REPORT FOR
GEOTECHNICAL ENGINEERING SERVICES
SLOPE STABILITY EVALUATION
SALT RIVER CHANNELIZATION
40TH STREET TO MILL AVENUE
TEMPE, ARIZONA

Registered Professional Engineer (Civil)
CERTIFICATE NO.
7354
JOHN P.
BOYD
Date Signed 8-10-92
ARIZONA, U.S.A.

THOMAS-HARTIG & ASSOCIATES, INC.

GEOTECHNICAL, MATERIALS TESTING, AND ENVIRONMENTAL CONSULTANTS

REPORT FOR
GEOTECHNICAL ENGINEERING SERVICES
SLOPE STABILITY EVALUATION
SALT RIVER CHANNELIZATION
40TH STREET TO MILL AVENUE
TEMPE, ARIZONA

Submitted To:

City of Tempe
Public Works Department
P.O. Box 5002
Tempe, Arizona 85280

Project No. 92-0933

10 August 1992

THOMAS-HARTIG & ASSOCIATES, INC.

Geotechnical, Materials Testing, and Environmental Consultants

7031 West Oakland Street • Chandler, Arizona 85226

Chandler: Phone (602) 961-1169, Fax (602) 940-0952 • Phoenix: Phone (602) 437-5450

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City of Tempe
Public Works Department
P.O. Box 5002
Tempe, Arizona 85280

10 August 1992

Attention: James E. Bond, Senior Civil Engineer

Subject: Report for Geotechnical Engineering Services
Slope Stability Evaluation
Salt River Channelization
40th Street to Mill Avenue
Tempe, Arizona

Project No. 92-0933

In accordance with your authorization, this firm has performed slope stability analyses for selected levee sections along this reach of the Salt River. Stability of the levee on the landside where adjacent ground is below the 100-year flood stage was evaluated. Locations with the most elevation differential between the top of the levee and ground level on the landside were analyzed for the north and south levees of the two projects to determine safety factors at the 100-year flood stage. These locations were:

- North Levee, Sta. 125, Project 866025
- South Levee, Sta. 230, Project 866025
- North Overbank Levee, Sta. 2, Project 876191
- South Overbank Levee, Sta. 606, Project 876191

These sections were evaluated both for a hypothetically limiting condition of minimum stability with a phreatic surface in the levee at the 100-year flood level (analogous to an instantaneous total draw down of a submerged slope) and for steady state seepage through the embankments passing just below the landside toe of the levee slope (the more likely condition for a permeable, granular embankment on an underlying granular base deposit after prolonged water impoundment). Minimum factors of safety between 1.4 and 1.5 were calculated for the four sections analyzed for the hypothetically limiting condition analogous to instantaneous drawdown of a submerged slope. The actual safety factors at the 100-year flood stage will be larger

as demonstrated by the minimum factors of safety of 2.3 or higher calculated for the several sections with steady state seepage assumed below the toe of the embankment. Prolonged water impoundment in the channel at the 100-year flood level would be necessary to develop such steady state seepage; thus, we conclude a factor of safety on the order of 2.3 or even higher would be maintained during the actual duration of the 100-year flood.

Copies of the stability analyses by the TSTAB computer program are attached. Please call if we may be of further assistance.

Respectfully submitted,

THOMAS-HARTIG & ASSOCIATES, INC.

By: _____ Reviewed by: _____

John P. Boyd, P.E. Kenneth L. Ricker, P.E.

/bc
Copies to: Addressee (5)

APPENDIX A
Slope Stability Analyses

```
*********************************************
* ******************************************* *
* *                                         * *
* *    ---------------------------------    * *
* *     TSTAB  slope stability analysis     * *
* *        Revision 2.40 - 02/12/85         * *
* *    ---------------------------------    * *
* *                                         * *
* *    TAGA Engineering Software Services   * *
* *           Berkeley, California          * *
* *                                         * *
* *   IBM PC & 8086/8088 MS-DOS Version by  * *
* *                                         * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington          * *
* *                                         * *
* *      copyright (c) 1983, 1984 TAGA      * *
* *      copyright (c) 1983, 1984 DPMS      * *
* *                                         * *
* ******************************************* *
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*******************************************************************
 92-0933,STA. 125,N. DIKE,TRY 1,TOE
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*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
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**************
 INPUT DATA
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CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  0
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    2
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =       .000
     ATMOSPHERIC PRESSURE                   =       .000
     UNIT WEIGHT OF WATER                   =     62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =     62.400

SEARCH STARTS AT CENTER ( 119.0,  46.0),WITH FINAL GRID OF  3.0

ALL CIRCLES PASS THROUGH THE POINT ( 117.0, 106.0)
```

GEOMETRY

SECTIONS	.00	40.00	58.00	118.00	150.00
T. CRACKS	80.00	80.00	86.00	106.00	106.00
W IN CRACK	80.00	80.00	86.00	106.00	106.00
BOUNDARY 1	80.00	80.00	86.00	106.00	106.00
BOUNDARY 2	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	58.00	118.00	150.00
Y-COORDINATE OF PHREATIC SURFACE	86.00	86.00	86.00	106.00	106.00

1

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RESULTS
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	106.0	60.0	119.0	46.0	1.474
2	106.1	60.1	113.0	46.0	1.523
3	106.0	66.0	119.0	40.0	1.474
4	106.5	60.5	125.0	46.0	1.841
5	106.0	54.0	119.0	52.0	1.474
6	106.0	60.0	116.0	46.0	1.495
7	106.0	63.0	119.0	43.0	1.474
8	106.2	60.2	122.0	46.0	1.510
9	106.0	57.0	119.0	49.0	1.474
10	106.0	63.0	116.0	43.0	1.494
11	106.2	63.2	122.0	43.0	1.502
12	106.2	57.2	122.0	49.0	1.521
13	106.0	57.0	116.0	49.0	1.496

F.S. MINIMUM= 1.474 FOR THE CIRCLE OF CENTER (119.0, 46.0)

Opened plot file: srslope.P01
Saved plot file: srslope.P01

1
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LOCATION OF CRITICAL CIRCLE
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Execution complete, time =    54.49 seconds
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*********************************************
* ******************************************* *
* *                                         * *
* *    ---------------------------------    * *
* *     TSTAB  slope stability analysis     * *
* *        Revision 2.40 - 02/12/85         * *
* *    ---------------------------------    * *
* *                                         * *
* *    TAGA Engineering Software Services   * *
* *           Berkeley, California          * *
* *                                         * *
* *   IBM PC & 8086/8088 MS-DOS Version by  * *
* *                                         * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington          * *
* *                                         * *
* *      copyright (c) 1983, 1984 TAGA      * *
* *      copyright (c) 1983, 1984 DPMS      * *
* *                                         * *
* ******************************************* *
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*******************************************************************
 92-0933,STA. 125,N. DIKE,TRY 2,TOE
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*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
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**************
 INPUT DATA
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```
CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  0
     NUMBER OF VERTICAL SECTIONS                        4
     NUMBER OF SOIL LAYER BOUNDARIES                    2
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =       .000
     ATMOSPHERIC PRESSURE                   =       .000
     UNIT WEIGHT OF WATER                   =     62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =     62.400

SEARCH STARTS AT CENTER ( 113.0,  34.0),WITH FINAL GRID OF  3.0

ALL CIRCLES PASS THROUGH THE POINT ( 117.0, 106.0)
```

GEOMETRY

SECTIONS	.00	40.00	118.00	150.00
T. CRACKS	80.00	80.00	106.00	106.00
W IN CRACK	80.00	80.00	106.00	106.00
BOUNDARY 1	80.00	80.00	106.00	106.00
BOUNDARY 2	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	118.00	150.00
Y-COORDINATE OF PHREATIC SURFACE	80.00	80.00	106.00	106.00

1

****
RESULTS
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NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	106.1	72.1	113.0	34.0	1.515
2	106.7	72.7	107.0	34.0	1.568
3	106.1	78.1	113.0	28.0	1.512
4	106.0	72.0	119.0	34.0	1.474
5	106.1	66.1	113.0	40.0	1.518
6	106.0	72.0	116.0	34.0	1.492
7	106.0	75.0	119.0	31.0	1.474
8	106.2	72.2	122.0	34.0	1.486
9	106.0	69.0	119.0	37.0	1.474
10	106.0	69.0	116.0	37.0	1.493
11	106.2	69.2	122.0	37.0	1.490
12	106.0	66.0	119.0	40.0	1.474
13	106.0	66.0	116.0	40.0	1.494
14	106.2	66.2	122.0	40.0	1.495
15	106.0	63.0	119.0	43.0	1.474
16	106.0	63.0	116.0	43.0	1.494
17	106.2	63.2	122.0	43.0	1.502
18	106.0	60.0	119.0	46.0	1.474
19	106.0	60.0	116.0	46.0	1.495
20	106.2	60.2	122.0	46.0	1.510
21	106.0	57.0	119.0	49.0	1.474
22	106.0	63.0	116.0	43.0	1.494
23	106.2	63.2	122.0	43.0	1.502
24	106.2	57.2	122.0	49.0	1.521
25	106.0	57.0	116.0	49.0	1.496

F.S. MINIMUM= 1.474 FOR THE CIRCLE OF CENTER (119.0, 46.0)

```
Opened plot file: srslope1.P01
Saved plot file:  srslope1.P01

1
*******************************
 LOCATION OF CRITICAL CIRCLE
*******************************

                                                    1.5

                                          1.6       1.5   1.5

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Execution complete, time =    85.63 seconds
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*********************************************
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* *                                       * *
* *    ---------------------------------  * *
* *     TSTAB  slope stability analysis   * *
* *        Revision 2.40 - 02/12/85       * *
* *    ---------------------------------  * *
* *                                       * *
* *    TAGA Engineering Software Services * *
* *           Berkeley, California        * *
* *                                       * *
* *   IBM PC & 8086/8088 MS-DOS Version by * *
* *                                       * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington        * *
* *                                       * *
* *      copyright (c) 1983, 1984 TAGA    * *
* *      copyright (c) 1983, 1984 DPMS    * *
* *                                       * *
* ***************************************** *
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*******************************************************************
 92-0933,STA. 125,N. DIKE,TRY 3,TOE
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*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
*****************************************
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**************
 INPUT DATA
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CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  0
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    2
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =       .000
     ATMOSPHERIC PRESSURE                   =       .000
     UNIT WEIGHT OF WATER                   =     62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =     62.400

SEARCH STARTS AT CENTER ( 119.0,  46.0),WITH FINAL GRID OF  3.0

ALL CIRCLES PASS THROUGH THE POINT ( 117.0, 106.0)
```

GEOMETRY

SECTIONS	.00	40.00	58.00	118.00	200.00
T. CRACKS	80.00	80.00	86.00	106.00	106.00
W IN CRACK	80.00	80.00	86.00	106.00	106.00
BOUNDARY 1	80.00	80.00	86.00	106.00	106.00
BOUNDARY 2	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	58.00	118.00	200.00
Y-COORDINATE OF PHREATIC SURFACE	86.00	93.00	97.00	110.00	126.00

1

****
RESULTS
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	106.0	60.0	119.0	46.0	2.723
2	106.1	60.1	113.0	46.0	2.802
3	106.0	66.0	119.0	40.0	2.723
4	106.5	60.5	125.0	46.0	3.369
5	106.0	54.0	119.0	52.0	2.723
6	106.0	60.0	116.0	46.0	2.757
7	106.0	63.0	119.0	43.0	2.723
8	106.2	60.2	122.0	46.0	2.788
9	106.0	57.0	119.0	49.0	2.723
10	106.0	63.0	116.0	43.0	2.756
11	106.2	63.2	122.0	43.0	2.773
12	106.2	57.2	122.0	49.0	2.807
13	106.0	57.0	116.0	49.0	2.759

F.S. MINIMUM= 2.723 FOR THE CIRCLE OF CENTER (119.0, 46.0)

Opened plot file: srslope2.P01
Saved plot file: srslope2.P01

1
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LOCATION OF CRITICAL CIRCLE
****

2.8

2.8 2.8

2.8

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Execution complete, time =    53.66 seconds
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*********************************************
* ***************************************** *
* *                                       * *
* *    ---------------------------------  * *
* *     TSTAB  slope stability analysis   * *
* *        Revision 2.40 - 02/12/85       * *
* *    ---------------------------------  * *
* *                                       * *
* *    TAGA Engineering Software Services * *
* *           Berkeley, California        * *
* *                                       * *
* *   IBM PC & 8086/8088 MS-DOS Version by * *
* *                                       * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington        * *
* *                                       * *
* *      copyright (c) 1983, 1984 TAGA    * *
* *      copyright (c) 1983, 1984 DPMS    * *
* *                                       * *
* ***************************************** *
*********************************************
```

```
*******************************************************************
 92-0933,STA. 125,N. DIKE,TRY 4,BASE
*******************************************************************
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*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
*****************************************
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**************
 INPUT DATA
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```
CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  3
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    3
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =       .000
     ATMOSPHERIC PRESSURE                   =       .000
     UNIT WEIGHT OF WATER                   =     62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =     62.400

SEARCH STARTS AT CENTER ( 100.0,  46.0),WITH FINAL GRID OF  3.0

ALL CIRCLES TANGENT TO DEPTH, 107.0, 112.0, 117.0,
```

GEOMETRY

SECTIONS	.00	40.00	58.00	118.00	200.00
T. CRACKS	80.00	80.00	86.00	106.00	106.00
W IN CRACK	80.00	80.00	86.00	106.00	106.00
BOUNDARY 1	80.00	80.00	86.00	106.00	106.00
BOUNDARY 2	106.00	106.00	106.00	106.00	106.00
BOUNDARY 3	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00
2	130.00	.00	35.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	58.00	118.00	200.00
Y-COORDINATE OF PHREATIC SURFACE	86.00	93.00	97.00	110.00	126.00

1

****
RESULTS
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****
DEPTH LIMITING TANGENT NO. 1 AT Y = 107.00
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	107.0	61.0	100.0	46.0	2.652
2	107.0	61.0	94.0	46.0	2.659
3	107.0	67.0	100.0	40.0	2.630
4	107.0	61.0	106.0	46.0	2.668
5	107.0	55.0	100.0	52.0	2.680
6	107.0	67.0	97.0	40.0	2.628
7	107.0	70.0	100.0	37.0	2.621
8	107.0	67.0	103.0	40.0	2.639
9	107.0	64.0	100.0	43.0	2.641
10	107.0	70.0	97.0	37.0	2.617
11	107.0	73.0	100.0	34.0	2.612
12	107.0	70.0	103.0	37.0	2.631
13	107.0	73.0	97.0	34.0	2.607
14	107.0	76.0	100.0	31.0	2.604
15	107.0	73.0	103.0	34.0	2.623
16	107.0	76.0	97.0	31.0	2.599
17	107.0	79.0	100.0	28.0	2.597
18	107.0	76.0	103.0	31.0	2.616

19	107.0	79.0	97.0	28.0	2.598
20	107.0	82.0	100.0	25.0	2.591
21	107.0	79.0	103.0	28.0	2.610
22	107.0	82.0	97.0	25.0	2.601
23	107.0	85.0	100.0	22.0	2.591
24	107.0	82.0	103.0	25.0	2.604
25	107.0	85.0	97.0	22.0	2.607
26	107.0	88.0	100.0	19.0	2.594
27	107.0	85.0	103.0	22.0	2.599
28	107.0	88.0	97.0	19.0	2.617
29	107.0	88.0	103.0	19.0	2.594
30	107.0	82.0	103.0	25.0	2.604
31	107.0	82.0	97.0	25.0	2.601

F.S. MINIMUM= 2.591 FOR THE CIRCLE OF CENTER (100.0, 22.0)

Opened plot file: srslope3.P01
Saved plot file: srslope3.P01

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*******************************
 LOCATION OF CRITICAL CIRCLE
*******************************
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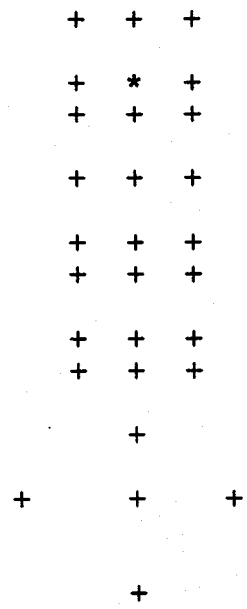

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                  OOXXXXXXXXXOOOO
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                                                  OOOOOXXXXXXXXXXXXXXXXXXXXXXXXXXXXXOO
                                                        OOOOOOOXXXXXXXXXXXXXXXXXXXXXXX
                                                                OOOOOOOOOOOOOOOOOOOOOO

1
**************************************************
 DEPTH LIMITING TANGENT NO.  2  AT Y =   112.00
**************************************************
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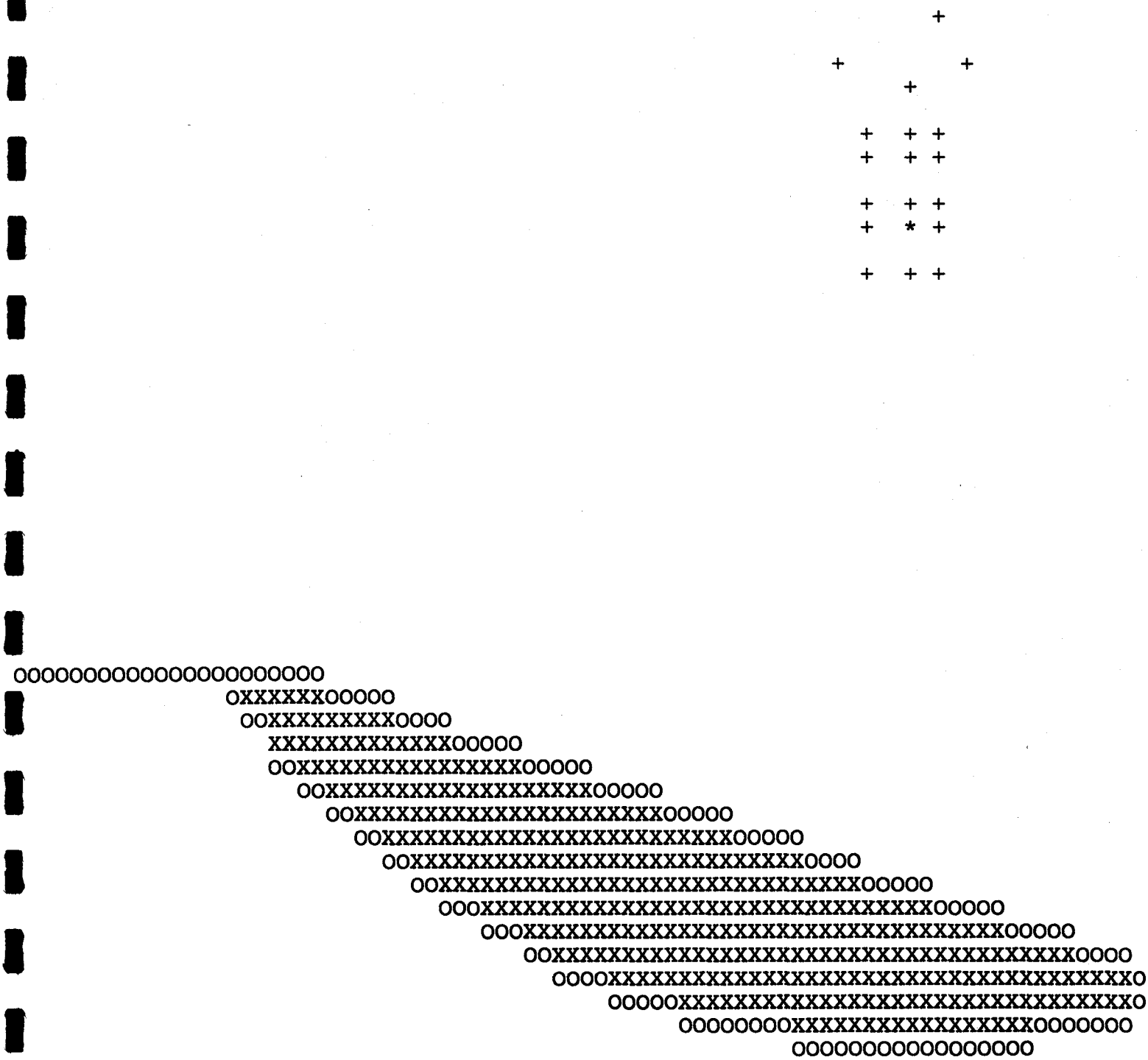
NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	112.0	90.0	100.0	22.0	2.383
2	112.0	87.0	91.0	25.0	2.442
3	112.0	93.0	97.0	19.0	2.406
4	112.0	87.0	103.0	25.0	2.388
5	112.0	81.0	97.0	31.0	2.356
6	112.0	81.0	94.0	31.0	2.375
7	112.0	84.0	97.0	28.0	2.365
8	112.0	81.0	100.0	31.0	2.354
9	112.0	78.0	97.0	34.0	2.347
10	112.0	78.0	94.0	34.0	2.366
11	112.0	78.0	100.0	34.0	2.350
12	112.0	75.0	97.0	37.0	2.341
13	112.0	75.0	94.0	37.0	2.357
14	112.0	75.0	100.0	37.0	2.349
15	112.0	72.0	97.0	40.0	2.339
16	112.0	72.0	94.0	40.0	2.352
17	112.0	72.0	100.0	40.0	2.353
18	112.0	69.0	97.0	43.0	2.341
19	112.0	75.0	94.0	37.0	2.357
20	112.0	75.0	100.0	37.0	2.349
21	112.0	69.0	100.0	43.0	2.359
22	112.0	69.0	94.0	43.0	2.351

F.S. MINIMUM= 2.339 FOR THE CIRCLE OF CENTER (97.0, 40.0)

Opened plot file: srslope3.P02
Saved plot file: srslope3.P02

```
1
*******************************
 LOCATION OF CRITICAL CIRCLE
*******************************
```

+



1

****
DEPTH LIMITING TANGENT NO. 3 AT Y = 117.00
****

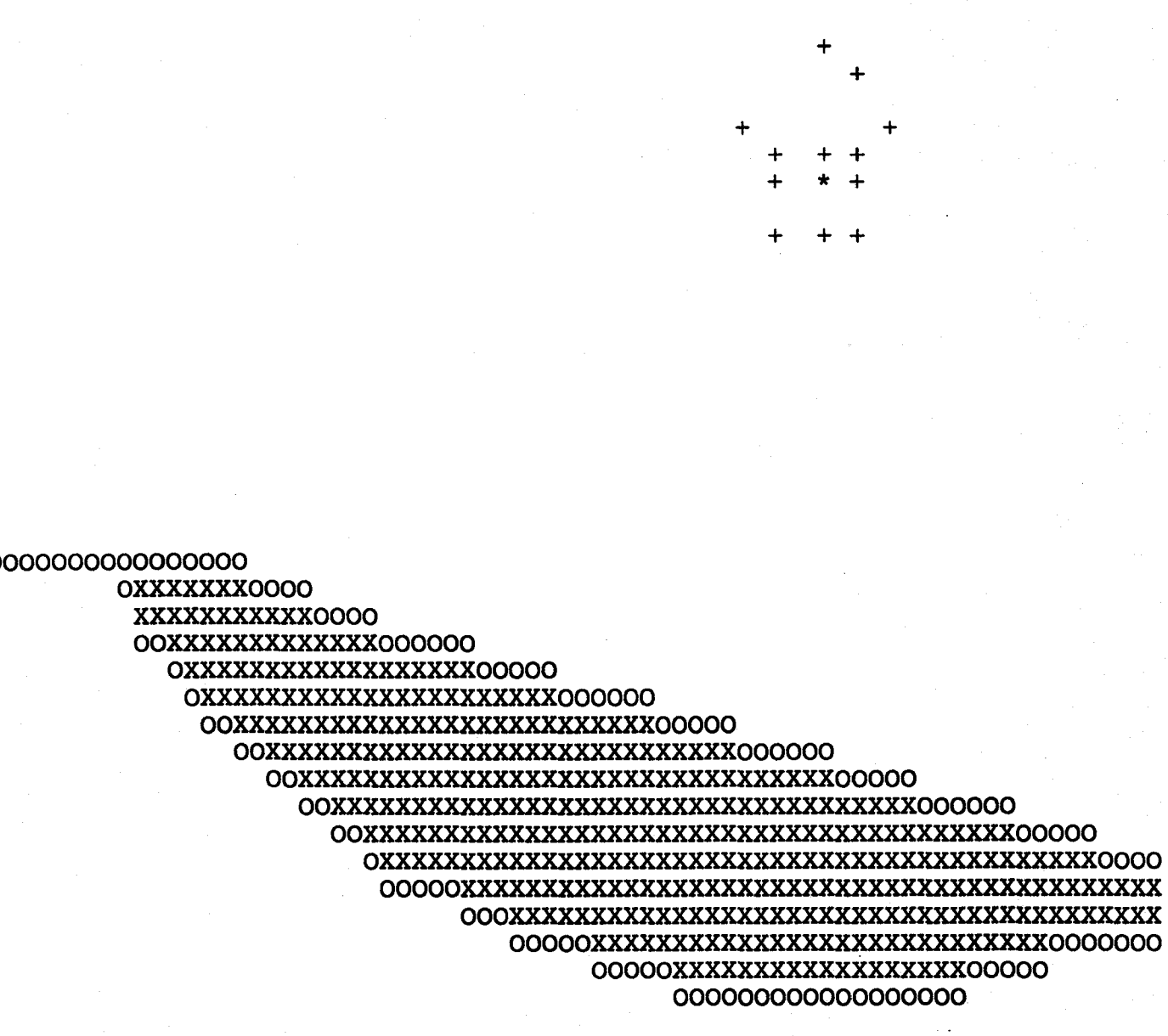
NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	117.0	77.0	97.0	40.0	2.379
2	117.0	74.0	88.0	43.0	2.421
3	117.0	80.0	94.0	37.0	2.387
4	117.0	74.0	100.0	43.0	2.399
5	117.0	68.0	94.0	49.0	2.366

6	117.0	68.0	91.0	49.0	2.379
7	117.0	71.0	94.0	46.0	2.367
8	117.0	68.0	97.0	49.0	2.375
9	117.0	65.0	94.0	52.0	2.370
10	117.0	71.0	91.0	46.0	2.381
11	117.0	71.0	97.0	46.0	2.372
12	117.0	65.0	97.0	52.0	2.383
13	117.0	65.0	91.0	52.0	2.382

F.S. MINIMUM= 2.366 FOR THE CIRCLE OF CENTER (94.0, 49.0)

Opened plot file: srslope3.P03
Saved plot file: srslope3.P03

1
****
LOCATION OF CRITICAL CIRCLE
****



Execution complete, time = 186.70 seconds

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*********************************************
* ******************************************* *
* *                                         * *
* *    ---------------------------------    * *
* *     TSTAB  slope stability analysis     * *
* *        Revision 2.40 - 02/12/85         * *
* *    ---------------------------------    * *
* *                                         * *
* *    TAGA Engineering Software Services   * *
* *           Berkeley, California          * *
* *                                         * *
* *   IBM PC & 8086/8088 MS-DOS Version by  * *
* *                                         * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington          * *
* *                                         * *
* *      copyright (c) 1983, 1984 TAGA      * *
* *      copyright (c) 1983, 1984 DPMS      * *
* *                                         * *
* ******************************************* *
*********************************************
```

```
*******************************************************************
 92-0933,STA. 125,N. DIKE,TRY 4A, BASE
*******************************************************************
```

```
*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
*****************************************
```

```
***************
 INPUT DATA
***************
```

```
CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  3
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    3
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =        .000
     ATMOSPHERIC PRESSURE                   =        .000
     UNIT WEIGHT OF WATER                   =      62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =      62.400

SEARCH STARTS AT CENTER ( 100.0,  46.0),WITH FINAL GRID OF  3.0

ALL CIRCLES TANGENT TO DEPTH, 107.0, 112.0, 117.0,
```

GEOMETRY

SECTIONS	.00	40.00	58.00	118.00	200.00
T. CRACKS	80.00	80.00	86.00	106.00	106.00
W IN CRACK	80.00	80.00	86.00	106.00	106.00
BOUNDARY 1	80.00	80.00	86.00	106.00	106.00
BOUNDARY 2	106.00	106.00	106.00	106.00	106.00
BOUNDARY 3	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00
2	130.00	.00	35.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	58.00	118.00	200.00
Y-COORDINATE OF PHREATIC SURFACE	86.00	86.00	86.00	106.00	106.00

1

****
RESULTS
****

****
DEPTH LIMITING TANGENT NO. 1 AT Y = 107.00
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	107.0	61.0	100.0	46.0	1.530
2	107.0	61.0	94.0	46.0	1.617
3	107.0	67.0	100.0	40.0	1.535
4	107.0	61.0	106.0	46.0	1.476
5	107.0	55.0	100.0	52.0	1.535
6	107.0	61.0	103.0	46.0	1.498
7	107.0	64.0	106.0	43.0	1.473
8	107.0	61.0	109.0	46.0	1.459
9	107.0	58.0	106.0	49.0	1.478
10	107.0	64.0	109.0	43.0	1.458
11	107.0	61.0	112.0	46.0	1.454
12	107.0	58.0	109.0	49.0	1.459
13	107.0	64.0	112.0	43.0	1.454
14	107.0	61.0	115.0	46.0	1.466
15	107.0	58.0	112.0	49.0	1.453
16	107.0	58.0	109.0	49.0	1.459
17	107.0	58.0	115.0	49.0	1.465
18	107.0	55.0	112.0	52.0	1.453

19	107.0	55.0	109.0	52.0	1.460
20	107.0	55.0	115.0	52.0	1.465
21	107.0	52.0	112.0	55.0	1.452
22	107.0	52.0	109.0	55.0	1.461
23	107.0	52.0	115.0	55.0	1.465
24	107.0	49.0	112.0	58.0	1.452
25	107.0	49.0	109.0	58.0	1.463
26	107.0	49.0	115.0	58.0	1.465
27	107.0	46.0	112.0	61.0	1.452
28	107.0	46.0	109.0	61.0	1.466
29	107.0	46.0	115.0	61.0	1.465
30	107.0	43.0	112.0	64.0	1.452
31	107.0	49.0	109.0	58.0	1.463
32	107.0	49.0	115.0	58.0	1.465
33	107.0	43.0	115.0	64.0	1.466
34	107.0	43.0	109.0	64.0	1.469

F.S. MINIMUM= 1.452 FOR THE CIRCLE OF CENTER (112.0, 61.0)

Opened plot file: srslope4.P01
Saved plot file: srslope4.P01

1
****
LOCATION OF CRITICAL CIRCLE
****

```
                                   1.5

                                           1.5  1.5  1.5

                         1.6       1.5  1.5  1.5  1.5  1.5  1.5

                                           1.5  1.5  1.5  1.5

                                   1.5            1.5  1.5  1.5

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                                  OOOOXXXXXXXXXXXXXXXXXXXXXXXOOOOO
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1

****
DEPTH LIMITING TANGENT NO. 2 AT Y = 112.00
****

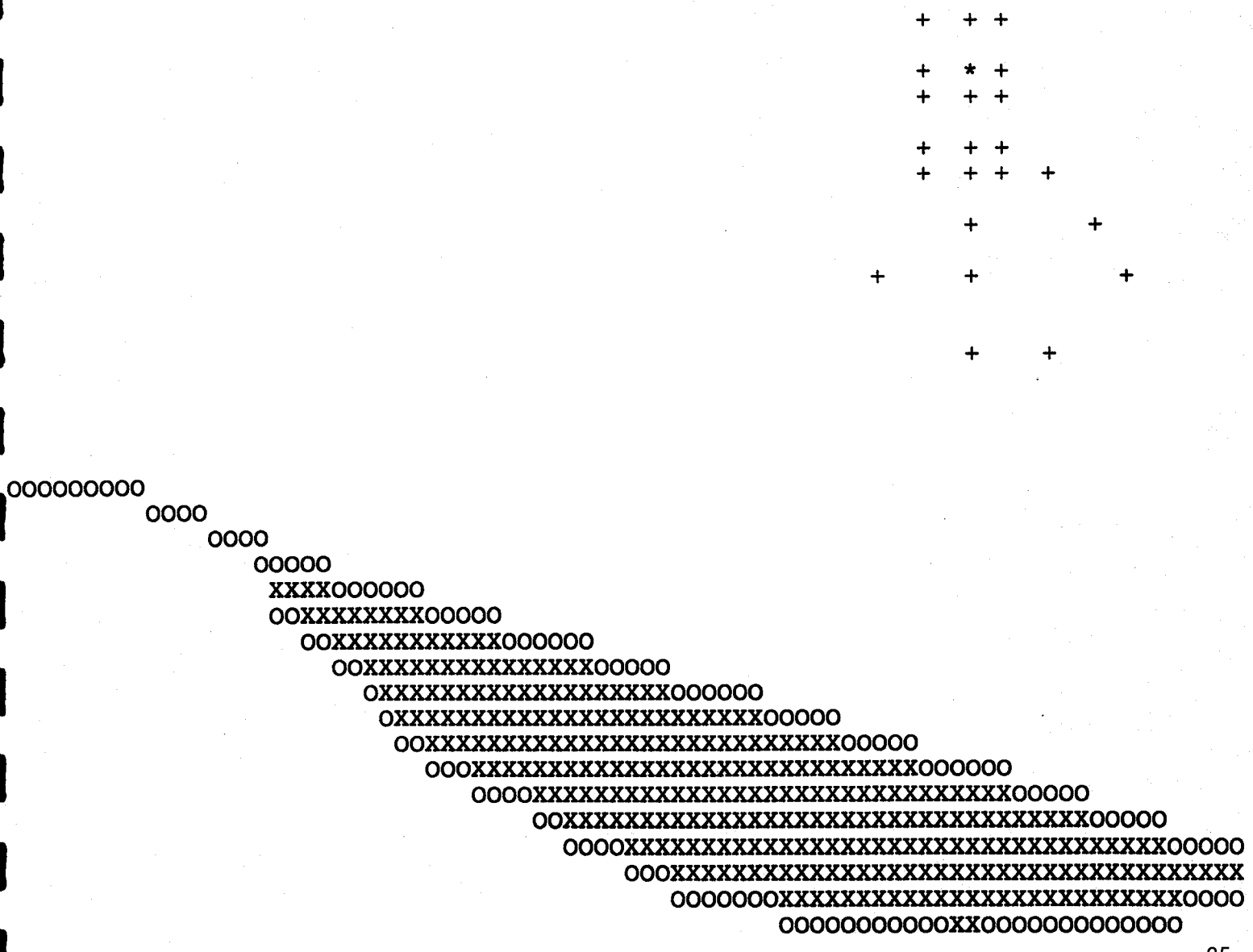
NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	112.0	51.0	112.0	61.0	1.692
2	112.0	48.0	103.0	64.0	1.586
3	112.0	54.0	109.0	58.0	1.618
4	112.0	48.0	115.0	64.0	1.811
5	112.0	42.0	109.0	70.0	1.668
6	112.0	48.0	97.0	64.0	1.614
7	112.0	54.0	103.0	58.0	1.564
8	112.0	42.0	103.0	70.0	1.619
9	112.0	54.0	100.0	58.0	1.567
10	112.0	57.0	103.0	55.0	1.558
11	112.0	54.0	106.0	58.0	1.581
12	112.0	51.0	103.0	61.0	1.574
13	112.0	57.0	100.0	55.0	1.560

14	112.0	60.0	103.0	52.0	1.553
15	112.0	57.0	106.0	55.0	1.573
16	112.0	60.0	100.0	52.0	1.557
17	112.0	63.0	103.0	49.0	1.551
18	112.0	60.0	106.0	52.0	1.567
19	112.0	63.0	100.0	49.0	1.557
20	112.0	66.0	103.0	46.0	1.551
21	112.0	63.0	106.0	49.0	1.563
22	112.0	66.0	100.0	46.0	1.557
23	112.0	66.0	106.0	46.0	1.560
24	112.0	60.0	106.0	52.0	1.567
25	112.0	60.0	100.0	52.0	1.557

F.S. MINIMUM= 1.551 FOR THE CIRCLE OF CENTER (103.0, 49.0)

Opened plot file: srslope4.P02
Saved plot file: srslope4.P02

1
****
LOCATION OF CRITICAL CIRCLE
****



OO

1
****
DEPTH LIMITING TANGENT NO. 3 AT Y = 117.00
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	117.0	68.0	103.0	49.0	1.744
2	117.0	65.0	94.0	52.0	1.741
3	117.0	71.0	100.0	46.0	1.726
4	117.0	65.0	106.0	52.0	1.783
5	117.0	59.0	100.0	58.0	1.747
6	117.0	71.0	97.0	46.0	1.729
7	117.0	74.0	100.0	43.0	1.728
8	117.0	71.0	103.0	46.0	1.740
9	117.0	68.0	100.0	49.0	1.727
10	117.0	74.0	97.0	43.0	1.735
11	117.0	74.0	103.0	43.0	1.738
12	117.0	68.0	103.0	49.0	1.744
13	117.0	68.0	97.0	49.0	1.726

F.S. MINIMUM= 1.726 FOR THE CIRCLE OF CENTER (100.0, 46.0)

Opened plot file: srslope4.P03
Saved plot file: srslope4.P03

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****
LOCATION OF CRITICAL CIRCLE
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      OOOXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXOOOOOOOOO
         OOXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
           OOOOOOXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXOO
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                      OOOOOOOOXXXXXXXOOOOOOOOOO
                              OOOOOOO
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Execution complete, time =   204.71 seconds
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*********************************************
* ******************************************* *
* *                                         * *
* *    ---------------------------------    * *
* *     TSTAB  slope stability analysis     * *
* *        Revision 2.40 - 02/12/85         * *
* *    ---------------------------------    * *
* *                                         * *
* *    TAGA Engineering Software Services   * *
* *           Berkeley, California          * *
* *                                         * *
* *   IBM PC & 8086/8088 MS-DOS Version by  * *
* *                                         * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington          * *
* *                                         * *
* *      copyright (c) 1983, 1984 TAGA      * *
* *      copyright (c) 1983, 1984 DPMS      * *
* *                                         * *
* ******************************************* *
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```

```
*******************************************************************
 92-0933,STA. 230,s. DIKE,TRY 5,TOE
*******************************************************************
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```
*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
*****************************************
```

```
***************
 INPUT DATA
***************
```

```
CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  0
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    2
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =        .000
     ATMOSPHERIC PRESSURE                   =        .000
     UNIT WEIGHT OF WATER                   =      62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =      62.400

SEARCH STARTS AT CENTER ( 115.0,  46.0),WITH FINAL GRID OF  2.0

ALL CIRCLES PASS THROUGH THE POINT ( 114.0, 105.0)
```

GEOMETRY

SECTIONS	.00	40.00	61.00	115.00	150.00
T. CRACKS	80.00	80.00	87.00	105.00	105.00
W IN CRACK	80.00	80.00	87.00	105.00	105.00
BOUNDARY 1	80.00	80.00	87.00	105.00	105.00
BOUNDARY 2	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	61.00	115.00	150.00
Y-COORDINATE OF PHREATIC SURFACE	87.00	87.00	87.00	105.00	105.00

1

****
RESULTS
****

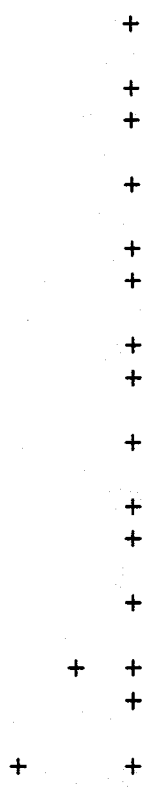
NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	105.0	59.0	115.0	46.0	1.479
2	105.1	59.1	111.0	46.0	1.514
3	105.0	63.0	115.0	42.0	1.479
4	105.2	59.2	119.0	46.0	1.513
5	105.0	55.0	115.0	50.0	1.479
6	105.0	63.0	113.0	42.0	1.494
7	105.0	65.0	115.0	40.0	1.479
8	105.1	63.1	117.0	42.0	1.473
9	105.0	61.0	115.0	44.0	1.479
10	105.1	65.1	117.0	40.0	1.472
11	105.2	63.2	119.0	42.0	1.502
12	105.1	61.1	117.0	44.0	1.473
13	105.0	65.0	115.0	40.0	1.479
14	105.1	67.1	117.0	38.0	1.472
15	105.2	65.2	119.0	40.0	1.497
16	105.0	67.0	115.0	38.0	1.479
17	105.1	69.1	117.0	36.0	1.472
18	105.2	67.2	119.0	38.0	1.493
19	105.0	69.0	115.0	36.0	1.479
20	105.1	71.1	117.0	34.0	1.472
21	105.2	69.2	119.0	36.0	1.490
22	105.0	71.0	115.0	34.0	1.479
23	105.1	73.1	117.0	32.0	1.471
24	105.2	71.2	119.0	34.0	1.487
25	105.0	73.0	115.0	32.0	1.479
26	105.1	75.1	117.0	30.0	1.471
27	105.2	73.2	119.0	32.0	1.485

28	105.0	75.0	115.0	30.0	1.479
29	105.1	77.1	117.0	28.0	1.471
30	105.2	75.2	119.0	30.0	1.483
31	105.0	77.0	115.0	28.0	1.479
32	105.1	79.1	117.0	26.0	1.471
33	105.2	77.2	119.0	28.0	1.481
34	105.0	79.0	115.0	26.0	1.479
35	105.1	81.1	117.0	24.0	1.471
36	105.2	79.2	119.0	26.0	1.479
37	105.0	81.0	115.0	24.0	1.479
38	105.1	83.1	117.0	22.0	1.471
39	105.2	81.2	119.0	24.0	1.478
40	105.0	83.0	115.0	22.0	1.479
41	105.1	85.1	117.0	20.0	1.471
42	105.2	83.2	119.0	22.0	1.477
43	105.0	85.0	115.0	20.0	1.479
44	105.1	87.1	117.0	18.0	1.471
45	105.1	85.1	119.0	20.0	1.476
46	105.0	87.0	115.0	18.0	1.479
47	105.1	87.1	119.0	18.0	1.475
48	105.2	83.2	119.0	22.0	1.477
49	105.0	83.0	115.0	22.0	1.479

F.S. MINIMUM= 1.471 FOR THE CIRCLE OF CENTER (117.0, 20.0)

Opened plot file: srslope4.P01
Saved plot file: srslope4.P01

1
****
LOCATION OF CRITICAL CIRCLE
****



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                                                   OOOOOXXXXXXXXXXXXXXXOOOOO
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 Execution complete, time =   135.67 seconds
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*********************************************
* ******************************************* *
* *                                         * *
* *    ---------------------------------    * *
* *     TSTAB  slope stability analysis     * *
* *        Revision 2.40 - 02/12/85         * *
* *    ---------------------------------    * *
* *                                         * *
* *    TAGA Engineering Software Services   * *
* *           Berkeley, California          * *
* *                                         * *
* *   IBM PC & 8086/8088 MS-DOS Version by  * *
* *                                         * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington          * *
* *                                         * *
* *      copyright (c) 1983, 1984 TAGA      * *
* *      copyright (c) 1983, 1984 DPMS      * *
* *                                         * *
* ******************************************* *
*********************************************
```

```
*********************************************************************
 92-0933,STA. 230 S. DIKE,TRY 6,BASE
*********************************************************************
```

```
*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
*****************************************
```

```
***************
  INPUT DATA
***************
```

```
CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  3
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    3
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =       .000
     ATMOSPHERIC PRESSURE                   =       .000
     UNIT WEIGHT OF WATER                   =     62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =     62.400

SEARCH STARTS AT CENTER ( 100.0,  46.0),WITH FINAL GRID OF  3.0

ALL CIRCLES TANGENT TO DEPTH, 106.0, 111.0, 116.0,
```

GEOMETRY

SECTIONS	.00	40.00	61.00	115.00	200.00
T. CRACKS	80.00	80.00	87.00	105.00	105.00
W IN CRACK	80.00	80.00	87.00	105.00	105.00
BOUNDARY 1	80.00	80.00	87.00	105.00	105.00
BOUNDARY 2	105.00	105.00	105.00	105.00	105.00
BOUNDARY 3	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00
2	130.00	.00	35.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	61.00	115.00	200.00
Y-COORDINATE OF PHREATIC SURFACE	87.00	87.00	87.00	105.00	105.00

1

****
RESULTS
****

****
DEPTH LIMITING TANGENT NO. 1 AT Y = 106.00
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	106.0	60.0	100.0	46.0	1.514
2	106.0	60.0	94.0	46.0	1.609
3	106.0	66.0	100.0	40.0	1.525
4	106.0	60.0	106.0	46.0	1.459
5	106.0	54.0	100.0	52.0	1.512
6	106.0	60.0	103.0	46.0	1.480
7	106.0	63.0	106.0	43.0	1.458
8	106.0	60.0	109.0	46.0	1.454
9	106.0	57.0	106.0	49.0	1.459
10	106.0	63.0	109.0	43.0	1.454
11	106.0	60.0	112.0	46.0	1.466
12	106.0	57.0	109.0	49.0	1.453
13	106.0	57.0	106.0	49.0	1.459
14	106.0	57.0	112.0	49.0	1.465
15	106.0	54.0	109.0	52.0	1.453
16	106.0	54.0	106.0	52.0	1.460
17	106.0	54.0	112.0	52.0	1.465
18	106.0	51.0	109.0	55.0	1.452

19	106.0	51.0	106.0	55.0	1.462
20	106.0	51.0	112.0	55.0	1.465
21	106.0	48.0	109.0	58.0	1.452
22	106.0	48.0	106.0	58.0	1.464
23	106.0	48.0	112.0	58.0	1.465
24	106.0	45.0	109.0	61.0	1.452
25	106.0	51.0	106.0	55.0	1.462
26	106.0	51.0	112.0	55.0	1.465
27	106.0	45.0	112.0	61.0	1.465
28	106.0	45.0	106.0	61.0	1.467

F.S. MINIMUM= 1.452 FOR THE CIRCLE OF CENTER (109.0, 58.0)

Opened plot file: srslope5.P01
Saved plot file: srslope5.P01

1
****
LOCATION OF CRITICAL CIRCLE
****

```
                                                  1.5

                                                            1.5  1.5

                                        1.6       1.5  1.5  1.5  1.5  1.5

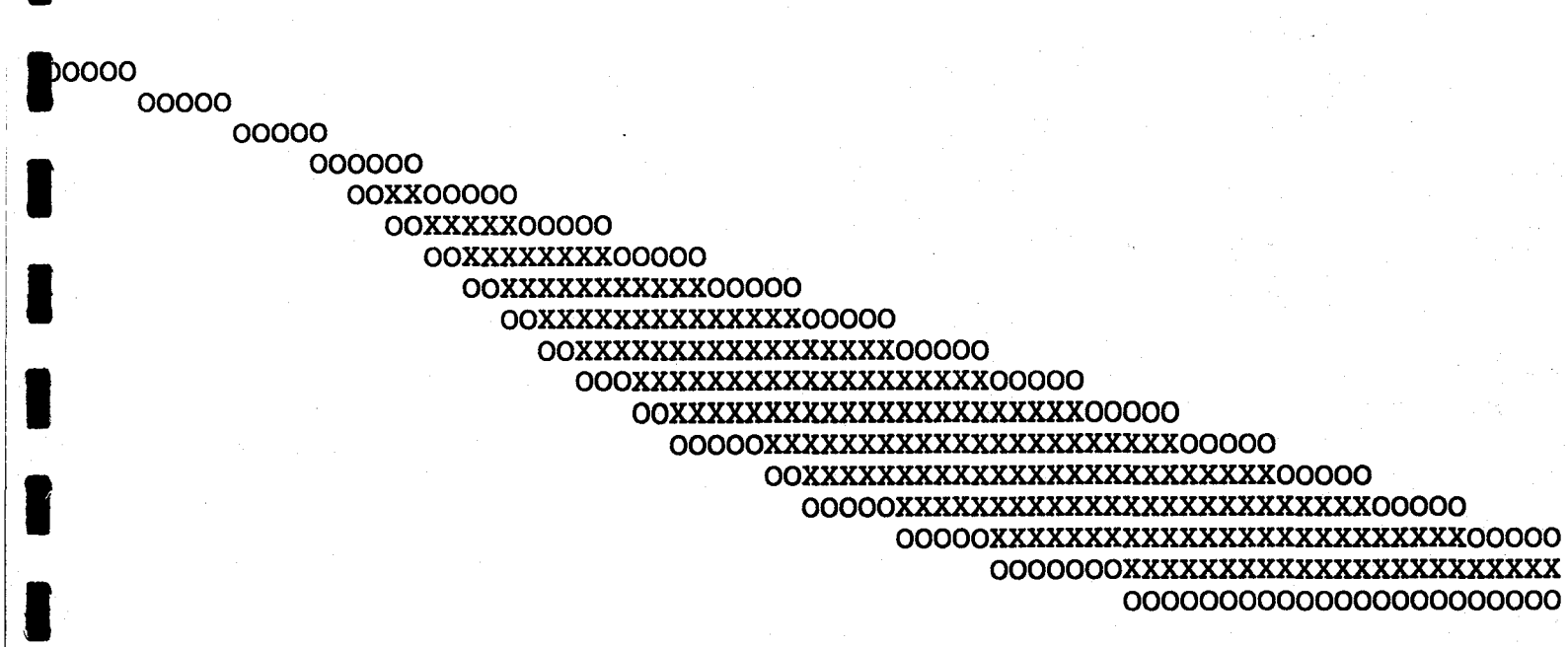
                                                            1.5  1.5  1.5

                                                  1.5       1.5  1.5  1.5

                                                            1.5  1.5  1.5

                                                            1.5  1*5  1.5

                                                            1.5  1.5  1.5
```



1

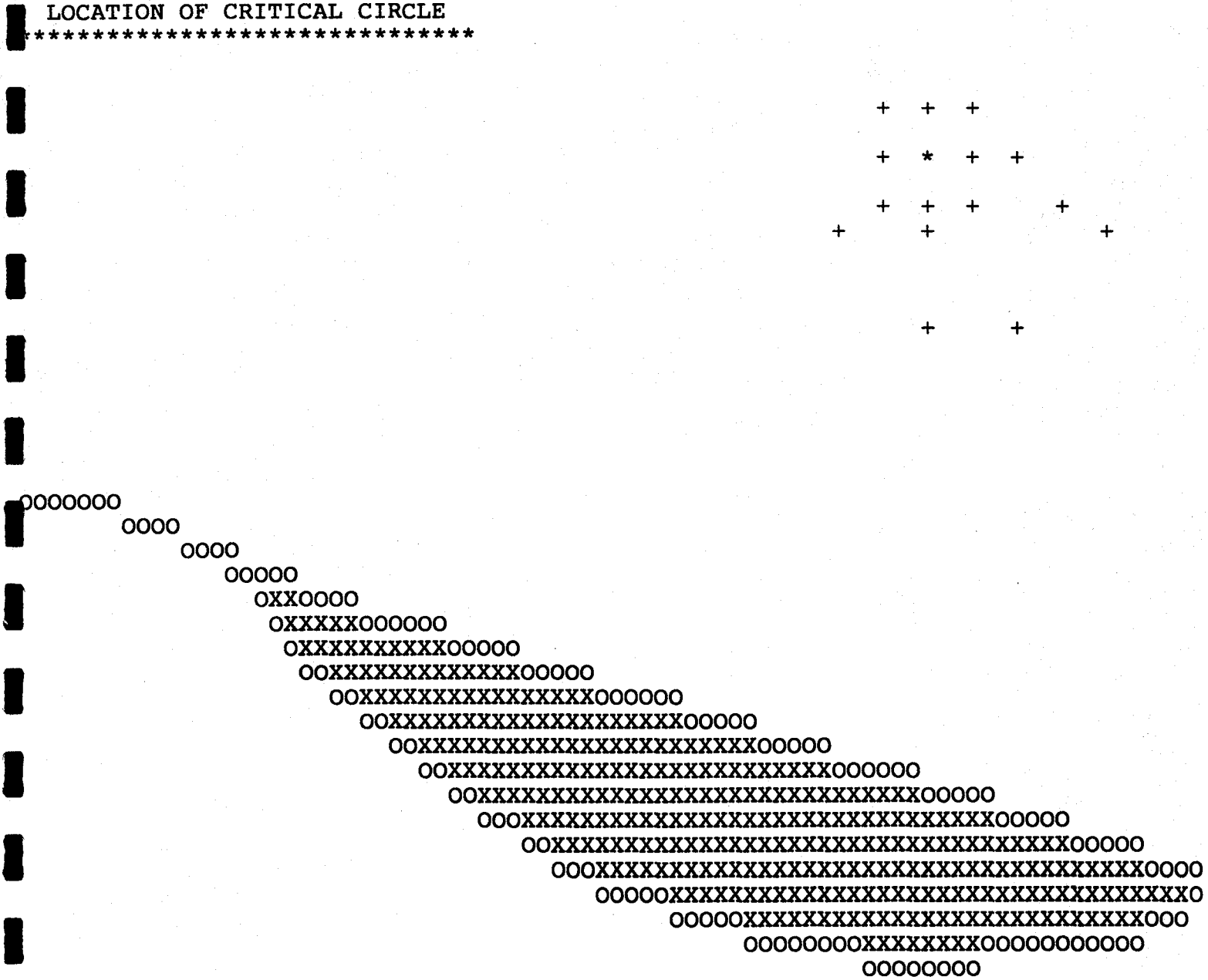
```
**************************************************
 DEPTH LIMITING TANGENT NO.  2  AT Y =   111.00
**************************************************
```

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	111.0	53.0	109.0	58.0	1.684
2	111.0	50.0	100.0	61.0	1.583
3	111.0	56.0	106.0	55.0	1.613
4	111.0	50.0	112.0	61.0	1.798
5	111.0	44.0	106.0	67.0	1.657
6	111.0	50.0	94.0	61.0	1.624
7	111.0	56.0	100.0	55.0	1.574
8	111.0	44.0	100.0	67.0	1.607
9	111.0	56.0	97.0	55.0	1.585
10	111.0	59.0	100.0	52.0	1.574
11	111.0	56.0	103.0	55.0	1.582
12	111.0	53.0	100.0	58.0	1.576
13	111.0	59.0	97.0	52.0	1.584
14	111.0	59.0	103.0	52.0	1.579
15	111.0	53.0	103.0	58.0	1.587
16	111.0	53.0	97.0	58.0	1.588

F.S. MINIMUM= 1.574 FOR THE CIRCLE OF CENTER (100.0, 55.0)

Opened plot file: srslope5.P02
Saved plot file: srslope5.P02

```
1
*******************************
 LOCATION OF CRITICAL CIRCLE
*******************************
```



```
1
*************************************************
 DEPTH LIMITING TANGENT NO.  3  AT Y =   116.00
*************************************************
```

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	116.0	61.0	100.0	55.0	1.783
2	116.0	58.0	91.0	58.0	1.792
3	116.0	64.0	97.0	52.0	1.763
4	116.0	58.0	103.0	58.0	1.825
5	116.0	52.0	97.0	64.0	1.799
6	116.0	64.0	94.0	52.0	1.768
7	116.0	67.0	97.0	49.0	1.762
8	116.0	64.0	100.0	52.0	1.777

```
   9     116.0      61.0        97.0        55.0        1.767
  10     116.0      67.0        94.0        49.0        1.771
  11     116.0      70.0        97.0        46.0        1.766
  12     116.0      67.0       100.0        49.0        1.773
  13     116.0      70.0        94.0        46.0        1.778
  14     116.0      70.0       100.0        46.0        1.773
  15     116.0      64.0       100.0        52.0        1.777
  16     116.0      64.0        94.0        52.0        1.768

F.S. MINIMUM= 1.762 FOR THE CIRCLE OF CENTER (  97.0,  49.0)

 Opened plot file: srslope5.P03
 Saved plot file:  srslope5.P03

1
*******************************
 LOCATION OF CRITICAL CIRCLE
*******************************

                                                          + +  +
                                                          + *  +

                                                          + +  +
                                                            +  +
                                                        +        +


                                                            +



OOOOOOOOOOOOOOOOOOOOOO
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                 OOXXXXXXXXXOOOOO
                   OXXXXXXXXXXXXXOOOOO
                    XXXXXXXXXXXXXXXXXXOOOOO
                    OOXXXXXXXXXXXXXXXXXXXXXOOOOO
                      OOXXXXXXXXXXXXXXXXXXXXXXXXXOOOOO
                        OOXXXXXXXXXXXXXXXXXXXXXXXXXXXXOOOOO
                          OOXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXOOOOO
                            OXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXOOOOO
                             OXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXOOOOO
                              OOOXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXOOOOOOOO
                                 OOOOXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                                      OOOXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXOO
                                         OOOOOXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXOOO
                                              OOOOOOXXXXXXXXXXXXXXXXXXXXXXOOOOOOO
                                                     OOOOOOOOOOOOOOOOOOOO

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 Execution complete, time =   180.93 seconds
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```

```
*********************************************
* ***************************************** *
* *                                       * *
* *    ---------------------------------  * *
* *     TSTAB  slope stability analysis   * *
* *        Revision 2.40 - 02/12/85       * *
* *    ---------------------------------  * *
* *                                       * *
* *    TAGA Engineering Software Services * *
* *           Berkeley, California        * *
* *                                       * *
* *   IBM PC & 8086/8088 MS-DOS Version by * *
* *                                       * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington        * *
* *                                       * *
* *      copyright (c) 1983, 1984 TAGA    * *
* *      copyright (c) 1983, 1984 DPMS    * *
* *                                       * *
* ***************************************** *
*********************************************
```

```
*******************************************************************
 92-0933,STA. 230 S. DIKE,TRY 7 TOE
*******************************************************************
```

```
*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
*****************************************
```

```
***************
 INPUT DATA
***************
```

```
CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  0
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    3
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =        .000
     ATMOSPHERIC PRESSURE                   =        .000
     UNIT WEIGHT OF WATER                   =      62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =      62.400

SEARCH STARTS AT CENTER ( 117.0,  20.0),WITH FINAL GRID OF  2.0

ALL CIRCLES PASS THROUGH THE POINT ( 114.0, 105.0)
```

GEOMETRY

SECTIONS	.00	40.00	61.00	115.00	200.00
T. CRACKS	80.00	80.00	87.00	105.00	105.00
W IN CRACK	80.00	80.00	87.00	105.00	105.00
BOUNDARY 1	80.00	80.00	87.00	105.00	105.00
BOUNDARY 2	105.00	105.00	105.00	105.00	105.00
BOUNDARY 3	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00
2	130.00	.00	35.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	61.00	115.00	200.00
Y-COORDINATE OF PHREATIC SURFACE	87.00	87.00	87.00	105.00	105.00

1

****
RESULTS
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	105.1	85.1	117.0	20.0	1.470
2	105.0	85.0	113.0	20.0	1.487
3	105.1	89.1	117.0	16.0	1.470
4	105.3	85.3	121.0	20.0	1.494
5	105.1	81.1	117.0	24.0	1.470
6	105.0	81.0	115.0	24.0	1.478
7	105.1	83.1	117.0	22.0	1.470
8	105.2	81.2	119.0	24.0	1.472
9	105.1	79.1	117.0	26.0	1.470
10	105.0	79.0	115.0	26.0	1.478
11	105.2	79.2	119.0	26.0	1.473
12	105.1	77.1	117.0	28.0	1.470
13	105.0	77.0	115.0	28.0	1.478
14	105.2	77.2	119.0	28.0	1.474
15	105.1	75.1	117.0	30.0	1.469
16	105.0	75.0	115.0	30.0	1.478
17	105.2	75.2	119.0	30.0	1.475
18	105.1	73.1	117.0	32.0	1.469
19	105.0	73.0	115.0	32.0	1.478
20	105.2	73.2	119.0	32.0	1.476
21	105.1	71.1	117.0	34.0	1.469
22	105.0	71.0	115.0	34.0	1.478
23	105.2	71.2	119.0	34.0	1.478
24	105.1	69.1	117.0	36.0	1.469
25	105.0	73.0	115.0	32.0	1.478

26	105.2	73.2	119.0	32.0	1.476
27	105.2	69.2	119.0	36.0	1.480
28	105.0	69.0	115.0	36.0	1.478

F.S. MINIMUM= 1.469 FOR THE CIRCLE OF CENTER (117.0, 34.0)

Opened plot file: srslope6.P01
Saved plot file: srslope6.P01

1
****
LOCATION OF CRITICAL CIRCLE
****

```
OOOOOO
      OOOOO
            OOOOO
               OOOOOOO
                 OOOOOOOOOO
                      OOXXXOOOOOO
                        OOXXXXXXXOOOOO
                          OOXXXXXXXXXXOOOOO
                            OOOOOXXXXXXXXXXOOOOO
                                  OOXXXXXXXXXXXXXXOOOOO
                                    OOOOOXXXXXXXXXXXXXXOOOOOO
                                         OOOOXXXXXXXXXXXXXXXXOOOOO
                                             OOOOOXXXXXXXXXXXXXXXXOOOOO
                                                  OOOOOOOOXXXXXXXXXXXXXOOOOO
                                                           OOOOOOOXXXXXXXXXXXOOOOO
                                                                   OOOOOOOOOOOOOOOOO

---------------------------------------
Execution complete, time =   100.62 seconds
---------------------------------------
```

```
*********************************************
* ******************************************* *
* *                                         * *
* *    ---------------------------------    * *
* *     TSTAB  slope stability analysis     * *
* *        Revision 2.40 - 02/12/85         * *
* *    ---------------------------------    * *
* *                                         * *
* *    TAGA Engineering Software Services   * *
* *           Berkeley, California          * *
* *                                         * *
* *   IBM PC & 8086/8088 MS-DOS Version by  * *
* *                                         * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington          * *
* *                                         * *
* *      copyright (c) 1983, 1984 TAGA      * *
* *      copyright (c) 1983, 1984 DPMS      * *
* *                                         * *
* ******************************************* *
*********************************************
```

```
*******************************************************************
 92-0933,STA. 2,8,&11 N. Overbank, Toe, Try 8
*******************************************************************
```

```
*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
*****************************************
```

```
***************
 INPUT DATA
***************
```

```
CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  0
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    2
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =       .000
     ATMOSPHERIC PRESSURE                   =       .000
     UNIT WEIGHT OF WATER                   =     62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =     62.400

SEARCH STARTS AT CENTER (  91.0,  50.0),WITH FINAL GRID OF  2.0

ALL CIRCLES PASS THROUGH THE POINT (  90.0,  97.0)
```

GEOMETRY

SECTIONS	.00	40.00	55.00	91.00	150.00
T. CRACKS	80.00	80.00	85.00	97.00	97.00
W IN CRACK	80.00	80.00	85.00	97.00	97.00
BOUNDARY 1	80.00	80.00	85.00	97.00	97.00
BOUNDARY 2	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	55.00	91.00	150.00
Y-COORDINATE OF PHREATIC SURFACE	85.00	85.00	85.00	97.00	97.00

1

****
RESULTS
****

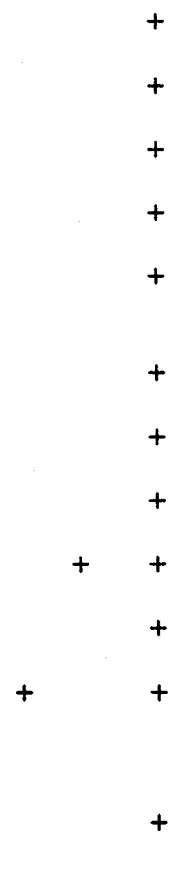
NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	97.0	47.0	91.0	50.0	1.479
2	97.1	47.1	87.0	50.0	1.523
3	97.0	51.0	91.0	46.0	1.479
4	97.3	47.3	95.0	50.0	1.588
5	97.0	43.0	91.0	54.0	1.479
6	97.0	51.0	89.0	46.0	1.498
7	97.0	53.0	91.0	44.0	1.479
8	97.1	51.1	93.0	46.0	1.477
9	97.0	49.0	91.0	48.0	1.479
10	97.1	53.1	93.0	44.0	1.476
11	97.2	51.2	95.0	46.0	1.553
12	97.1	49.1	93.0	48.0	1.479
13	97.0	53.0	91.0	44.0	1.479
14	97.1	55.1	93.0	42.0	1.475
15	97.2	53.2	95.0	44.0	1.540
16	97.0	55.0	91.0	42.0	1.479
17	97.1	57.1	93.0	40.0	1.474
18	97.2	55.2	95.0	42.0	1.529
19	97.0	57.0	91.0	40.0	1.479
20	97.1	59.1	93.0	38.0	1.474
21	97.2	57.2	95.0	40.0	1.521
22	97.0	59.0	91.0	38.0	1.479
23	97.1	61.1	93.0	36.0	1.473
24	97.2	59.2	95.0	38.0	1.513
25	97.0	61.0	91.0	36.0	1.480
26	97.1	63.1	93.0	34.0	1.473
27	97.2	61.2	95.0	36.0	1.507

28	97.0	63.0	91.0	34.0	1.483
29	97.1	65.1	93.0	32.0	1.472
30	97.2	63.2	95.0	34.0	1.502
31	97.0	65.0	91.0	32.0	1.489
32	97.1	67.1	93.0	30.0	1.473
33	97.2	65.2	95.0	32.0	1.497
34	97.0	67.0	91.0	30.0	1.498
35	97.2	67.2	95.0	30.0	1.493
36	97.2	63.2	95.0	34.0	1.502
37	97.0	63.0	91.0	34.0	1.483

F.S. MINIMUM= 1.472 FOR THE CIRCLE OF CENTER (93.0, 32.0)

Opened plot file: srslope7.P01
Saved plot file: srslope7.P01

****
LOCATION OF CRITICAL CIRCLE
****



```
OOOOO
     OOOO
         OOOO
             OOOOO
                 OOOOOOO
                   OOOXXOOOOO
                       OOXXXXXOOOOO
                         OOOOXXXXXXOOOOO
                              OOXXXXXXXXXXOOOOO
                                OOOOOXXXXXXXXXXOOOOO
                                     OOXXXXXXXXXXXXXOOOOO
                                       OOOOOXXXXXXXXXXXXXOOOOO
                                            OOOOOXXXXXXXXXXXXXXOOOOO
                                                 OOOOOXXXXXXXXXXXXXXOOOOO
                                                      OOOOOOOXXXXXXXXXXXXOOOOO
                                                              OOOOOOOOOOXXXXXXOOOO
                                                                          OOOOOOOOOOOO
```

```
-------------------------------------------
Execution complete, time =   111.22 seconds
-------------------------------------------
```

```
*********************************************
* ******************************************* *
* *                                         * *
* *    ---------------------------------    * *
* *     TSTAB  slope stability analysis     * *
* *        Revision 2.40 - 02/12/85         * *
* *    ---------------------------------    * *
* *                                         * *
* *    TAGA Engineering Software Services   * *
* *           Berkeley, California          * *
* *                                         * *
* *   IBM PC & 8086/8088 MS-DOS Version by  * *
* *                                         * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington          * *
* *                                         * *
* *      copyright (c) 1983, 1984 TAGA      * *
* *      copyright (c) 1983, 1984 DPMS      * *
* *                                         * *
* ******************************************* *
*********************************************
```

```
*******************************************************************
 92-0933,STA. 606 S. Overbank, Toe, Try 9
*******************************************************************
```

```
*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
*****************************************
```

```
**************
 INPUT DATA
**************
```

```
CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  0
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    2
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =       .000
     ATMOSPHERIC PRESSURE                   =       .000
     UNIT WEIGHT OF WATER                   =     62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =     62.400

SEARCH STARTS AT CENTER (  84.0,  35.0),WITH FINAL GRID OF  2.0

ALL CIRCLES PASS THROUGH THE POINT (  81.0,  94.0)
```

GEOMETRY

SECTIONS	.00	40.00	52.00	82.00	150.00
T. CRACKS	80.00	80.00	84.00	94.00	94.00
W IN CRACK	80.00	80.00	84.00	94.00	94.00
BOUNDARY 1	80.00	80.00	84.00	94.00	94.00
BOUNDARY 2	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	52.00	82.00	150.00
Y-COORDINATE OF PHREATIC SURFACE	84.00	84.00	84.00	94.00	94.00

1

****
RESULTS
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	94.1	59.1	84.0	35.0	1.480
2	94.0	59.0	80.0	35.0	1.577
3	94.1	63.1	84.0	31.0	1.499
4	94.4	59.4	88.0	35.0	1.683
5	94.1	55.1	84.0	39.0	1.475
6	94.0	55.0	82.0	39.0	1.494
7	94.1	57.1	84.0	37.0	1.476
8	94.2	55.2	86.0	39.0	1.529
9	94.1	53.1	84.0	41.0	1.476
10	94.0	57.0	82.0	37.0	1.504
11	94.2	57.2	86.0	37.0	1.521
12	94.2	53.2	86.0	41.0	1.540
13	94.0	53.0	82.0	41.0	1.485

F.S. MINIMUM= 1.475 FOR THE CIRCLE OF CENTER (84.0, 39.0)

Opened plot file: srslope8.P01
Saved plot file: srslope8.P01

1
****
LOCATION OF CRITICAL CIRCLE
****

```
OOOOO
    OOOO
        OOOO
            OOOOOO
                OOXOOOOO
                  OOOOOXOOOOO
                       OOXXXXOOOOO
                         OOXXXXXXXOOOOO
                           OOOOOXXXXXXXOOOOOO
                                 OOXXXXXXXXXXXOOOOO
                                   OOOOOXXXXXXXXXXXOOOOO
                                        OOOOXXXXXXXXXXXXXOOOOO
                                            OOOOOXXXXXXXXXXXXXOOOOO
                                                 OOOOOOOOXXXXXXXXXXOOOOO
                                                          OOOOOOOXXXXXXXXOOOOO
                                                                  OOOOOOOOOOOOOOOOO
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-------------------------------------------
Execution complete, time =    59.38 seconds
-------------------------------------------
```

```
*********************************************
* ******************************************* *
* *                                         * *
* *    ---------------------------------    * *
* *     TSTAB  slope stability analysis     * *
* *        Revision 2.40 - 02/12/85         * *
* *    ---------------------------------    * *
* *                                         * *
* *    TAGA Engineering Software Services   * *
* *           Berkeley, California          * *
* *                                         * *
* *   IBM PC & 8086/8088 MS-DOS Version by  * *
* *                                         * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington          * *
* *                                         * *
* *      copyright (c) 1983, 1984 TAGA      * *
* *      copyright (c) 1983, 1984 DPMS      * *
* *                                         * *
* ******************************************* *
*********************************************
```

```
*******************************************************************
 92-0933,STA. 2,8,&11 N. Overbank, Base, Try 10
*******************************************************************
```

```
*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
*****************************************
```

```
***************
 INPUT DATA
***************
```

```
CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  3
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    3
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =       .000
     ATMOSPHERIC PRESSURE                   =       .000
     UNIT WEIGHT OF WATER                   =     62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =     62.400

SEARCH STARTS AT CENTER (  85.0,  55.0),WITH FINAL GRID OF  3.0

ALL CIRCLES TANGENT TO DEPTH,  98.0, 103.0, 108.0,
```

GEOMETRY

SECTIONS	.00	40.00	55.00	91.00	200.00
T. CRACKS	80.00	80.00	85.00	97.00	105.00
W IN CRACK	80.00	80.00	85.00	97.00	105.00
BOUNDARY 1	80.00	80.00	85.00	97.00	105.00
BOUNDARY 2	97.00	97.00	97.00	97.00	105.00
BOUNDARY 3	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00
2	130.00	.00	35.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	55.00	91.00	200.00
Y-COORDINATE OF PHREATIC SURFACE	85.00	85.00	85.00	97.00	97.00

1

****
RESULTS
****

****
DEPTH LIMITING TANGENT NO. 1 AT Y = 98.00
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	98.0	43.0	85.0	55.0	1.447
2	98.0	43.0	79.0	55.0	1.555
3	98.0	49.0	85.0	49.0	1.462
4	98.0	43.0	91.0	55.0	1.433
5	98.0	37.0	85.0	61.0	1.448
6	98.0	43.0	88.0	55.0	1.432
7	98.0	46.0	91.0	52.0	1.433
8	98.0	43.0	94.0	55.0	1.448
9	98.0	40.0	91.0	58.0	1.433
10	98.0	43.0	85.0	55.0	1.447
11	98.0	46.0	88.0	52.0	1.433
12	98.0	40.0	88.0	58.0	1.432
13	98.0	40.0	85.0	58.0	1.446
14	98.0	40.0	91.0	58.0	1.433
15	98.0	37.0	88.0	61.0	1.432
16	98.0	37.0	85.0	61.0	1.448
17	98.0	37.0	91.0	61.0	1.434
18	98.0	34.0	88.0	64.0	1.432

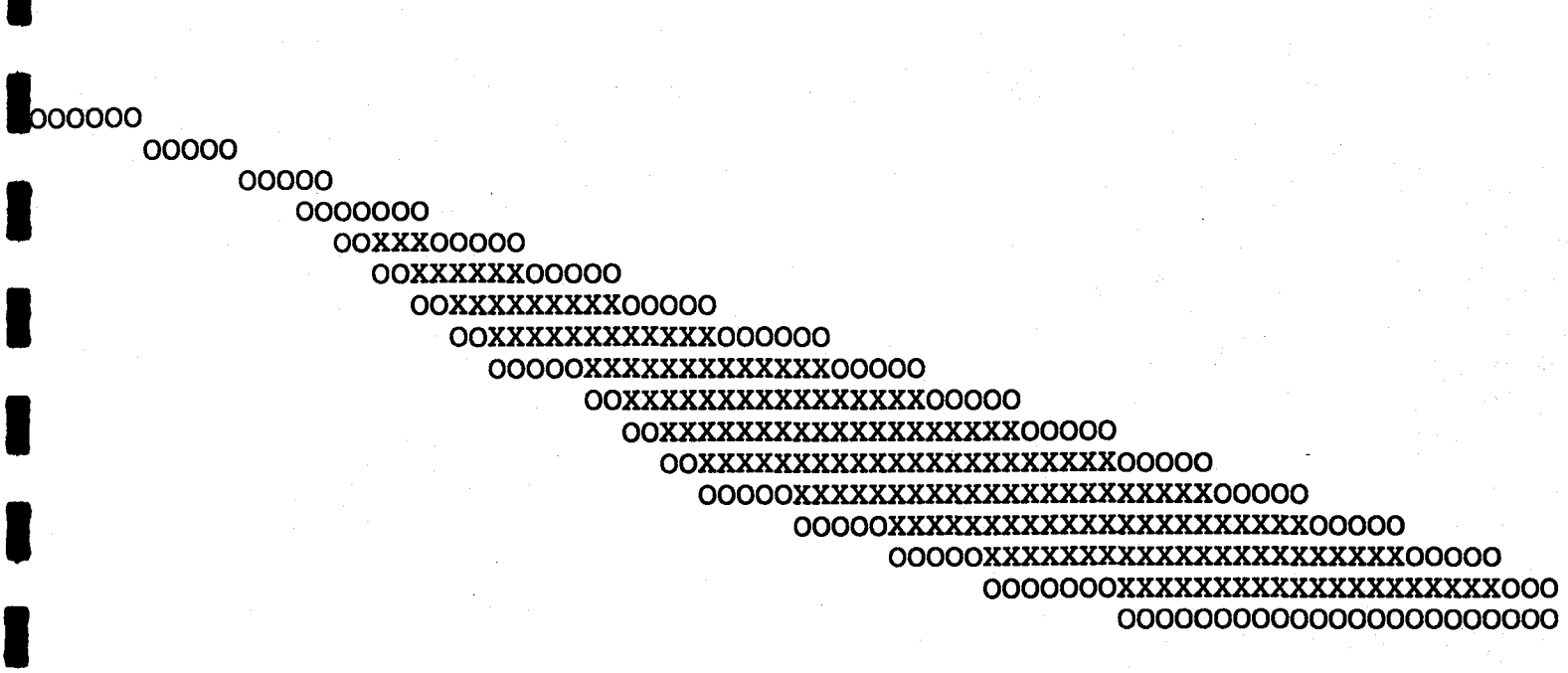
19	98.0	40.0	85.0	58.0	1.446
20	98.0	40.0	91.0	58.0	1.433
21	98.0	34.0	91.0	64.0	1.435
22	98.0	34.0	85.0	64.0	1.451

F.S. MINIMUM= 1.432 FOR THE CIRCLE OF CENTER (88.0, 61.0)

Opened plot file: srslope8.P01
Saved plot file: srslope8.P01

****
LOCATION OF CRITICAL CIRCLE
****

	1.5		
		1.4	1.4
1.6	1.4	1.4	1.4
	1.4	1.4	1.4
	1.4	1*4	1.4
	1.5	1.4	1.4



1

****
DEPTH LIMITING TANGENT NO. 2 AT Y = 103.00
****

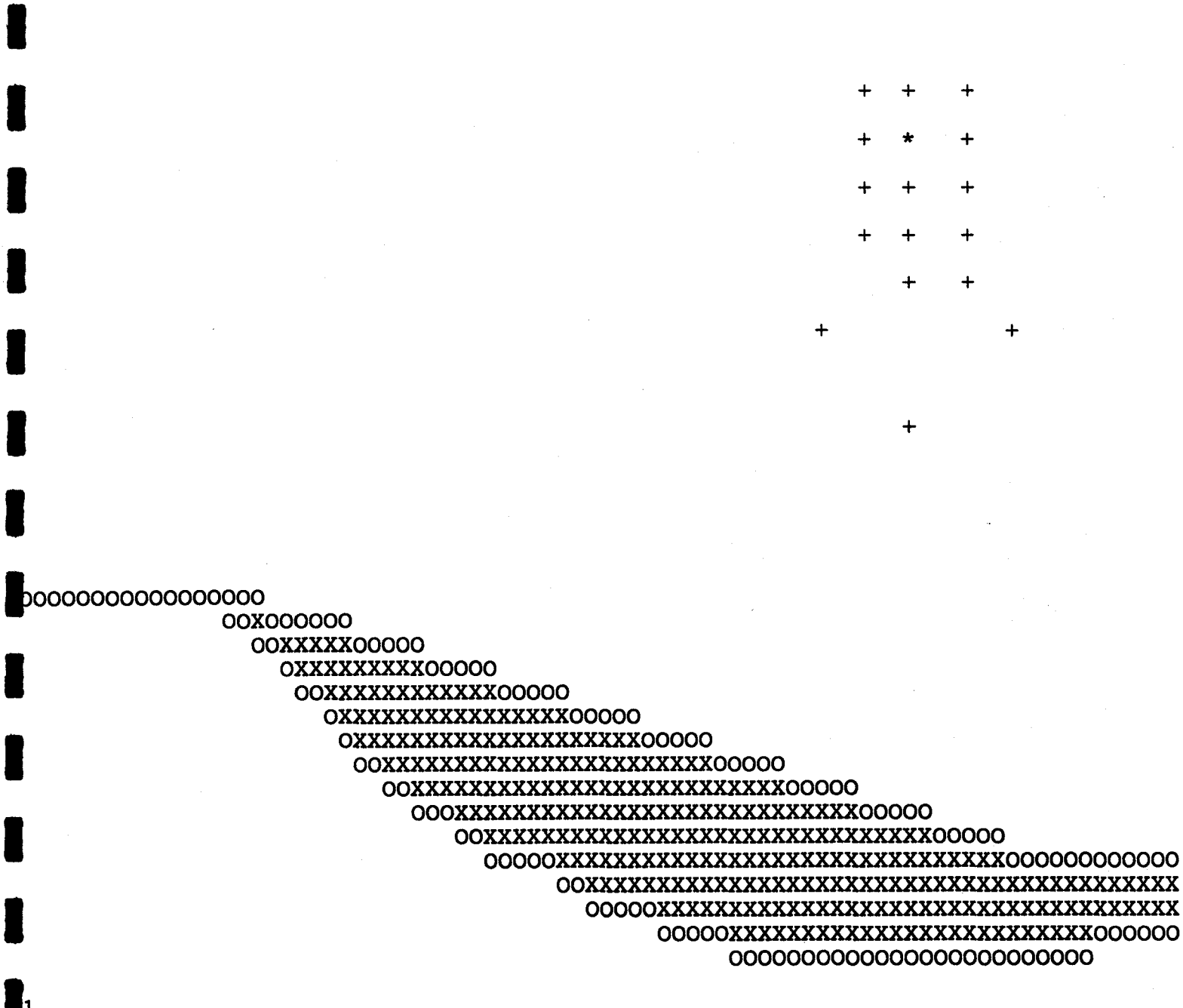
NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	103.0	42.0	88.0	61.0	1.636
2	103.0	39.0	79.0	64.0	1.647
3	103.0	45.0	85.0	58.0	1.607
4	103.0	39.0	91.0	64.0	1.722
5	103.0	33.0	85.0	70.0	1.676
6	103.0	45.0	82.0	58.0	1.614
7	103.0	48.0	85.0	55.0	1.603
8	103.0	45.0	88.0	58.0	1.621
9	103.0	42.0	85.0	61.0	1.614
10	103.0	48.0	82.0	55.0	1.614
11	103.0	51.0	85.0	52.0	1.602
12	103.0	48.0	88.0	55.0	1.611
13	103.0	51.0	82.0	52.0	1.616
14	103.0	54.0	85.0	49.0	1.605
15	103.0	51.0	88.0	52.0	1.607
16	103.0	54.0	82.0	49.0	1.624
17	103.0	54.0	88.0	49.0	1.604
18	103.0	48.0	88.0	55.0	1.611
19	103.0	48.0	82.0	55.0	1.614

F.S. MINIMUM= 1.602 FOR THE CIRCLE OF CENTER (85.0, 52.0)

Opened plot file: srslope8.P02
Saved plot file: srslope8.P02

1

****
LOCATION OF CRITICAL CIRCLE
****



1

****
DEPTH LIMITING TANGENT NO. 3 AT Y = 108.00
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	108.0	56.0	85.0	52.0	1.832
2	108.0	53.0	76.0	55.0	1.918
3	108.0	59.0	82.0	49.0	1.854
4	108.0	53.0	88.0	55.0	1.855
5	108.0	47.0	82.0	61.0	1.857
6	108.0	53.0	79.0	55.0	1.871
7	108.0	50.0	82.0	58.0	1.846
8	108.0	56.0	79.0	52.0	1.879
9	108.0	56.0	85.0	52.0	1.832
10	108.0	50.0	85.0	58.0	1.849

11	108.0	50.0	79.0	58.0	1.868
12	108.0	59.0	85.0	49.0	1.834
13	108.0	56.0	88.0	52.0	1.841
14	108.0	59.0	82.0	49.0	1.854
15	108.0	59.0	88.0	49.0	1.832
16	108.0	53.0	88.0	55.0	1.855
17	108.0	53.0	82.0	55.0	1.844

F.S. MINIMUM= 1.832 FOR THE CIRCLE OF CENTER (85.0, 52.0)

Opened plot file: srslope8.P03
Saved plot file: srslope8.P03

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*******************************
 LOCATION OF CRITICAL CIRCLE
*******************************
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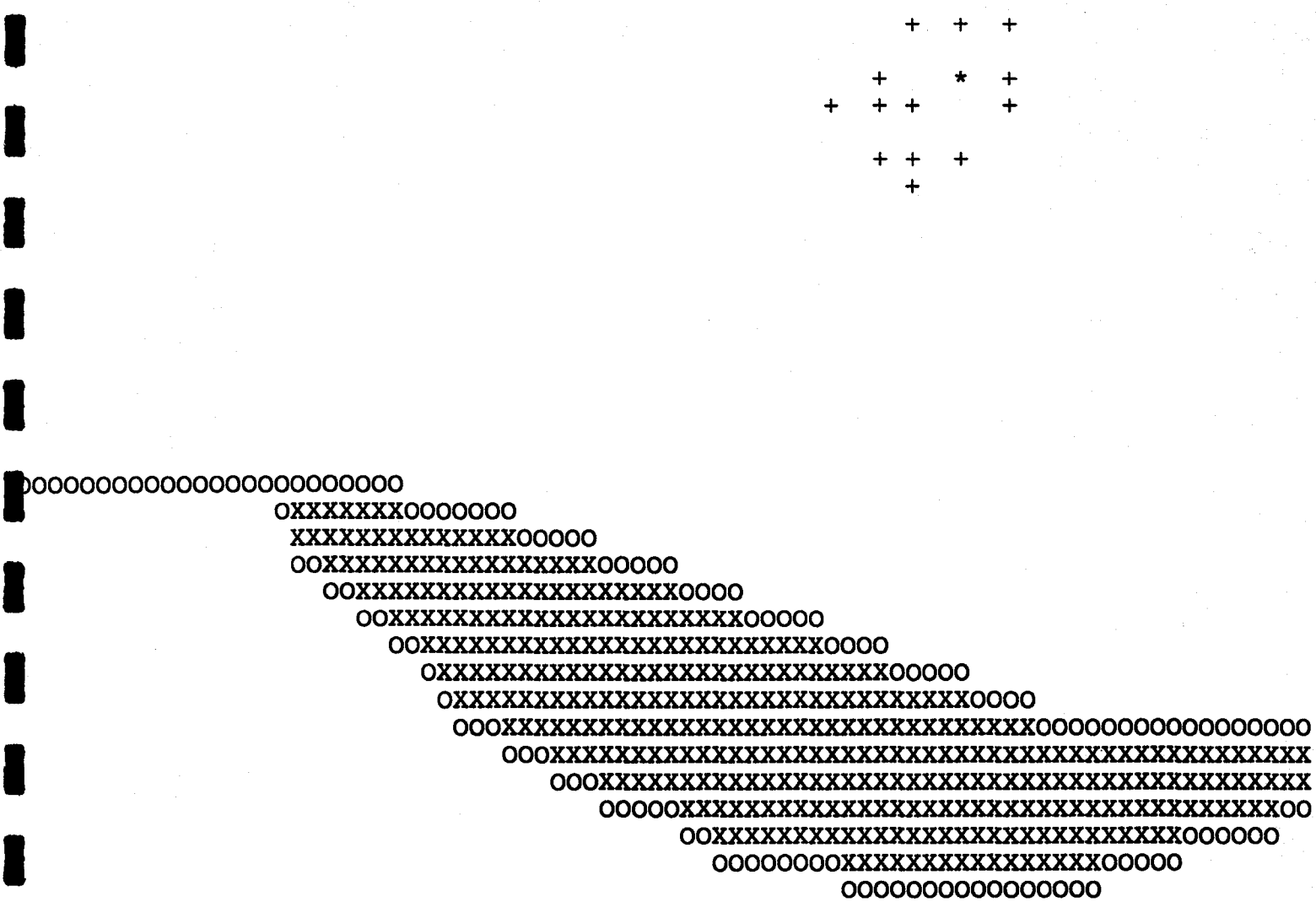

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Execution complete, time =   171.15 seconds
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*********************************************
* ***************************************** *
* *                                       * *
* *    ---------------------------------  * *
* *     TSTAB  slope stability analysis   * *
* *        Revision 2.40 - 02/12/85       * *
* *    ---------------------------------  * *
* *                                       * *
* *    TAGA Engineering Software Services * *
* *           Berkeley, California        * *
* *                                       * *
* *   IBM PC & 8086/8088 MS-DOS Version by * *
* *                                       * *
* * Design Professionals Management Systems * *
* *           Kirkland, Washington        * *
* *                                       * *
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* *      copyright (c) 1983, 1984 DPMS    * *
* *                                       * *
* ***************************************** *
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```

```
*******************************************************************
 92-0933,STA. 2,8,&11 N. Overbank, Base, Try 11
*******************************************************************
```

```
*****************************************
 ANALYSIS BY BISHOP'S SIMPLIFIED METHOD
*****************************************
```

```
**************
 INPUT DATA
**************
```

```
CONTROL DATA,
     AUTOMATIC SEARCH FOR CRITICAL CIRCLE
     NUMBER OF DEPTH LIMITING TANGENTS                  3
     NUMBER OF VERTICAL SECTIONS                        5
     NUMBER OF SOIL LAYER BOUNDARIES                    3
     NUMBER OF POINTS DEFINING COHESION PROFILE         0
     NUMBER OF CURVES DEFINING COHESION ANISOTROPY      0
     NUMBER OF BOUNDARY LINE LOADS                      0
     NUMBER OF BOUNDARY PRESSURE LOADS                  0

     SEISMIC COEFFICIENT                    =       .000
     ATMOSPHERIC PRESSURE                   =       .000
     UNIT WEIGHT OF WATER                   =     62.400
     UNIT WEIGHT OF WATER IN TENSION CRACK  =     62.400

SEARCH STARTS AT CENTER (  90.0,  50.0),WITH FINAL GRID OF  3.0

ALL CIRCLES TANGENT TO DEPTH,  98.0, 103.0, 108.0,
```

GEOMETRY

SECTIONS	.00	40.00	55.00	91.00	200.00
T. CRACKS	80.00	80.00	85.00	97.00	105.00
W IN CRACK	80.00	80.00	85.00	97.00	105.00
BOUNDARY 1	80.00	80.00	85.00	97.00	105.00
BOUNDARY 2	97.00	97.00	97.00	97.00	105.00
BOUNDARY 3	150.00	150.00	150.00	150.00	150.00

SOIL PROPERTIES

LAYER	DENSITY	COHESION	FRICTION ANGLE	DELTA PHI
1	135.00	.00	41.00	.00
2	130.00	.00	35.00	.00

PORE PRESSURE DATA

PHREATIC SURFACE OPTION

SECTIONS	.00	40.00	55.00	91.00	200.00
Y-COORDINATE OF PHREATIC SURFACE	85.00	92.00	95.00	103.00	125.00

1

****
RESULTS
****

****
DEPTH LIMITING TANGENT NO. 1 AT Y = 98.00
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	98.0	48.0	90.0	50.0	2.690
2	98.0	48.0	84.0	50.0	2.687
3	98.0	54.0	90.0	44.0	2.688
4	98.0	48.0	96.0	50.0	2.890
5	98.0	42.0	90.0	56.0	2.693
6	98.0	48.0	81.0	50.0	2.722
7	98.0	51.0	84.0	47.0	2.686
8	98.0	48.0	87.0	50.0	2.675
9	98.0	45.0	84.0	53.0	2.689
10	98.0	51.0	87.0	47.0	2.675
11	98.0	48.0	90.0	50.0	2.690
12	98.0	45.0	87.0	53.0	2.674
13	98.0	45.0	84.0	53.0	2.689
14	98.0	45.0	90.0	53.0	2.691
15	98.0	42.0	87.0	56.0	2.674
16	98.0	42.0	84.0	56.0	2.692
17	98.0	42.0	90.0	56.0	2.693
18	98.0	39.0	87.0	59.0	2.674

19	98.0	45.0	84.0	53.0	2.689
20	98.0	45.0	90.0	53.0	2.691
21	98.0	39.0	90.0	59.0	2.696
22	98.0	39.0	84.0	59.0	2.695

F.S. MINIMUM= 2.674 FOR THE CIRCLE OF CENTER (87.0, 56.0)

Opened plot file: srslope9.P01
Saved plot file: srslope9.P01

****
LOCATION OF CRITICAL CIRCLE
****

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                                                                  2.7

                                                        2.7   2.7

                                                  2.7   2.7   2.7   2.7

                                                        2.7   2.7   2.7

                                                        2.7   2*7   2.7

                                                        2.7   2.7   2.7
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OOOOO
     OOOOO
          OOOOO
               OOOOOO
                 OOXXOOOOO
                   OOXXXXXOOOOO
                     OOXXXXXXXXOOOOO
                       OOXXXXXXXXXXXOOOOO
                         OOXXXXXXXXXXXXXXOOOOO
                           OOXXXXXXXXXXXXXXXXXOOOOO
                             OOOOOXXXXXXXXXXXXXXXXXXOOOOO
                                  OOXXXXXXXXXXXXXXXXXXXXXOOOOO
                                    OOOXXXXXXXXXXXXXXXXXXXXXXOOOOO
                                       OOOOXXXXXXXXXXXXXXXXXXXXXXXOOOOO
                                           OOOOOXXXXXXXXXXXXXXXXXXXXXXXOOOOO
                                                OOOOOXXXXXXXXXXXXXXXXXXXXXXXXOOOO
                                                     OOOOOOOOOXXXXXXXXXXXXXXXXXXXXO
                                                               OOOOOOOOOOOOOOOOOOOO
```

1

****
DEPTH LIMITING TANGENT NO. 2 AT Y = 103.00
****

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	103.0	47.0	87.0	56.0	2.912
2	103.0	44.0	78.0	59.0	2.682
3	103.0	50.0	84.0	53.0	2.767
4	103.0	44.0	90.0	59.0	3.128
5	103.0	38.0	84.0	65.0	2.887
6	103.0	44.0	72.0	59.0	2.739
7	103.0	50.0	78.0	53.0	2.663
8	103.0	38.0	78.0	65.0	2.750
9	103.0	50.0	75.0	53.0	2.687
10	103.0	53.0	78.0	50.0	2.668
11	103.0	50.0	81.0	53.0	2.687
12	103.0	47.0	78.0	56.0	2.666
13	103.0	53.0	75.0	50.0	2.699
14	103.0	53.0	81.0	50.0	2.680
15	103.0	47.0	81.0	56.0	2.707
16	103.0	47.0	75.0	56.0	2.681

F.S. MINIMUM= 2.663 FOR THE CIRCLE OF CENTER (78.0, 53.0)

Opened plot file: srslope9.P02
Saved plot file: srslope9.P02

1

****
LOCATION OF CRITICAL CIRCLE
****

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                                                  +  +  +

                                                  +  *  +   +
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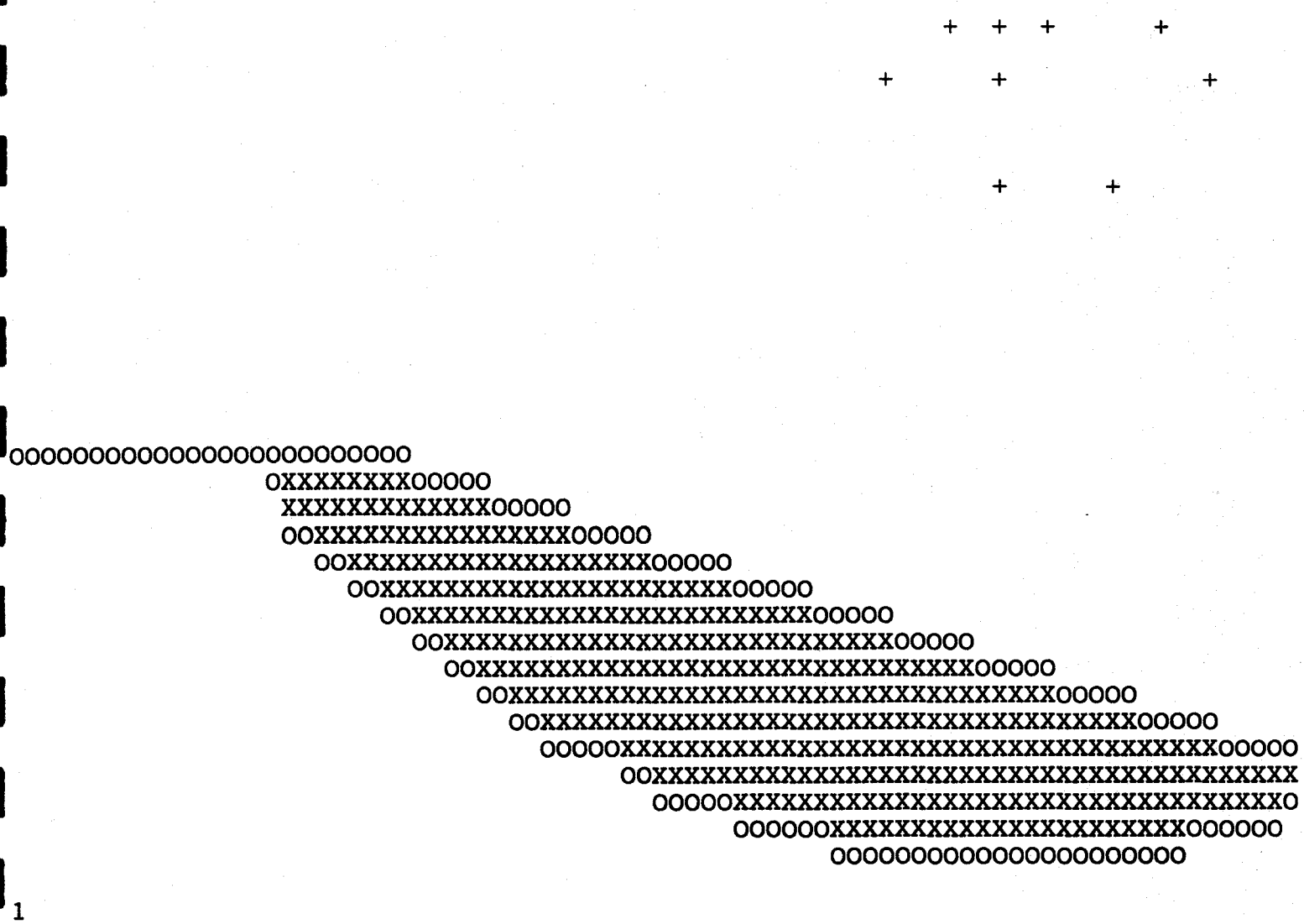


1

****
DEPTH LIMITING TANGENT NO. 3 AT Y = 108.00
****

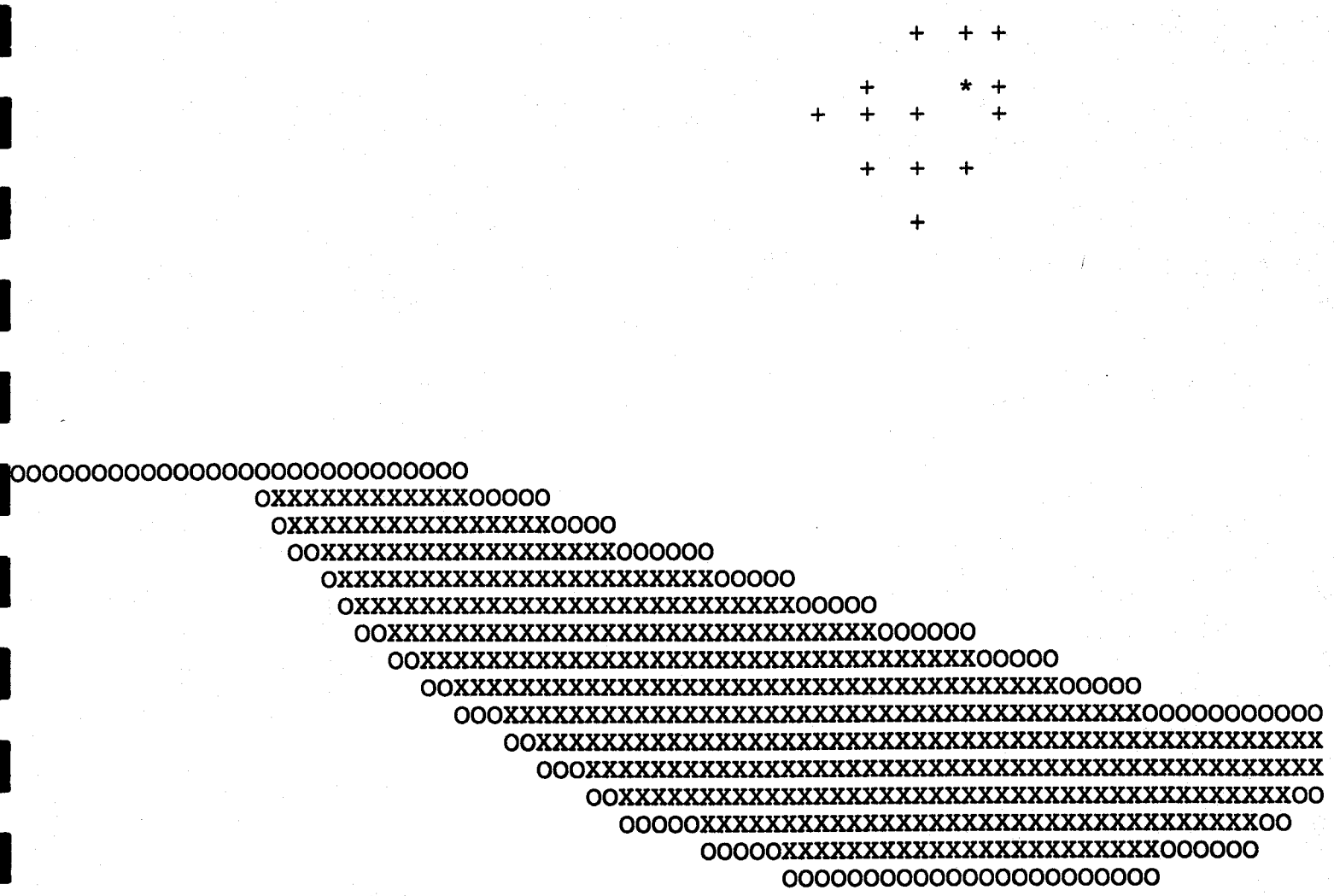
NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	F.S.
1	108.0	55.0	78.0	53.0	2.766
2	108.0	52.0	69.0	56.0	2.888
3	108.0	58.0	75.0	50.0	2.793
4	108.0	52.0	81.0	56.0	2.788
5	108.0	46.0	75.0	62.0	2.784
6	108.0	52.0	72.0	56.0	2.817
7	108.0	49.0	75.0	59.0	2.776
8	108.0	55.0	72.0	53.0	2.825
9	108.0	55.0	78.0	53.0	2.766
10	108.0	49.0	78.0	59.0	2.771
11	108.0	49.0	72.0	59.0	2.814
12	108.0	58.0	78.0	50.0	2.773
13	108.0	55.0	81.0	53.0	2.781
14	108.0	58.0	75.0	50.0	2.793
15	108.0	58.0	81.0	50.0	2.781
16	108.0	52.0	81.0	56.0	2.788

```
  17     108.0      52.0         75.0         56.0        2.776

F.S. MINIMUM= 2.766 FOR THE CIRCLE OF CENTER (  78.0,  53.0)

Opened plot file: srslope9.P03
Saved plot file:  srslope9.P03

1
*******************************
 LOCATION OF CRITICAL CIRCLE
*******************************
```



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Execution complete, time =   161.86 seconds
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