IF K = NS THEN 9520
9510 H = H - H(K + 1)
9520 DM = DM + IP(K) * H
9530 NEXT K
9540 BD(I,1) = DM
9550 NEXT I
9560 FOR I = NS TO 0 STEP - 1
9570 A = 0
9580 FOR J = NS TO I STEP - 1
9590 A = A + IM(J)
9600 NEXT J

```



```

9610 IF I = NS THEN BD(I,0) = A : GOTO 9630
9620 BD(I,0) = BD(I + 1,1) + A
9630 NEXT I
9640 FOR I = NS TO 1 STEP - 1
9650 BD(I,1) = BD(I - 1,0) - IM(I - 1)
9660 NEXT I
9670 REM COMPUTE SHEAR WALL'S SHEARS
9680 FOR I = NS-1 TO 1 STEP -1
9690 IP(I) = IP(I+1) + IP(I)
9700 NEXT I
9710 RETURN
9720 REM COMPUTE SHEAR WALL'S DEFORMATIONS
9730 FOR I = 1 TO NS
9740 HD(I) = 0:SW(I) = 0
9750 NEXT I
9760 SW(0) = BD(1,1) / KS / ESW/ IS
9770 FOR I = 1 TO NS
9780 FOR J = 1 TO I
9790 TL = 0
9800 FOR K = J TO I
9810 IF K < > J THEN TL = TL + H(K): GOTO 9830
9820 TL = TL + H(K) / 2
9830 NEXT K
9840 HD(I) = HD(I) + BD(J,0) * H(J) * TL
9850 TL = 0
9860 FOR K = J TO I
9870 IF K < > J THEN TL = TL + H(K): GOTO 9890
9880 TL = TL + 2 * H(K) / 3
9890 NEXT K
9900 HD(I) = HD(I) + (BD(J,1) - BD(J,0)) * H(J) * TL / 2
9910 NEXT J
9920 SW(I) = (BD(I,0) + BD(I,1)) * H(I) / 2
9930 SW(I) = SW(I - 1) + SW(I)
9940 NEXT I
9950 FOR I = 1 TO NS
9960 H = 0
9970 FOR J = 1 TO I
9980 H = H + H(J)
9990 NEXT J
10000 HD(I) = HD(I) + SW(0) * H
10010 NEXT I
10020 FOR I = 0 TO NS
10030 HD(I) = HD(I) / ESW/ IS
10040 SW(I) = SW(I) / ESW/ IS
10050 NEXT I
10060 RETURN
10070 A = SB(I,NB - 1) * 2 * SF(I,NB - 1)
10080 A = A + SC(I,NB) * (2 * SF(I - 1,NB) - 6 * RW(I))
10090 A = A + SC(I+1,NB)*(2*SF(I+1,NB)-6*RW(I+1))
10100 SF(I,NB) = -A/4/(SB(I,NB-1)+SC(I,NB)+SC(I+1,NB))
10110 RETURN
10120 A = 2 * SB(I,J - 1) * SF(I,J - 1)
10130 A = A + 2 * SB(I,J) * SF(I,J + 1)
10140 A = A + SC(I + 1,J) * (2 * SF(I + 1,J) - 6 * RW(I + 1))

```

```

10150 A = A + SC(I,J) * (2 * SF(I - 1,J) - 6 * RW(I))
10160 SF(I,J)=-A/4/(SB(I,J - 1) + SB(I,J) + SC(I + 1,J) + SC(I,J))
10170 RETURN
10180 A = SC(I + 1,1) * (2 * SF(I + 1,1) - 6 * RW(I + 1))
10190 A = A + SC(I,1) * (2 * SF(I - 1,1) - 6 * RW(I))
10200 A = A + 2 * SB(I,1) * SF(I,2)
10210 SF(I,1) = - A / 4 / (SC(I + 1,1) + SC(I,1) + SB(I,1))
10220 RETURN
10230 A = SB(I,NB - 1) * 2 * SF(I,NB - 1)
10240 A = A + SB(I,NB) * (2 * SF(I,NB + 1) + 6 * SW(I)*DH/ LB(NB))
10250 A = A + SC(I + 1,NB) * (2 * SF(I + 1,NB) - 6 * RW(I + 1))
10260 A = A + SC(I,NB) * (2 * SF(I - 1,NB) - 6 * RW(I))
10270 SF(I,NB)=-A/4/(SB(I,NB-1)+SB(I,NB)+SC(I+1,NB)+SC(I,NB))
10280 RETURN
10290 A = SB(I,NB) * 3 * SW(I) * DH/ LB(NB)
10300 A = A + SB(I,NB - 1) * 2 * SF(I,NB - 1)
10310 A = A + SC(I + 1,NB) * (2 * SF(I + 1,NB) - 6 * RW(I + 1))
10320 A = A + SC(I,NB) * (2 * SF(I - 1,NB) - 6 * RW(I))
10330 SF(I,NB)=-A/(3*SB(I,NB)+4*(SB(I,NB-1)+4*SC(I+1,NB)+4*SC(I,NB)))
10340 RETURN
10350 CLS
10360 LOCATE 2
10370 RETURN
10380 REM *****
10390 REM **
10400 REM **          PROGRAM OUTPUT1          **
10410 REM **
10420 REM *****
10430 CLS : LOCATE 3
10440 AS = "OUTPUT MENU": GOSUB 13400
10450 AS = "=====": GOSUB 13400
10460 LOCATE 8
10470 BB = 28
10480 PRINT TAB( BB);"< 1 >          OUTPUT ON SCREEN"
10490 PRINT
10500 PRINT TAB( BB);"< 2 >          HARD COPY"
10510 PRINT
10520 PRINT TAB( BB);"< 3 >          DISK FILE"
10530 PRINT
10540 PRINT TAB( BB);"< 4 >          QUIT TO INPUT MENU"
10550 LOCATE 20
10560 PRINT TAB( BB - 5);"SELECT 1,2,3 OR 4          :          ";
10570 IS = "" : IS = INKEY$
10580 IF IS = "" THEN GOTO 10570
10590 IF IS <> "1" AND IS <> "2" AND IS <> "3" AND IS <> "4" THEN GOTO 10570
10600 IF IS = "1" THEN GOTO 10640
10610 IF IS = "2" THEN GOTO 13430
10620 IF IS = "3" THEN GOTO 16280
10630 IF IS = "4" THEN 1070
10640 REM
10650 REM OUTPUT ON SCREEN
10660 REM
10670 IF M$ = "HINGE" THEN N$ = "HINGED AT BOTH ENDS"
10680 IF M$ = "FIX" THEN N$ = "FIXED AT BOTH ENDS"

```

```
10690 IF M$="FIX-HINGE"THEN N$="FIXED AT FRAME END,HINGED AT WALL END"
10700 PAGE = 1
10710 PRINT "PROJECT : ";NAME$; TAB(65);"PAGE";
10720 PRINT USING"###";PAGE
10730 PRINT
10740 PRINT
10750 BB = 10
10760 LIN = 0
10770 PRINT SPC(24);"GENERAL PROPERTIES"
10780 GOSUB 13210
10790 PRINT SPC(24);"=====
10800 GOSUB 13210
10810 PRINT :GOSUB 13210
10820 PRINT :GOSUB 13210
10830 PRINT :GOSUB 13210
10840 PRINT "FRAME PROPERTIES :":GOSUB 13210
10850 PRINT :GOSUB 13210
10860 PRINT SPC(10);"TOTAL NUMBER OF STORIES";SPC(17);
10870 PRINT USING"#####";NS
10880 GOSUB 13210
10890 PRINT SPC(10);"TOTAL NUMBER OF BAYS";SPC(20);
10900 PRINT USING"#####";NB
10910 GOSUB 13210
10920 PRINT SPC(10);"MODULUS OF ELASTICITY";SPC(19);
10930 PRINT USING"#.###^";E
10940 GOSUB 13210
10950 PRINT :GOSUB 13210
10960 PRINT :GOSUB 13210
10970 PRINT SPC(10);"ROTATIONAL SPRING STIFFNESS :
10980 GOSUB 13210
10990 PRINT :GOSUB 13210
11000 PRINT SPC(51);"STIFFNESS"
11010 GOSUB 13210
11020 PRINT SPC(25);"AT COLUMN"
11030 GOSUB 13210
11040 PRINT SPC(28);"BASE"
11050 GOSUB 13210
11060 PRINT :GOSUB 13210
11070 FOR J = 1 TO NB
11080 PRINT SPC(26);
11090 PRINT USING"###";1;
11100 PRINT " ,";
11110 PRINT USING"###";J;
11120 PRINT SPC(16);
11130 PRINT USING"#.###^";KS(J)
11140 GOSUB 13210
11150 NEXT J
11160 PRINT :GOSUB 13210
11170 PRINT :GOSUB 13210
11180 PRINT :GOSUB 13210
11190 PRINT "SHEAR WALL PROPERTIES :
11200 GOSUB 13210
11210 PRINT :GOSUB 13210
11220 PRINT SPC(10);"MOMENT OF INERTIA";SPC(22);
```

```

11230 PRINT USING "##.###^";IS
11240 GOSUB 13210
11250 PRINT : GOSUB 13210
11260 PRINT SPC(10);"MODULUS OF ELASTICITY";SPC(19);
11270 PRINT USING"##.###^";ESW
11280 GOSUB 13210.
11290 IF MS = "HINGE" THEN 11360
11300 PRINT : GOSUB 13210
11310 PRINT SPC(10);"DISTANCE FROM NEUTRAL"
11320 GOSUB 13210
11330 PRINT SPC(10);"AXIS TO OUTER FIBER ";SPC(19);
11340 PRINT USING"#####.##";DH
11350 GOSUB 13210
11360 PRINT : GOSUB 13210
11370 PRINT SPC(10);"ROTATIONAL SPRING STIFFNESS : " :GOSUB 13210
11380 PRINT : GOSUB 13210
11390 PRINT : GOSUB 13210
11400 PRINT SPC(25);"AT SHEAR WALL"
11410 GOSUB 13210
11420 PRINT SPC(28);"BASE";SPC(18);
11430 PRINT USING"##.###^";KS
11440 GOSUB 13210
11450 PRINT : GOSUB 13210
11460 PRINT : GOSUB 13210
11470 PRINT : GOSUB 13210
11480 PRINT SPC(10);"LINKING CONDITION : ";NS
11490 GOSUB 13210
11500 GOSUB 13300
11510 PRINT SPC(21);"PROPERTIES OF BEAMS AND COLUMNS"
11520 GOSUB 13210
11530 PRINT SPC(21);"=====
11540 GOSUB 13210
11550 PRINT : GOSUB 13210
11560 PRINT : GOSUB 13210
11570 PRINT SPC(2);"COLUMN";SPC(4);"COLUMN";SPC(6);"MOMENT";
11580 PRINT SPC(11);"BEAM";SPC(6);"BEAM";SPC(7)"MOMENT"
11590 GOSUB 13210
11600 PRINT SPC(2);"NUMBER";SPC(4);"HEIGHT";SPC(4);"OF INERTIA";
11610 PRINT SPC(8);"NUMBER";SPC(4);"LENGTH";SPC(4);"OF INERTIA"
11620 GOSUB 13210
11630 PRINT : GOSUB 13210
11640 FOR I = 1 TO NS
11650 FOR J = 1 TO NB
11660 PRINT SPC(2);
11670 PRINT USING "##";I;
11680 PRINT " ,";
11690 PRINT USING "##";J;
11700 PRINT SPC(3);
11710 PRINT USING "###.##";H(I);
11720 PRINT SPC(3);
11730 PRINT USING "##.###^";MIC(I,J);
11740 PRINT SPC(8);
11750 PRINT USING "##";I;
11760 PRINT " ,";

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```
11770 PRINT USING "##";J;
11780 PRINT SPC(3);
11790 PRINT USING "####.##";LB(J);
11800 PRINT SPC(3);
11810 PRINT USING "##.####^";MIB(I,J);
11820 GOSUB 13210
11830 NEXT J
11840 PRINT : GOSUB 13210
11850 NEXT I
11860 GOSUB 13300
11870 PRINT SPC(29);"LATERAL LOADS"
11880 GOSUB 13210
11890 PRINT SPC(29);"====="
11900 GOSUB 13210
11910 PRINT : GOSUB 13210
11920 PRINT : GOSUB 13210
11930 PRINT : GOSUB 13210
11940 PRINT SPC(18);"FLOOR NUMBER";
11950 PRINT SPC(16);"LOAD"
11960 GOSUB 13210
11970 PRINT : GOSUB 13210
11980 FOR I = 1 TO NS
11990 PRINT SPC(22);
12000 PRINT USING "###";I;
12010 PRINT SPC(15);
12020 PRINT USING "#####.##";P(I)
12030 GOSUB 13210
12040 NEXT I
12050 GOSUB 13300
12060 PRINT SPC(27);"SHEAR WALL RESULTS"
12070 GOSUB 13210
12080 PRINT SPC(27);"====="
12090 GOSUB 13210
12100 PRINT : GOSUB 13210
12110 PRINT : GOSUB 13210
12120 PRINT SPC(2);"FLOOR";SPC(5);"HORIZONTAL ";SPC(6);"SLOPES";SPC(7);
12130 PRINT "SHEAR WALL"; SPC(5);"SHEAR WALL"
12140 GOSUB 13210
12150 PRINT SPC(12);"DEFLECTIONS";
12160 PRINT SPC(21);"SHEARS"; SPC(9);"MOMENTS"
12170 GOSUB 13210
12180 PRINT : GOSUB 13210
12190 FOR I = NS TO 0 STEP - 1
12200 PRINT SPC(2);
12210 PRINT USING "###";I;
12220 PRINT SPC(5);
12230 PRINT USING "##.####^";HD(I);
12240 PRINT SPC(3);
12250 PRINT USING "##.####^";SW(I);
12260 PRINT SPC(15);
12270 IF I = 0 THEN PRINT SPC(4);USING"##.####^";BD(1,1)
12280 IF I = 0 THEN GOSUB 13210 : GOTO 12340
12290 PRINT SPC(4);USING "##.####^";BD(I,0)
12300 GOSUB 13210
```

```
12310 PRINT SPC(35);
12320 PRINT SPC(6);USING "##.###^";IP(I)
12330 GOSUB 13210
12340 NEXT I
12350 GOSUB 13300
12360 A$ = "FRAME RESULTS"
12370 GOSUB 13400
12380 GOSUB 13210
12390 A$ = "====="
12400 GOSUB 13400
12410 GOSUB 13210
12420 PRINT : GOSUB 13210
12430 PRINT : GOSUB 13210
12440 PRINT SPC(2);"JOINT";SPC(7);"SLOPE";SPC(8);"TOP";
12450 PRINT SPC(9);"BOTTOM";SPC(8);"LEFT";SPC(9);"RIGHT"
12460 GOSUB 13210
12470 PRINT SPC( 26);"MOMENT"; SPC(7);
12480 PRINT "MOMENT"; SPC( 7);"MOMENT"; SPC( 7);"MOMENT"
12490 GOSUB 13210
12500 PRINT : GOSUB 13210
12510 PRINT : GOSUB 13210
12520 FOR I = 0 TO NS
12530 FOR J = 1 TO NB
12540 PRINT USING "###";I;
12550 PRINT " ,";
12560 PRINT USING "###";J;
12570 PRINT SPC(2);
12580 PRINT USING "##.###^";SF(I,J);
12590 PRINT SPC(2);
12600 PRINT USING "##.###^";BMC(I+1,J);
12610 PRINT SPC(2);
12620 PRINT USING "##.###^";TMC(I,J);
12630 PRINT SPC(2);
12640 PRINT USING "##.###^";RMB(I,J-1);
12650 PRINT SPC(2);
12660 PRINT USING "##.###^";LMB(I,J)
12670 GOSUB 13210
12680 NEXT J
12690 PRINT : GOSUB 13210
12700 NEXT I
12710 GOSUB 13300
12720 A$ = "SHEARS AND AXIAL FORCES IN COLUMNS": GOSUB 13400
12730 GOSUB 13210
12740 A$ = "=====": GOSUB 13400
12750 GOSUB 13210
12760 FOR I = 1 TO NS
12770 PRINT : GOSUB 13210
12780 PRINT : GOSUB 13210
12790 PRINT " STOREY ";
12800 PRINT USING "###";I
12810 GOSUB 13210
12820 PRINT " ====="
12830 GOSUB 13210
12840 PRINT : GOSUB 13210
```



```
12850 PRINT : GOSUB 13210
12860 PRINT SPC(6);"COLUMN NUMBER";SPC(5);"AXIAL FORCES";SPC(5);
12870 PRINT "COLUMN SHEARS"; SPC( 4);"FRAME STORY SHEAR"
12880 GOSUB 13210
12890 PRINT : GOSUB 13210
12900 FOR J = 1 TO NB
12910 PRINT SPC(7);
12920 PRINT USING "###";I;
12930 PRINT " ,";
12940 PRINT USING "###";J;
12950 PRINT SPC(8);
12960 PRINT USING "##.####^";AX(I,J);
12970 PRINT SPC(6);
12980 PRINT USING "##.####^";VC(I,J);
12990 IF J <> INT((NB+1)/2) THEN PRINT " ":GOSUB 13210:GOTO 13030
13000 PRINT SPC(7);
13010 PRINT USING "##.####^";V(I)
13020 GOSUB 13210
13030 NEXT J
13040 NEXT I
13050 PRINT : GOSUB 13210
13060 PRINT : GOSUB 13210
13070 PRINT : GOSUB 13210
13080 PRINT SPC(10);"TOLERANCE USED FOR TERMINATION = ";
13090 PRINT USING "#####.##";EPP;
13100 PRINT " %"
13110 GOSUB 13210
13120 PRINT : GOSUB 13210
13130 PRINT SPC(10);"CONVERGENT SOLUTION AFTER ";
13140 PRINT USING"###";KK;
13150 PRINT " CYCLES OF ITERATION"
13160 GOSUB 13210
13170 FOR I = 1 TO 66-LIN
13180 PRINT
13190 NEXT I
13200 GOTO 10380
13210 LIN = LIN + 1
13220 IF LIN >= 58 THEN LIN = 0:GOTO 13240
13230 GOTO 13290
13240 FOR IK = 1 TO 4 : PRINT : NEXT IK
13250 PAGE = PAGE + 1
13260 PRINT "PROJECT : ";NAME$; TAB(65);"PAGE";
13270 PRINT USING"###";PAGE
13280 FOR IK = 1 TO 3 : PRINT : NEXT IK
13290 RETURN
13300 REM SET LIN TO ZERO
13310 PAGE = PAGE + 1
13320 FOR IK = 1 TO 66-LIN-4
13330 PRINT
13340 NEXT IK
13350 PRINT "PROJECT : ";NAME$; TAB(65);"PAGE";
13360 PRINT USING "###";PAGE
13370 FOR IK = 1 TO 3 : PRINT :NEXT IK
13380 LIN = 0
```

```

13390 RETURN
13400 REM CENTER STRING A$
13410 B = INT (40 - ( LEN (A$) / 2)): IF B = < 0 THEN B = 1
13420 PRINT SPC(B):PRINT A$: RETURN
13430 REM *****
13440 REM ** **
13450 REM ** PROGRAM OUTPUT2 **
13460 REM ** **
13470 REM *****
13480 REM
13490 REM OUTPUT ON HARD COPY
13500 REM
13510 LPRINT CHR$(15);
13520 IF M$ = "HINGE" THEN N$ = "HINGED AT BOTH ENDS"
13530 IF M$ = "FIX" THEN N$ = "FIXED AT BOTH ENDS"
13540 IF M$="FIX-HINGE"THEN N$="FIXED AT FRAME END,HINGED AT WALL END"
13550 PAGE = 1
13560 LPRINT "PROJECT : ";NAME$; TAB(65);"PAGE";
13570 LPRINT USING"###";PAGE
13580 LPRINT
13590 LPRINT
13600 BB = 10
13610 LIN = 0
13620 LPRINT SPC(24);"GENERAL PROPERTIES"
13630 GOSUB 16060
13640 LPRINT SPC(24);"=====
13650 GOSUB 16060
13660 LPRINT :GOSUB 16060
13670 LPRINT :GOSUB 16060
13680 LPRINT :GOSUB 16060
13690 LPRINT "FRAME PROPERTIES :":GOSUB 16060
13700 LPRINT :GOSUB 16060
13710 LPRINT SPC(10);"TOTAL NUMBER OF STORIES";SPC(17);
13720 LPRINT USING"#####";NS
13730 GOSUB 16060
13740 LPRINT SPC(10);"TOTAL NUMBER OF BAYS";SPC(20);
13750 LPRINT USING"#####";NB
13760 GOSUB 16060
13770 LPRINT SPC(10);"MODULUS OF ELASTICITY";SPC(19);
13780 LPRINT USING"##.##^" ;E
13790 GOSUB 16060
13800 LPRINT :GOSUB 16060
13810 LPRINT :GOSUB 16060
13820 LPRINT SPC(10);"ROTATIONAL SPRING STIFFNESS :
13830 GOSUB 16060
13840 LPRINT :GOSUB 16060
13850 LPRINT SPC(51);"STIFFNESS"
13860 GOSUB 16060
13870 LPRINT SPC(25);"AT COLUMN"
13880 GOSUB 16060
13890 LPRINT SPC(28);"BASE"
13900 GOSUB 16060
13910 LPRINT :GOSUB 16060
13920 FOR J = 1 TO NB

```



```

13930 LPRINT SPC(26);
13940 LPRINT USING"###";1;
13950 LPRINT " ,";
13960 LPRINT USING"###";J;
13970 LPRINT SPC(16);
13980 LPRINT USING"##.###^";KS(J)
13990 GOSUB 16060
14000 NEXT J
14010 LPRINT :GOSUB 16060
14020 LPRINT :GOSUB 16060
14030 LPRINT :GOSUB 16060
14040 LPRINT "SHEAR WALL PROPERTIES : "
14050 GOSUB 16060
14060 LPRINT :GOSUB 16060
14070 LPRINT SPC(10);"MOMENT OF INERTIA";SPC(22);
14080 LPRINT USING "##.###^";IS
14090 GOSUB 16060
14100 LPRINT : GOSUB 16060
14110 LPRINT SPC(10);"MODULUS OF ELASTICITY";SPC(19);
14120 LPRINT USING"##.###^";ESW
14130 GOSUB 16060
14140 LPRINT : GOSUB 16060
14150 IF MS = "HINGE" THEN 14220
14160 LPRINT SPC(10);"DISTANCE FROM NEUTRAL"
14170 GOSUB 16060
14180 LPRINT SPC(10);"AXIS TO OUTER FIBER ";SPC(19);
14190 LPRINT USING"#####.##";DH
14200 GOSUB 16060
14210 LPRINT : GOSUB 16060
14220 LPRINT SPC(10);"ROTATIONAL SPRING STIFFNESS : " :GOSUB 16060
14230 LPRINT : GOSUB 16060
14240 LPRINT : GOSUB 16060
14250 LPRINT SPC(25);"AT SHEAR WALL"
14260 GOSUB 16060
14270 LPRINT SPC(28);"BASE";SPC(18);
14280 LPRINT USING"##.###^";KS
14290 GOSUB 16060
14300 LPRINT : GOSUB 16060
14310 LPRINT : GOSUB 16060
14320 LPRINT : GOSUB 16060
14330 LPRINT SPC(10);"LINKING CONDITION : ";N$
14340 GOSUB 16060
14350 GOSUB 16150
14360 LPRINT SPC(21);"PROPERTIES OF BEAMS AND COLUMNS"
14370 GOSUB 16060
14380 LPRINT SPC(21);"===== "
14390 GOSUB 16060
14400 LPRINT : GOSUB 16060
14410 LPRINT : GOSUB 16060
14420 LPRINT SPC(2);"COLUMN";SPC(4);"COLUMN";SPC(6);"MOMENT";
14430 LPRINT SPC(11);"BEAM";SPC(6);"BEAM";SPC(7)"MOMENT"
14440 GOSUB 16060
14450 LPRINT SPC(2);"NUMBER";SPC(4);"HEIGHT";SPC(4);"OF INERTIA";
14460 LPRINT SPC(8);"NUMBER";SPC(4);"LENGTH";SPC(4);"OF INERTIA"

```

```
14470 GOSUB 16060
14480 LPRINT : GOSUB 16060
14490 FOR I = 1 TO NS
14500 FOR J = 1 TO NB
14510 LPRINT SPC(2);
14520 LPRINT USING "##";I;
14530 LPRINT " ,";
14540 LPRINT USING "##";J;
14550 LPRINT SPC(3);
14560 LPRINT USING "###.##";H(I);
14570 LPRINT SPC(3);
14580 LPRINT USING "##.###^";MIC(I,J);
14590 LPRINT SPC(8);
14600 LPRINT USING "##";I;
14610 LPRINT " ,";
14620 LPRINT USING "##";J;
14630 LPRINT SPC(3);
14640 LPRINT USING "###.##";LB(J);
14650 LPRINT SPC(3);
14660 LPRINT USING"##.###^";MIB(I,J)
14670 GOSUB 16060
14680 NEXT J
14690 LPRINT : GOSUB 16060
14700 NEXT I
14710 GOSUB 16150
14720 LPRINT SPC(29);"LATERAL LOADS"
14730 GOSUB 16060
14740 LPRINT SPC(29);"====="
14750 GOSUB 16060
14760 LPRINT : GOSUB 16060
14770 LPRINT : GOSUB 16060
14780 LPRINT : GOSUB 16060
14790 LPRINT SPC(18);"FLOOR NUMBER";
14800 LPRINT SPC(16);"LOAD"
14810 GOSUB 16060
14820 LPRINT : GOSUB 16060
14830 FOR I = 1 TO NS
14840 LPRINT SPC(22);
14850 LPRINT USING "###";I;
14860 LPRINT SPC(15);
14870 LPRINT USING "#####.##";P(I)
14880 GOSUB 16060
14890 NEXT I
14900 GOSUB 16150
14910 LPRINT SPC(27);"SHEAR WALL RESULTS"
14920 GOSUB 16060
14930 LPRINT SPC(27);"====="
14940 GOSUB 16060
14950 LPRINT : GOSUB 16060
14960 LPRINT : GOSUB 16060
14970 LPRINT SPC(2);"FLOOR";SPC(5);"HORIZONTAL ";SPC(6);"SLOPES";SPC(7);
14980 LPRINT "SHEAR WALL"; SPC(5);"SHEAR WALL"
14990 GOSUB 16060
15000 LPRINT SPC(12);"DEFLECTIONS";
```

```
15010 LPRINT SPC(21);"SHEARS"; SPC(9);"MOMENTS"
15020 GOSUB 16060
15030 LPRINT : GOSUB 16060
15040 FOR I = NS TO 0 STEP - 1
15050 LPRINT SPC(2);
15060 LPRINT USING "###";I;
15070 LPRINT SPC(5);
15080 LPRINT USING "##.####^";HD(I);
15090 LPRINT SPC(4);
15100 LPRINT USING "##.####^";SW(I);
15110 LPRINT SPC(15);
15120 IF I = 0 THEN LPRINT SPC(4);USING"##.####^";BD(1,1)
15130 IF I = 0 THEN GOSUB 16060 : GOTO 15190
15140 LPRINT SPC(4);USING "##.####^";BD(I,0)
15150 GOSUB 16060
15160 LPRINT SPC(35);
15170 LPRINT SPC(6);USING "##.####^";IP(I)
15180 GOSUB 16060
15190 NEXT I
15200 GOSUB 16150
15210 A$ = "FRAME RESULTS"
15220 GOSUB 16250
15230 GOSUB 16060
15240 A$ = "======"
15250 GOSUB 16250
15260 GOSUB 16060
15270 LPRINT : GOSUB 16060
15280 LPRINT : GOSUB 16060
15290 LPRINT SPC(2);"JOINT";SPC(7);"SLOPE";SPC(8);"TOP";
15300 LPRINT SPC(9);"BOTTOM";SPC(8);"LEFT";SPC(9);"RIGHT"
15310 GOSUB 16060
15320 LPRINT SPC( 26);"MOMENT"; SPC(7);
15330 LPRINT "MOMENT"; SPC( 7);"MOMENT"; SPC( 7);"MOMENT"
15340 GOSUB 16060
15350 LPRINT : GOSUB 16060
15360 LPRINT : GOSUB 16060
15370 FOR I = 0 TO NS
15380 FOR J = 1 TO NB
15390 LPRINT USING "###";I;
15400 LPRINT " ,";
15410 LPRINT USING "###";J;
15420 LPRINT SPC(2);
15430 LPRINT USING "##.####^";SF(I,J);
15440 LPRINT SPC(2);
15450 LPRINT USING "##.####^";BMC(I+1,J);
15460 LPRINT SPC(2);
15470 LPRINT USING "##.####^";TMC(I,J);
15480 LPRINT SPC(2);
15490 LPRINT USING "##.####^";RMB(I,J-1);
15500 LPRINT SPC(2);
15510 LPRINT USING "##.####^";LMB(I,J)
15520 GOSUB 16060
15530 NEXT J
15540 LPRINT : GOSUB 16060
```

```

15550 NEXT I
15560 GOSUB 16150
15570 A$ = "SHEARS AND AXIAL FORCES IN COLUMNS": GOSUB 16250
15580 GOSUB 16060
15590 A$ = "=====": GOSUB 16250
15600 GOSUB 16060
15610 FOR I = 1 TO NS
15620 LPRINT : GOSUB 16060
15630 LPRINT : GOSUB 16060
15640 LPRINT " STOREY ";
15650 LPRINT USING "###";I
15660 GOSUB 16060
15670 LPRINT " ====="
15680 GOSUB 16060
15690 LPRINT : GOSUB 16060
15700 LPRINT : GOSUB 16060
15710 LPRINT SPC(6);"COLUMN NUMBER";SPC(5);"AXIAL FORCES";SPC(5);
15720 LPRINT "COLUMN SHEARS"; SPC( 4);"FRAME STORY SHEAR"
15730 GOSUB 16060
15740 LPRINT : GOSUB 16060
15750 FOR J = 1 TO NB
15760 LPRINT SPC(7);
15770 LPRINT USING "###";I;
15780 LPRINT " ,";
15790 LPRINT USING "###";J;
15800 LPRINT SPC(8);
15810 LPRINT USING "##.####^";AX(I,J);
15820 LPRINT SPC(6);
15830 LPRINT USING "##.####^";VC(I,J);
15840 IF J <> INT((NB+1)/2) THEN LPRINT " ":GOSUB 16060:GOTO 15880
15850 LPRINT SPC(7);
15860 LPRINT USING "##.####^";V(I)
15870 GOSUB 16060
15880 NEXT J
15890 NEXT I
15900 LPRINT : GOSUB 16060
15910 LPRINT : GOSUB 16060
15920 LPRINT : GOSUB 16060
15930 LPRINT SPC(10);"TOLERANCE USED FOR TERMINATION      = ";
15940 LPRINT USING "#####.##";EPP;
15950 LPRINT " %"
15960 GOSUB 16060
15970 LPRINT : GOSUB 16060
15980 LPRINT SPC(10);"CONVERGENT SOLUTION AFTER ";
15990 LPRINT USING"####";KK;
16000 LPRINT " CYCLES OF ITERATION"
16010 GOSUB 16060
16020 FOR I = 1 TO 66-LIN
16030 LPRINT
16040 NEXT I
16050 GOTO 10380
16060 LIN = LIN + 1
16070 IF LIN >= 58 THEN LIN = 0:GOTO 16090
16080 GOTO 16140

```

```

16090 FOR IK = 1 TO 4 : LPRINT : NEXT IK
16100 PAGE = PAGE + 1
16110 LPRINT "PROJECT : ";NAME$; TAB(65);"PAGE";
16120 LPRINT USING"###";PAGE
16130 FOR IK = 1 TO 3 : LPRINT : NEXT IK
16140 RETURN
16150 REM SET LIN TO ZERO
16160 PAGE = PAGE + 1
16170 FOR IK = 1 TO 66-LIN-4
16180 LPRINT
16190 NEXT IK
16200 LPRINT "PROJECT : ";NAME$; TAB(65);"PAGE";
16210 LPRINT USING "###";PAGE
16220 FOR IK = 1 TO 3 : LPRINT :NEXT IK
16230 LIN = 0
16240 RETURN
16250 REM CENTER STRING AS
16260 B = INT (40 - ( LEN (A$) / 2)): IF B = < 0 THEN B = 1
16270 LPRINT SPC(B):LPRINT AS: RETURN
16280 REM *****
16290 REM **                                                                 **
16300 REM **                                PROGRAM OUTPUT3                **
16310 REM **                                                                 **
16320 REM *****
16330 REM
16340 REM OUTPUT TO DISK FILE
16350 REM
16360 CLS
16370 LOCATE 3
16380 PRINT "SAVE OUTPUT RESULTS TO DISK FILE"
16390 PRINT "=====
16400 LOCATE 9
16410 INPUT "FILE NAME [.OUT] : ";FS
16420 LOCATE 11
16430 PRINT "IS FILE NAME CORRECT ?      Y/N      ";
16440 AS = ""
16450 AS = INKEY$
16460 IF AS = "" THEN GOTO 16440
16470 IF AS <> "N" AND AS <> "Y" AND AS <> "y" AND AS <> "n" THEN 16440
16480 IF AS = "N" OR AS = "n" THEN GOTO 16330
16490 PRINT
16500 LOCATE 13
16510 PRINT"INSERT DATA DISKETTE IN DRIVE B:"
16520 LOCATE 15
16530 PRINT"STRIKE ANY KEY WHEN READY"
16540 AS = ""
16550 AS = INKEY$
16560 IF AS = "" THEN GOTO 16540
16570 FS = "B:" + FS
16580 OPEN "O",#4,FS,80
16590 CLOSE #4
16600 KILL FS
16610 OPEN "O",#4,FS,80
16620 IF M$ = "HINGE" THEN N$ = "HINGED AT BOTH ENDS"

```

```

16630 IF M$ = "FIX" THEN N$ = "FIXED AT BOTH ENDS"
16640 IF M$="FIX-HINGE"THEN N$="FIXED AT FRAME END,HINGED AT WALL END"
16650 PAGE = 1
16660 PRINT#4, "PROJECT : ";NAME$; TAB(65);"PAGE";
16670 PRINT#4, USING"###";PAGE
16680 PRINT#4,
16690 PRINT#4,
16700 BB = 10
16710 LIN = 0
16720 PRINT#4, SPC(24);"GENERAL PROPERTIES"
16730 GOSUB 19160
16740 PRINT#4, SPC(24);"=====
16750 GOSUB 19160
16760 PRINT#4, :GOSUB 19160
16770 PRINT#4, :GOSUB 19160
16780 PRINT#4, :GOSUB 19160
16790 PRINT#4, "FRAME PROPERTIES :":GOSUB 19160
16800 PRINT#4, :GOSUB 19160
16810 PRINT#4, SPC(10);"TOTAL NUMBER OF STORIES";SPC(17);
16820 PRINT#4, USING"#####";NS
16830 GOSUB 19160
16840 PRINT#4, SPC(10);"TOTAL NUMBER OF BAYS";SPC(20);
16850 PRINT#4, USING"#####";NB
16860 GOSUB 19160
16870 PRINT#4, SPC(10);"MODULUS OF ELASTICITY";SPC(19);
16880 PRINT#4, USING"##.###^~~~";E
16890 GOSUB 19160
16900 PRINT#4, :GOSUB 19160
16910 PRINT#4, :GOSUB 19160
16920 PRINT#4, SPC(10);"ROTATIONAL SPRING STIFFNESS :
16930 GOSUB 19160
16940 PRINT#4, :GOSUB 19160
16950 PRINT#4, SPC(51);"STIFFNESS"
16960 GOSUB 19160
16970 PRINT#4, SPC(25);"AT COLUMN"
16980 GOSUB 19160
16990 PRINT#4, SPC(28);"BASE"
17000 GOSUB 19160
17010 PRINT#4, :GOSUB 19160
17020 FOR J = 1 TO NB
17030 PRINT#4, SPC(26);
17040 PRINT#4, USING"###";1;
17050 PRINT#4, " ,";
17060 PRINT#4, USING"###";J;
17070 PRINT#4, SPC(16);
17080 PRINT#4, USING"##.###^~~~";KS(J)
17090 GOSUB 19160
17100 NEXT J
17110 PRINT#4, :GOSUB 19160
17120 PRINT#4, :GOSUB 19160
17130 PRINT#4, :GOSUB 19160
17140 PRINT#4, "SHEAR WALL PROPERTIES :
17150 GOSUB 19160
17160 PRINT#4, :GOSUB 19160

```

```
17170 PRINT#4, SPC(10);"MOMENT OF INERTIA";SPC(22);
17180 PRINT#4, USING "##.###^";IS
17190 GOSUB 19160
17200 PRINT#4, : GOSUB 19160
17210 PRINT#4, SPC(10);"MODULUS OF ELASTICITY";SPC(19);
17220 PRINT#4, USING"##.###^";ESW
17230 GOSUB 19160
17240 PRINT#4, : GOSUB 19160
17250 IF M$ = "HINGE" THEN 17320
17260 PRINT#4, SPC(10);"DISTANCE FROM NEUTRAL"
17270 GOSUB 19160
17280 PRINT#4, SPC(10);"AXIS TO OUTER FIBER ";SPC(19);
17290 PRINT#4, USING"#####.##";DH
17300 GOSUB 19160
17310 PRINT#4, : GOSUB 19160
17320 PRINT#4, SPC(10);"ROTATIONAL SPRING STIFFNESS : " :GOSUB 19160
17330 PRINT#4, : GOSUB 19160
17340 PRINT#4, : GOSUB 19160
17350 PRINT#4, SPC(25);"AT SHEAR WALL"
17360 GOSUB 19160
17370 PRINT#4, SPC(28);"BASE";SPC(18);
17380 PRINT#4, USING"##.###^";KS
17390 GOSUB 19160
17400 PRINT#4, : GOSUB 19160
17410 PRINT#4, : GOSUB 19160
17420 PRINT#4, : GOSUB 19160
17430 PRINT#4, SPC(10);"LINKING CONDITION : ";N$
17440 GOSUB 19160
17450 GOSUB 19250
17460 PRINT#4, SPC(21);"PROPERTIES OF BEAMS AND COLUMNS"
17470 GOSUB 19160
17480 PRINT#4, SPC(21);"=====
17490 GOSUB 19160
17500 PRINT#4, : GOSUB 19160
17510 PRINT#4, : GOSUB 19160
17520 PRINT#4, SPC(2);"COLUMN";SPC(4);"COLUMN";SPC(6);"MOMENT";
17530 PRINT#4, SPC(11);"BEAM";SPC(6);"BEAM";SPC(7)"MOMENT"
17540 GOSUB 19160
17550 PRINT#4, SPC(2);"NUMBER";SPC(4);"HEIGHT";SPC(4);"OF INERTIA";
17560 PRINT#4, SPC(8);"NUMBER";SPC(4);"LENGTH";SPC(4);"OF INERTIA"
17570 GOSUB 19160
17580 PRINT#4, : GOSUB 19160
17590 FOR I = 1 TO NS
17600 FOR J = 1 TO NB
17610 PRINT#4, SPC(2);
17620 PRINT#4, USING "##";I;
17630 PRINT#4, " ,";
17640 PRINT#4, USING "##";J;
17650 PRINT#4, SPC(3);
17660 PRINT#4, USING "###.##";H(I);
17670 PRINT#4, SPC(3);
17680 PRINT#4, USING "##.###^";MIC(I,J);
17690 PRINT#4, SPC(8);
17700 PRINT#4, USING "##";I;
```

```
17710 PRINT#4, " ,";
17720 PRINT#4, USING "##";J;
17730 PRINT#4, SPC(3);
17740 PRINT#4, USING "####.##";LB(J);
17750 PRINT#4, SPC(3);
17760 PRINT#4, USING"##.####^";MIB(I,J)
17770 GOSUB 19160
17780 NEXT J
17790 PRINT#4, : GOSUB 19160
17800 NEXT I
17810 GOSUB 19250
17820 PRINT#4, SPC(29);"LATERAL LOADS"
17830 GOSUB 19160
17840 PRINT#4, SPC(29);"====="
17850 GOSUB 19160
17860 PRINT#4, : GOSUB 19160
17870 PRINT#4, : GOSUB 19160
17880 PRINT#4, : GOSUB 19160
17890 PRINT#4, SPC(18);"FLOOR NUMBER";
17900 PRINT#4, SPC(16);"LOAD"
17910 GOSUB 19160
17920 PRINT#4, : GOSUB 19160
17930 FOR I = 1 TO NS
17940 PRINT#4, SPC(22);
17950 PRINT#4, USING "###";I;
17960 PRINT#4, SPC(15);
17970 PRINT#4, USING "#####.##";P(I)
17980 GOSUB 19160
17990 NEXT I
18000 GOSUB 19250
18010 PRINT#4, SPC(27);"SHEAR WALL RESULTS"
18020 GOSUB 19160
18030 PRINT#4, SPC(27);"====="
18040 GOSUB 19160
18050 PRINT#4, : GOSUB 19160
18060 PRINT#4, : GOSUB 19160
18070 PRINT#4, SPC(2);"FLOOR";SPC(5);"HORIZONTAL ";SPC(6);"SLOPES";SPC(7);
18080 PRINT#4, "SHEAR WALL"; SPC(5);"SHEAR WALL"
18090 GOSUB 19160
18100 PRINT#4, SPC(12);"DEFLECTIONS";
18110 PRINT#4, SPC(21);"SHEARS"; SPC(9);"MOMENTS"
18120 GOSUB 19160
18130 PRINT#4, : GOSUB 19160
18140 FOR I = NS TO 0 STEP - 1
18150 PRINT#4, SPC(2);
18160 PRINT#4, USING "###";I;
18170 PRINT#4, SPC(5);
18180 PRINT#4, USING "##.####^";HD(I);
18190 PRINT#4, SPC(4);
18200 PRINT#4, USING "##.####^";SW(I);
18210 PRINT#4, SPC(15);
18220 IF I = 0 THEN PRINT#4, SPC(4);USING"##.####^";BD(1,1)
18230 IF I = 0 THEN GOSUB 19160 : GOTO 18290
18240 PRINT#4,SPC(4);USING "##.####^";BD(I,0)
```





```

18250 GOSUB 19160
18260 PRINT#4, SPC(35);
18270 PRINT#4, SPC(6); USING "##.###^"; IP(I)
18280 GOSUB 19160
18290 NEXT I
18300 GOSUB 19250
18310 A$ = "FRAME RESULTS"
18320 GOSUB 19350
18330 GOSUB 19160
18340 A$ = "====="
18350 GOSUB 19350
18360 GOSUB 19160
18370 PRINT#4, : GOSUB 19160
18380 PRINT#4, : GOSUB 19160
18390 PRINT#4, SPC(2); "JOINT"; SPC(7); "SLOPE"; SPC(8); "TOP";
18400 PRINT#4, SPC(9); "BOTTOM"; SPC(8); "LEFT"; SPC(9); "RIGHT"
18410 GOSUB 19160
18420 PRINT#4, SPC( 26); "MOMENT"; SPC(7);
18430 PRINT#4, "MOMENT"; SPC( 7); "MOMENT"; SPC( 7); "MOMENT"
18440 GOSUB 19160
18450 PRINT#4, : GOSUB 19160
18460 PRINT#4, : GOSUB 19160
18470 FOR I = 0 TO NS
18480 FOR J = 1 TO NB
18490 PRINT#4, USING "###"; I;
18500 PRINT#4, " ,";
18510 PRINT#4, USING "###"; J;
18520 PRINT#4, SPC(2);
18530 PRINT#4, USING "##.###^"; SF(I, J);
18540 PRINT#4, SPC(2);
18550 PRINT#4, USING "##.###^"; BMC(I+1, J);
18560 PRINT#4, SPC(2);
18570 PRINT#4, USING "##.###^"; TMC(I, J);
18580 PRINT#4, SPC(2);
18590 PRINT#4, USING "##.###^"; RMB(I, J-1);
18600 PRINT#4, SPC(2);
18610 PRINT#4, USING "##.###^"; LMB(I, J)
18620 GOSUB 19160
18630 NEXT J
18640 PRINT#4, : GOSUB 19160
18650 NEXT I
18660 GOSUB 19250
18670 A$ = "SHEARS AND AXIAL FORCES IN COLUMNS": GOSUB 19350
18680 GOSUB 19160
18690 A$ = "=====": GOSUB 19350
18700 GOSUB 19160
18710 FOR I = 1 TO NS
18720 PRINT#4, : GOSUB 19160
18730 PRINT#4, : GOSUB 19160
18740 PRINT#4, " STOREY ";
18750 PRINT#4, USING "###"; I
18760 GOSUB 19160
18770 PRINT#4, " ====="
18780 GOSUB 19160

```

```

18790 PRINT#4, : GOSUB 19160
18800 PRINT#4, : GOSUB 19160
18810 PRINT#4, SPC(6);"COLUMN NUMBER";SPC(5);"AXIAL FORCES";SPC(5);
18820 PRINT#4, "COLUMN SHEARS"; SPC( 4);"FRAME STORY SHEAR"
18830 GOSUB 19160
18840 PRINT#4, : GOSUB 19160
18850 FOR J = 1 TO NB
18860 PRINT#4, SPC(7);
18870 PRINT#4, USING "###";I;
18880 PRINT#4, " ,";
18890 PRINT#4, USING "###";J;
18900 PRINT#4, SPC(8);
18910 PRINT#4, USING "##.###^";AX(I,J);
18920 PRINT#4, SPC(6);
18930 PRINT#4, USING "##.###^";VC(I,J);
18940 IF J <>INT((NB+1)/2)THEN PRINT#4, " ":GOSUB 19160:GOTO 18980
18950 PRINT#4, SPC(7);
18960 PRINT#4, USING "##.###^";V(I)
18970 GOSUB 19160
18980 NEXT J
18990 NEXT I
19000 PRINT#4, : GOSUB 19160
19010 PRINT#4, : GOSUB 19160
19020 PRINT#4, : GOSUB 19160
19030 PRINT#4, SPC(10);"TOLERANCE USED FOR TERMINATION = ";
19040 PRINT#4, USING "#####.##";EPP;
19050 PRINT#4, " %"
19060 GOSUB 19160
19070 PRINT#4, : GOSUB 19160
19080 PRINT#4, SPC(10);"CONVERGENT SOLUTION AFTER ";
19090 PRINT#4, USING"####";KK;
19100 PRINT#4, " CYCLES OF ITERATION"
19110 GOSUB 19160
19120 FOR I = 1 TO 66-LIN
19130 PRINT#4,
19140 NEXT I
19150 GOTO 10380
19160 LIN = LIN + 1
19170 IF LIN >= 58 THEN LIN = 0:GOTO 19190
19180 GOTO 19240
19190 FOR IK = 1 TO 4 : PRINT#4, : NEXT IK
19200 PAGE = PAGE + 1
19210 PRINT#4, "PROJECT : ";NAME$; TAB(65);"PAGE";
19220 PRINT#4, USING"###";PAGE
19230 FOR IK = 1 TO 3 : PRINT#4, : NEXT IK
19240 RETURN
19250 REM SET LIN TO ZERO
19260 PAGE = PAGE + 1
19270 FOR IK = 1 TO 66-LIN-4
19280 PRINT#4,
19290 NEXT IK
19300 PRINT#4, "PROJECT : ";NAME$; TAB(65);"PAGE";
19310 PRINT#4, USING "###";PAGE
19320 FOR IK = 1 TO 3 : PRINT#4, :NEXT IK

```

```
19330 LIN = 0
19340 RETURN
19350 REM CENTER STRING A$
19360 B = INT (40 - ( LEN (A$) / 2)): IF B = < 0 THEN B = 1
19370 PRINT#4, SPC(B):PRINT#4, A$: RETURN
19380 END
```

ประวัติ

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