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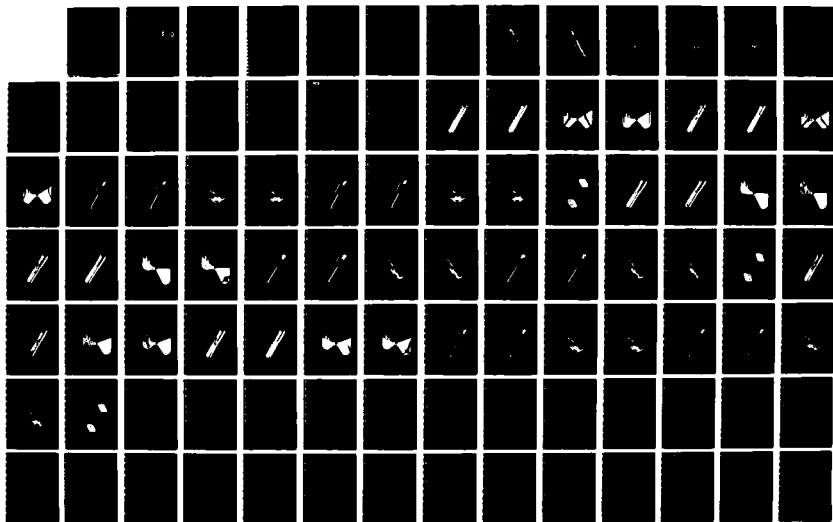
LIGHTWEIGHT TOWED HOWITZER DEMONSTRATOR PHASE 1 AND
 PARTIAL PHASE 2 VOLUM (U) FMC CORP MINNEAPOLIS MINN
 NORTHERN ORDNANCE DIV R RATHE ET AL APR 87
 FMC-E-3041-VOL-D2-PT-3 DAAAZ1-86-C-0047

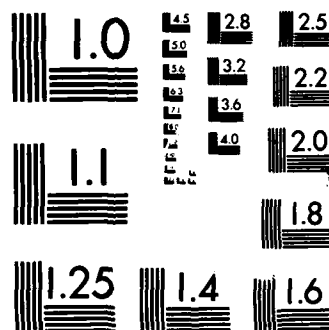
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NATIONAL BUREAU OF STANDARDS-1963-A

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Lightweight Towed Howitzer Demonstrator

Final Report

Volume D2 - Part III

Structural Analysis of Cradle

April 1987

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AD-A183 991

Contract Number DAAA21-86-C-0047

FMC CORPORATION
Northern Ordnance Division
4800 East River Road
Minneapolis, Minnesota 55421

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The LTHD (Lightweight Towed Howitzer Demonstrator) was to be a 9,000 lb equivalent to the M198, transportable via Blackhawk helicopter, with reduced emplacement time using fewer personnel. The FMC design achieved weight reduction via a mortar-like configuration, composites structure, and hydraulic actuators. Recovery of power from the recoil system, in turn, facilitated crew reduction via hydraulic emplacement, four-way joystick tube lay, and power ramming. FMC completed Concept Development (Ph I) and two-thirds of Detailed Design (Ph II) prior to funds running out. <i>Keywords:</i>		

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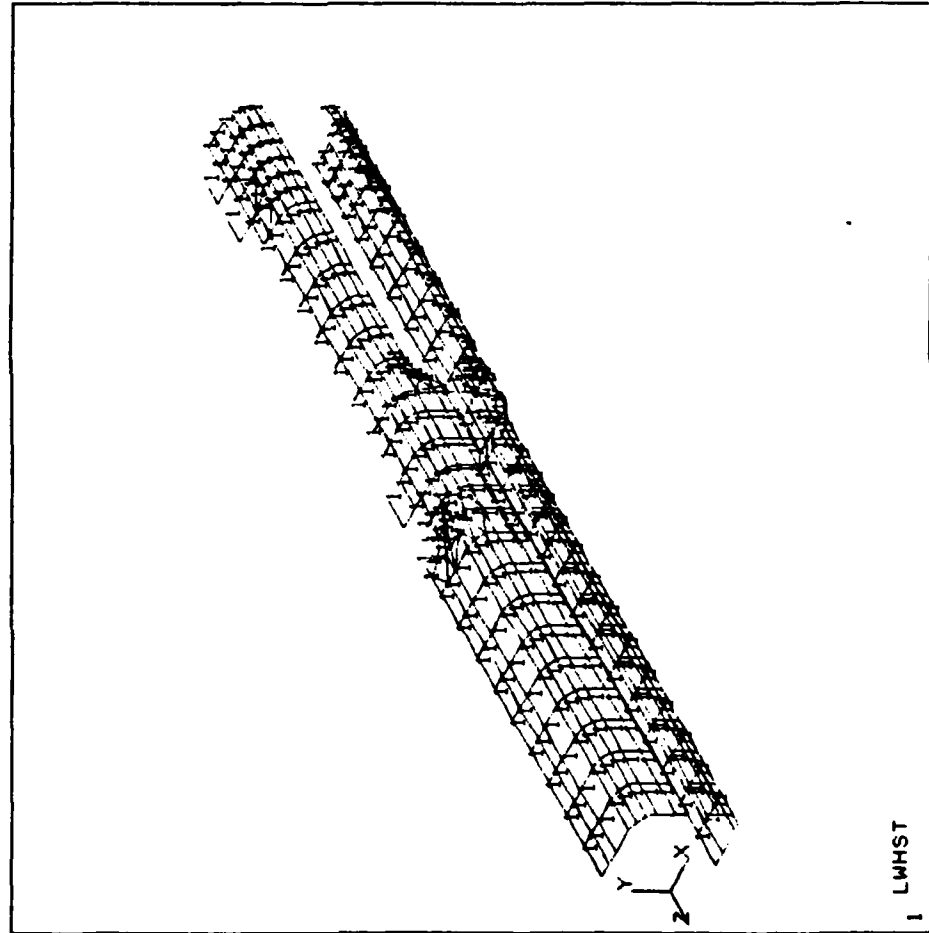
D2/250

GEOMETRY PLOTS - MODEL 11

Model 11

ANSYS 4.2B
FEB 6 1987
8:52:46
PLOT NO. 1
PREP7 ELEMENTS
TNUM=1

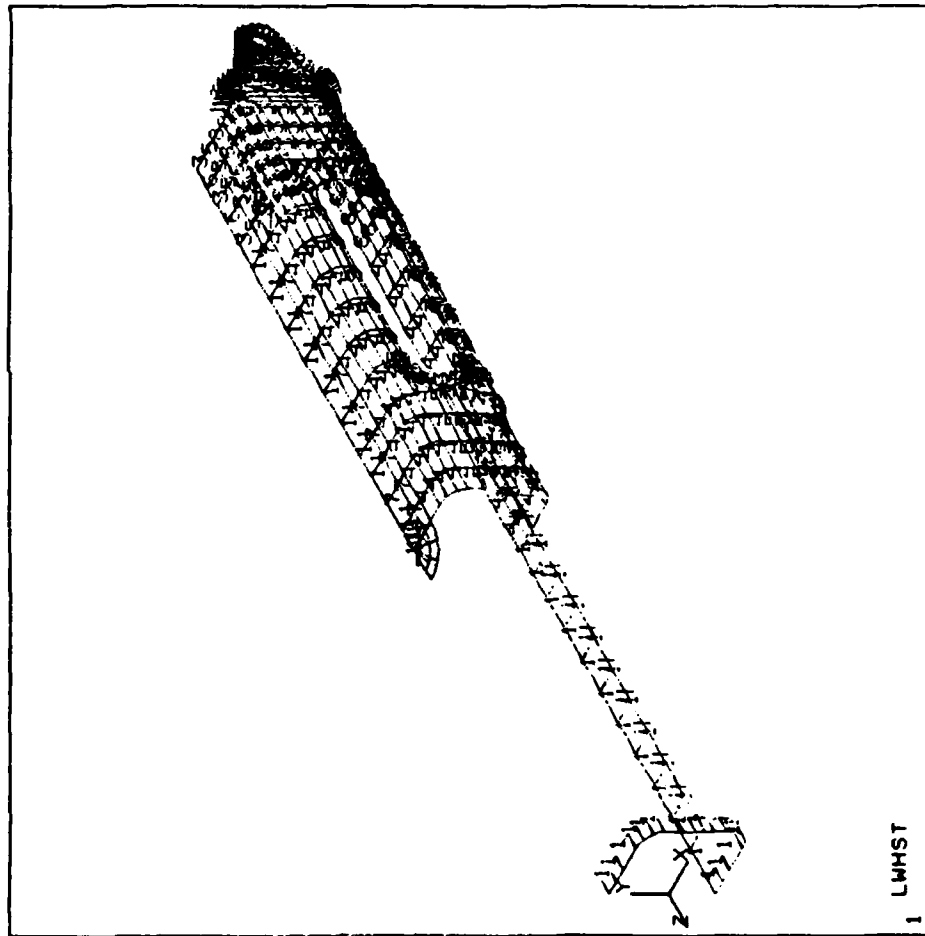
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YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.24
ZF=-115



1 LWHST

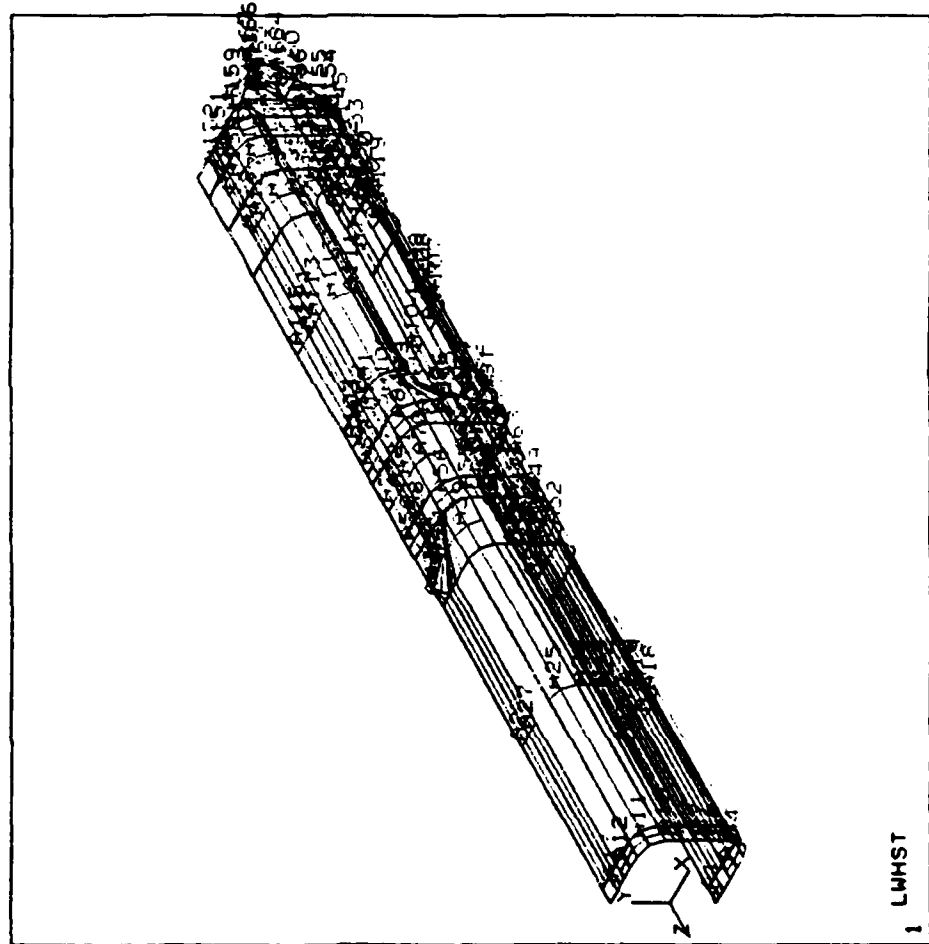
ANSYS 4.2B
FEB 6 1987
8:53:31
PLOT NO. 2
PREP7 ELEMENTS
RNUM=1

XV=1
YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.24
ZF=-115



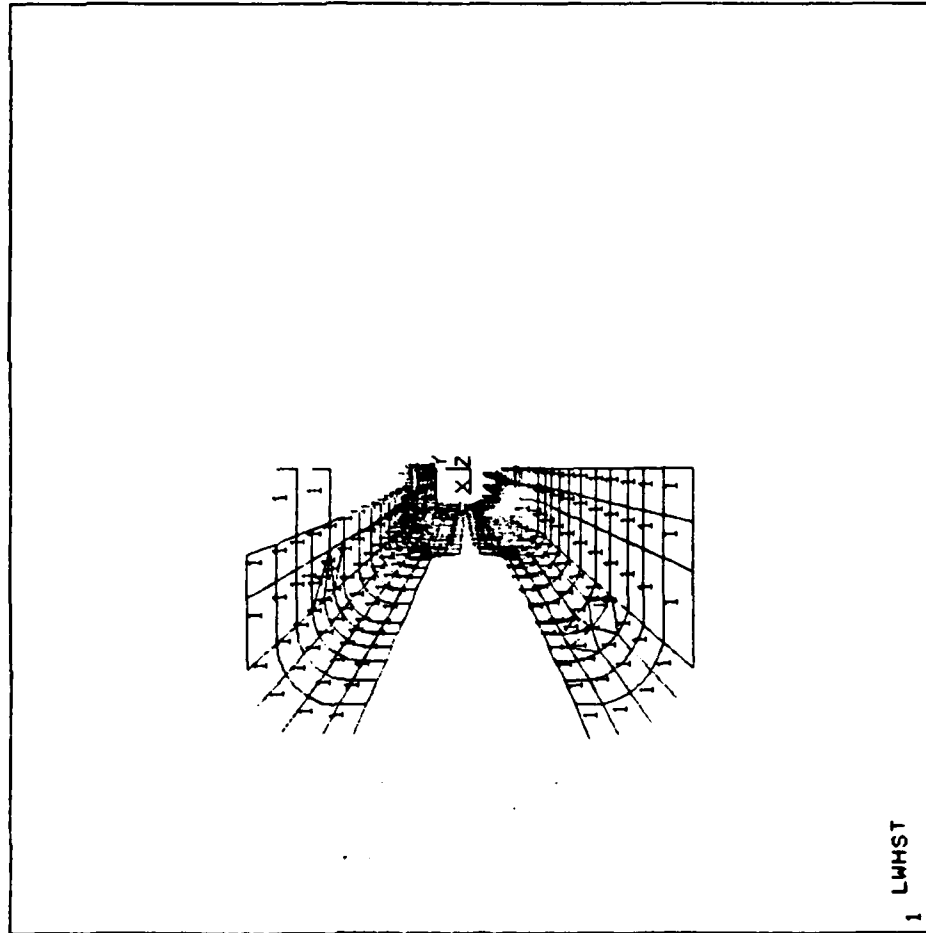
ANSYS 4.2B
FEB 6 1987
8:54:04
PLOT NO. 3
PREP7 AREAS

XV=1
YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.33
ZF=-116

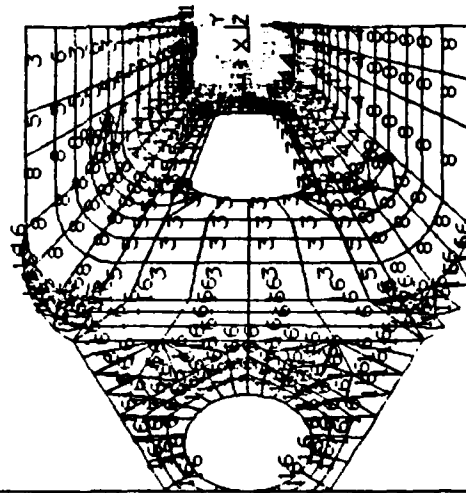


ANSYS 4.2B
FEB 6 1987
8:54:38
PLOT NO. 4
PREP7 ELEMENTS
TNUM=1

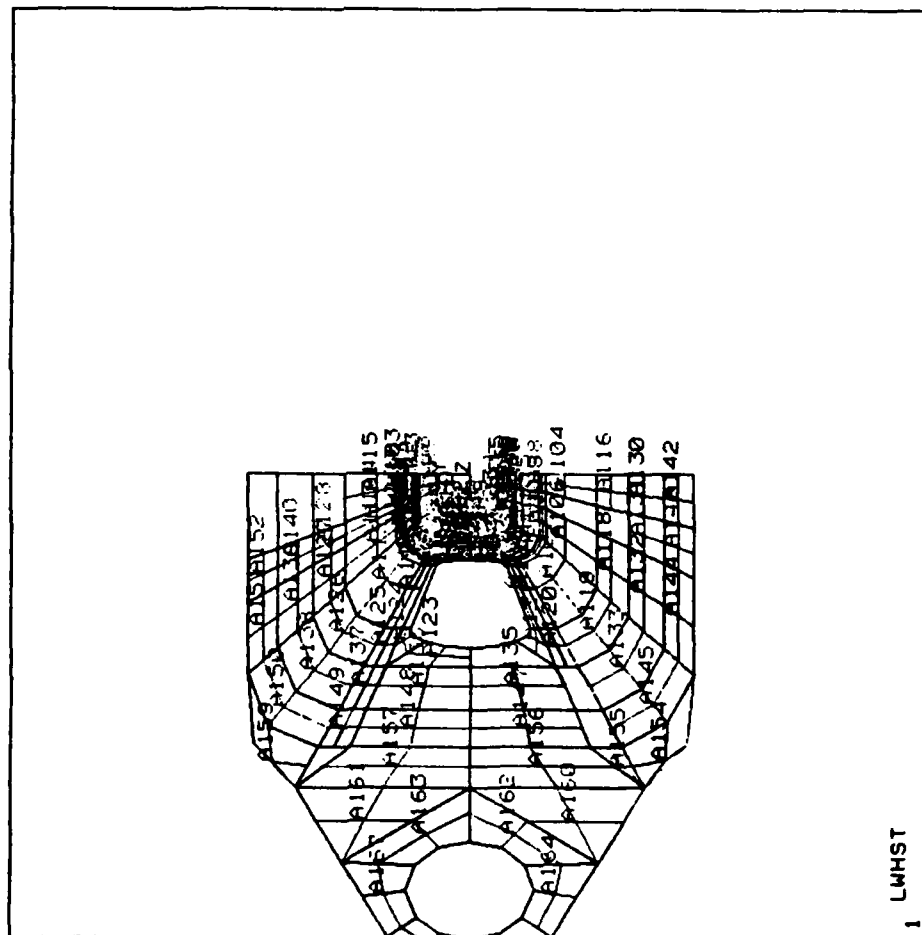
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* DIST=139
* ZF=-119
CONE=40



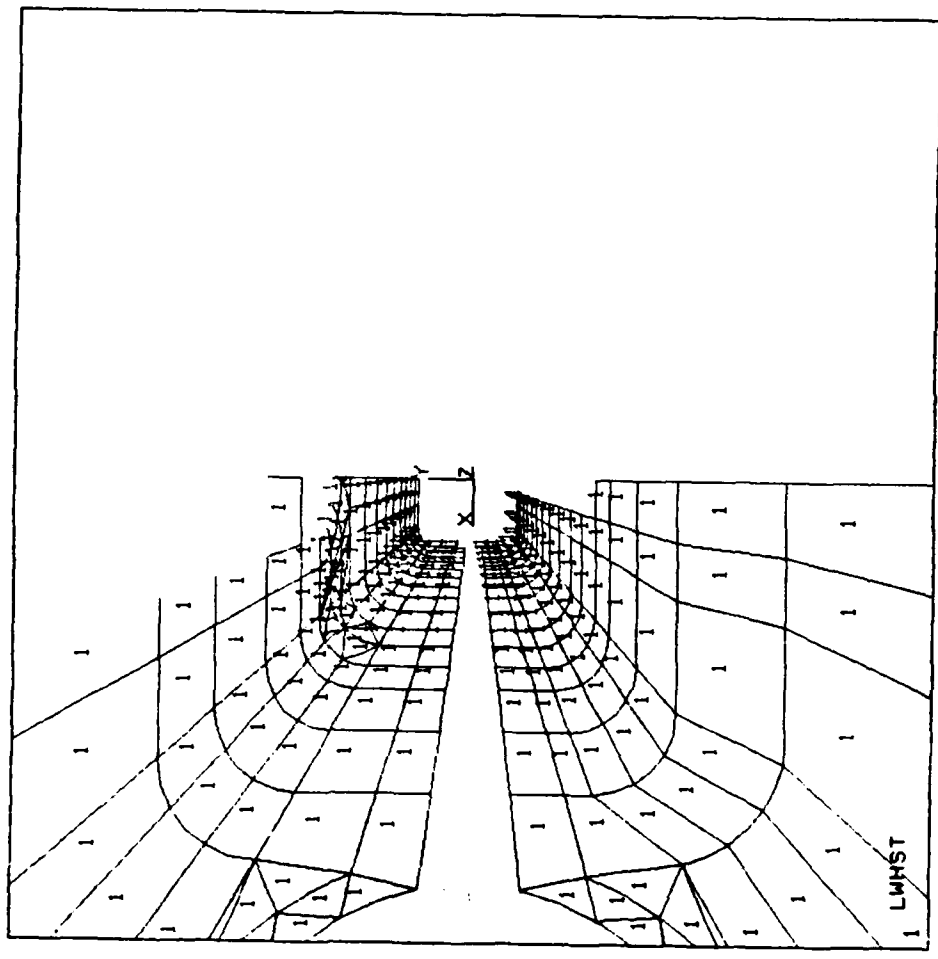
ANSYS 4.2B
FEB 6 1987
8:55:01
PLOT NO. 5
PREP7 ELEMENTS
RNUN=1
ZV=-1
* DIST=139
* ZF=-119
CONE=40



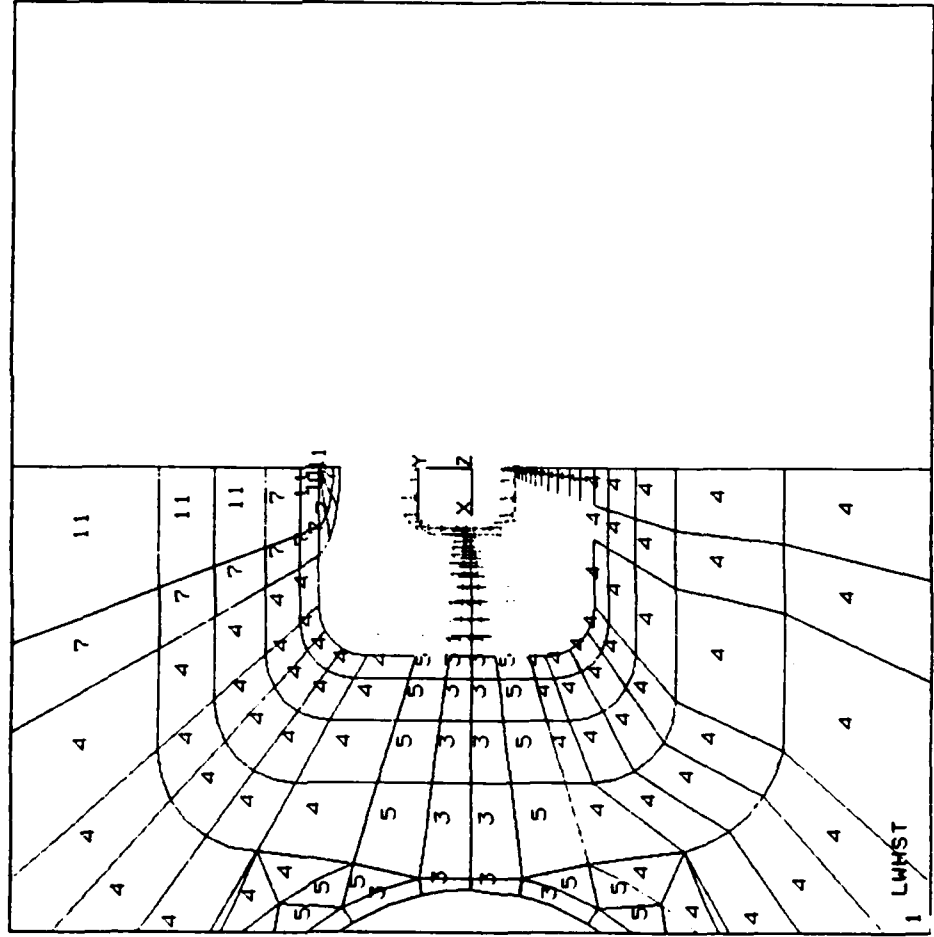
ANSYS 4.2B
 FEB 6 1987
 8:55:49
 PLOT NO. 6
 PREP7 AREAS
 ZV=-1
 * DIST=139
 * ZF=-119
 CONE=40



ANSYS 4.2B
FEB 6 1987
8:56:23
PLOT NO. 7
PREP7 ELEMENTS
TNUM=1
ZV=-1
* DIST=160
CDNE=40

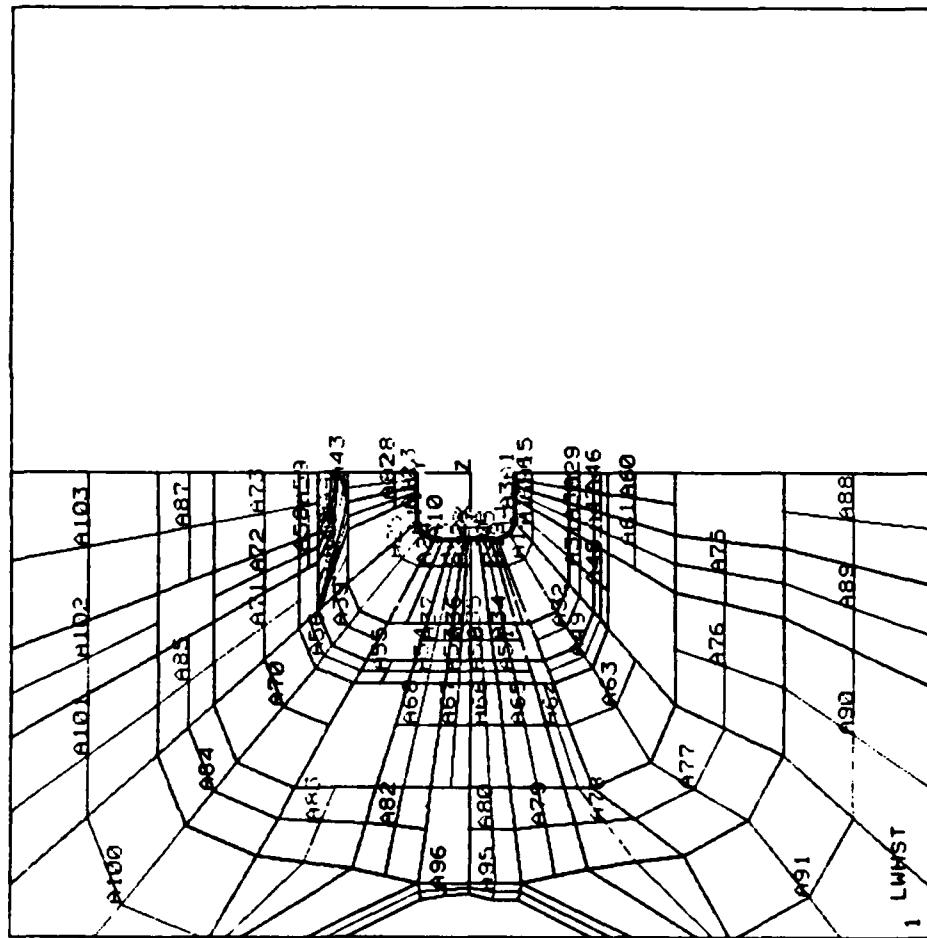


ANSYS 4.2B
 FEB 6 1987
 8:56:38
 PLOT NO. 8
 PREP7 ELEMENTS
 RNUM=1
 ZV=-1
 # DIST=160
 CONE=40

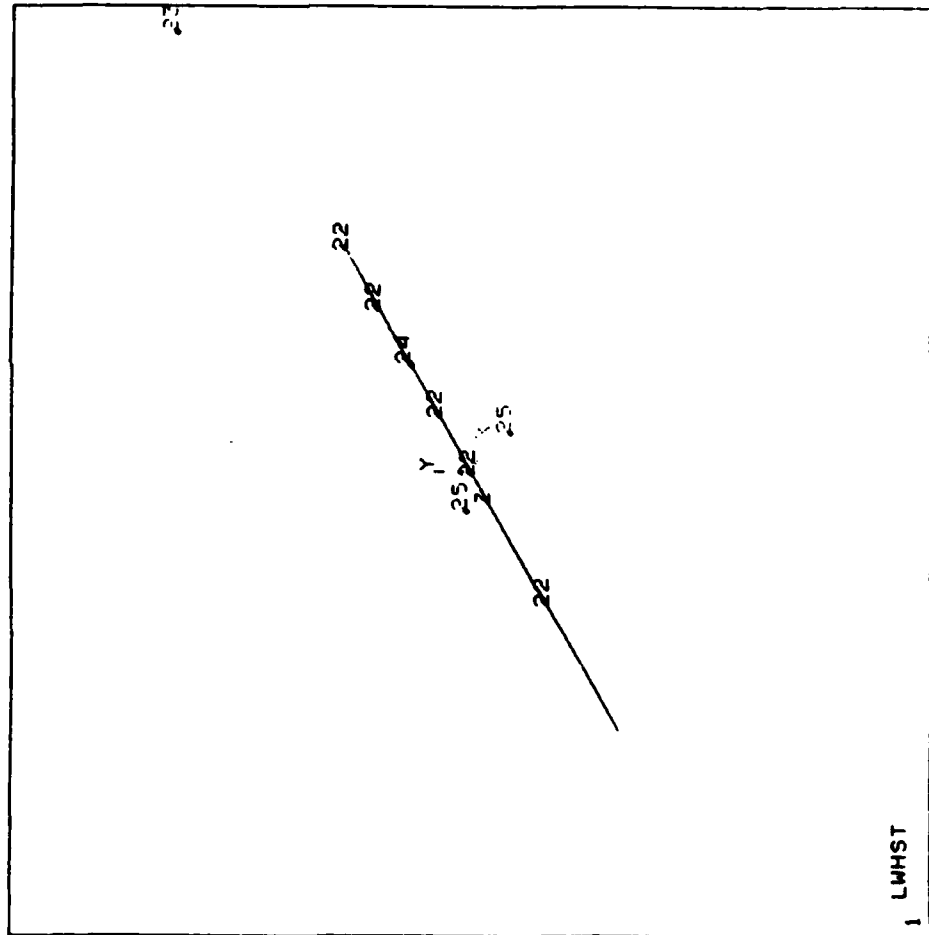


ANSYS 4.2B
 FEB 6 1987
 8:56:54
 PLOT NO. 9
 PREP7 AREAS

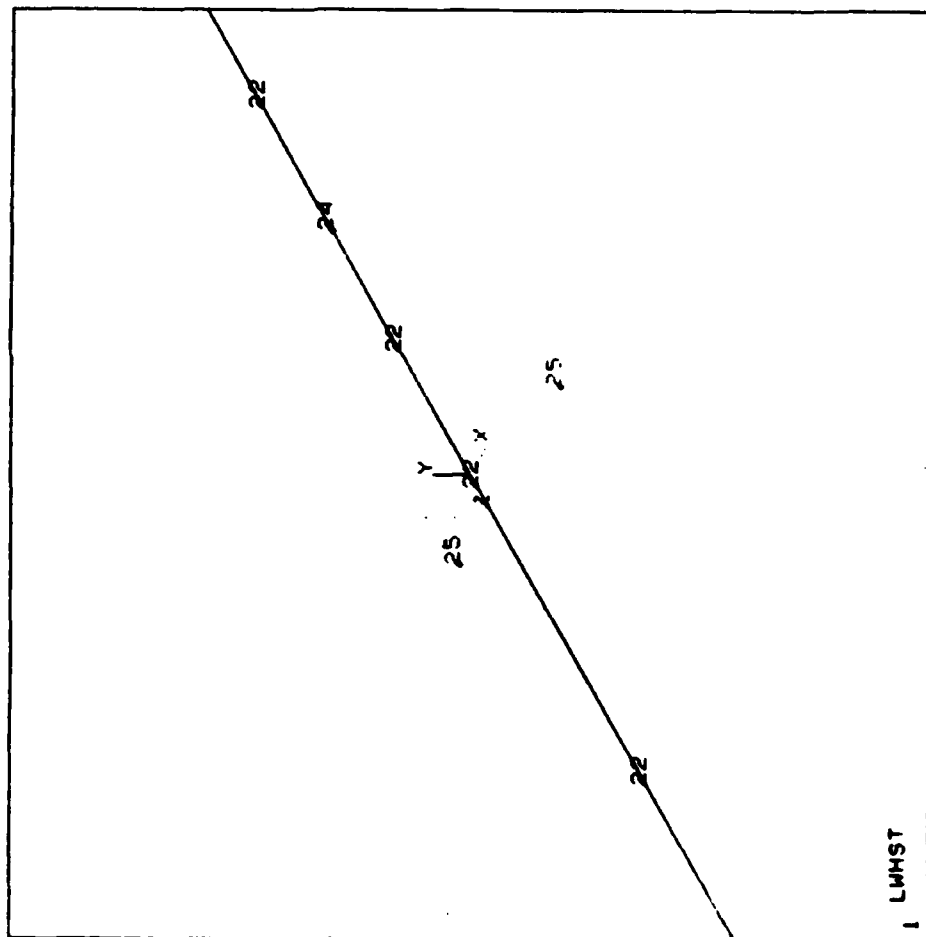
ZV=-1
 # DIST=160
 CONE=40



ANSYS 4.2B
FEB 6 1987
8:57:36
PLOT NO. 10
PREP7 ELEMENTS
RNUM=1
XV=1
YV=1
ZV=1
DIST=160



ANSYS 4.2B
FEB 6 1987
8:57:36
PLOT NO. 10
PREP7 ELEMENTS
RNUM=1
XV=1
YV=1
ZV=1
DIST=70



D2/260

MCR MEMO: FEBRUARY 5, 1987

February 5, 1987

Time.

Model 11

Larry Libhardt
FMC Corporation
3989 Central Ave NE
Minneapolis, Minn 55421

Dear Larry,

Here are the results for model 11. We made all of the thickness changes as shown on the drawings you sent to us. The enclosed table shows the REAL#s, their properties and the areas that were assigned to that property. The set of element and area plots are also included as well as an input listing. The same set of contour plots are also included. We will plan to perform a transient analysis this weekend although we will probably reduce the number of elements from 3 around the radius to 2 to decrease the wavefront and the required disk space. The static run is using 185 mb of disk and we do not feel that there is enough disk space to run a transient which would probably require at least 300 mb. The model has been built in a parametric way so that reducing its size should not require excessive man-time (about 3-4 hours). Also, the model accuracy should not be as crucial for a dynamic analysis as for extracting stress results. We will send you the dynamic results on Monday of next week.

Best regards,

Mark C. Rodamaker

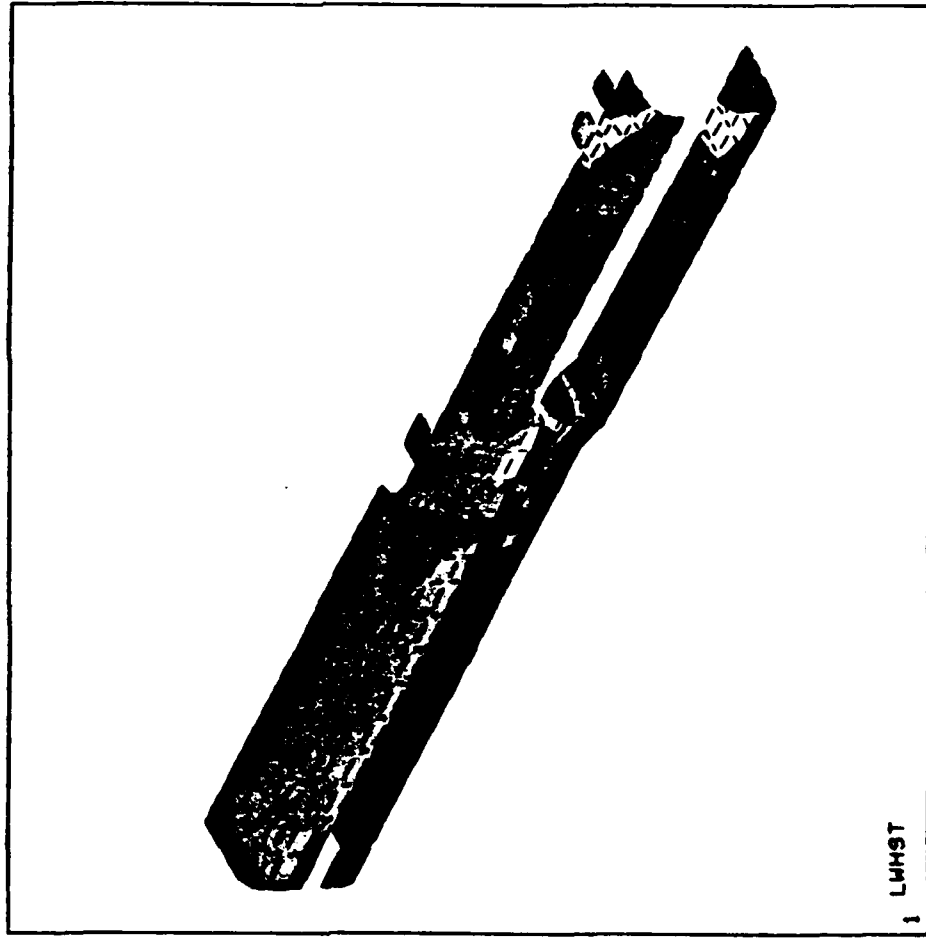
Mark C. Rodamaker

REAL# PROPERTIES

AREAS

REAL#	PROPERTIES	AREAS	
1	.081 P	1-14, 15,29, 21-22, 35-36	blue
2	.0405 P 2 C .0405 P	17-19, 24-28, 31-33,38-43	yellow
3	.324 P	52-53, 66-67, 80-81, 94-97, 109,110, 121-124,129,135-136,141,147-148, 153	orange
4	.0675 P 2 C .0675 P	46-50, 55-57, 60-64, 69-71 74-78, 83-85, 88-92, 99-101,104-107 112-113	blue
5	.162 P 1 C .162 P	51,54,65,68,79,82,93,98 108,111,120,125,128,134,137,140 146,149,152	chartruse
7	.135 P 1 C .135 P	44,58,72,86,102,114	red
8	.135 P 2 C .135 P	116-119, 126-127, 130-133, 138-139 142-145, 150-151	red
9	.0405 P 1 C .0405 P	16, 20, 23, 30, 34, 37	
11	.270 P	45, 59, 73, 87, 103, 115	green
16	.81 P	154-167	blue

FIGURE 1
RECOIL

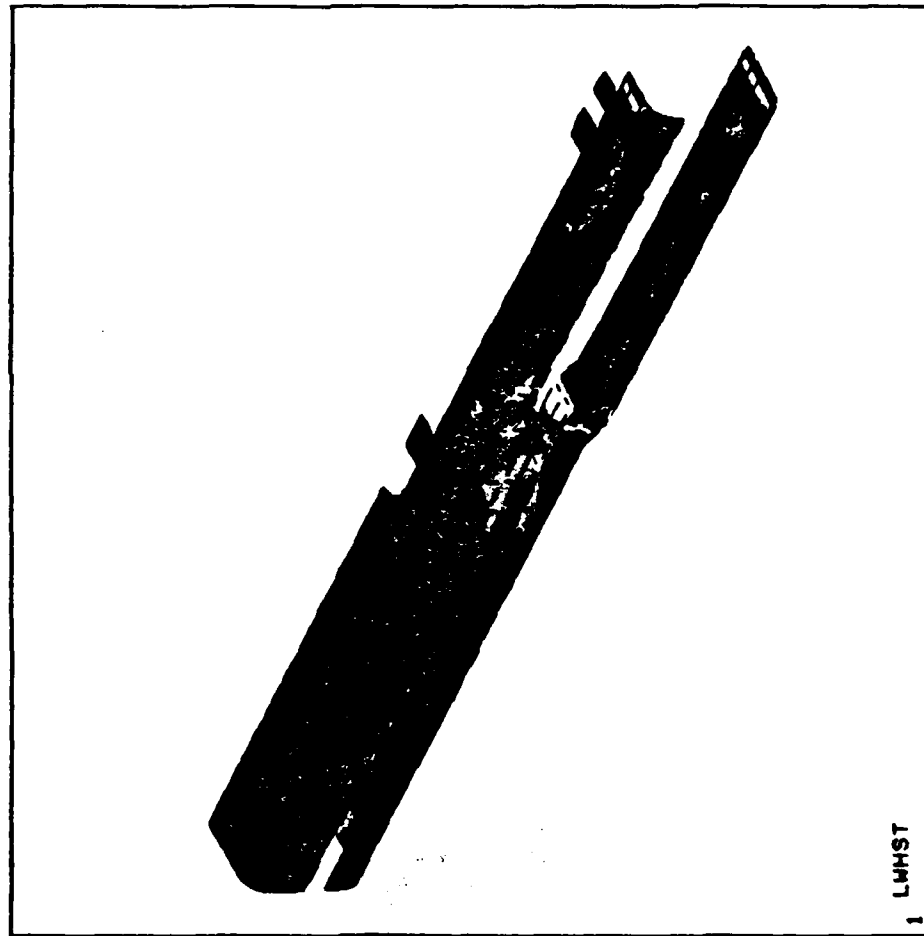


1 LHMST

ANSYS 4.2B
FEB 6 1987
8:16:19
PLOT NO. 1
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM CS

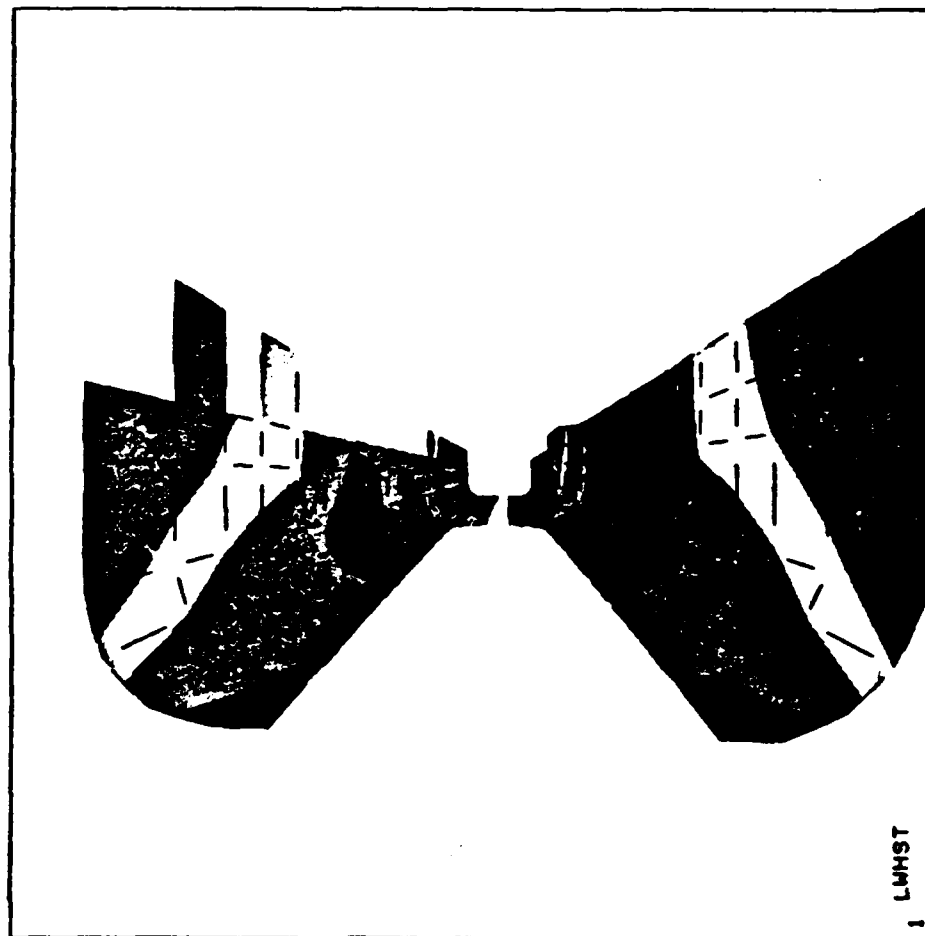
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.74
YF=1.45
ZF=-112
HIDDEN
MX=2110
MN=-10539
-9136
-7730
-6324
-4918
-3512
-1100

FIGURE 2
RECOIL



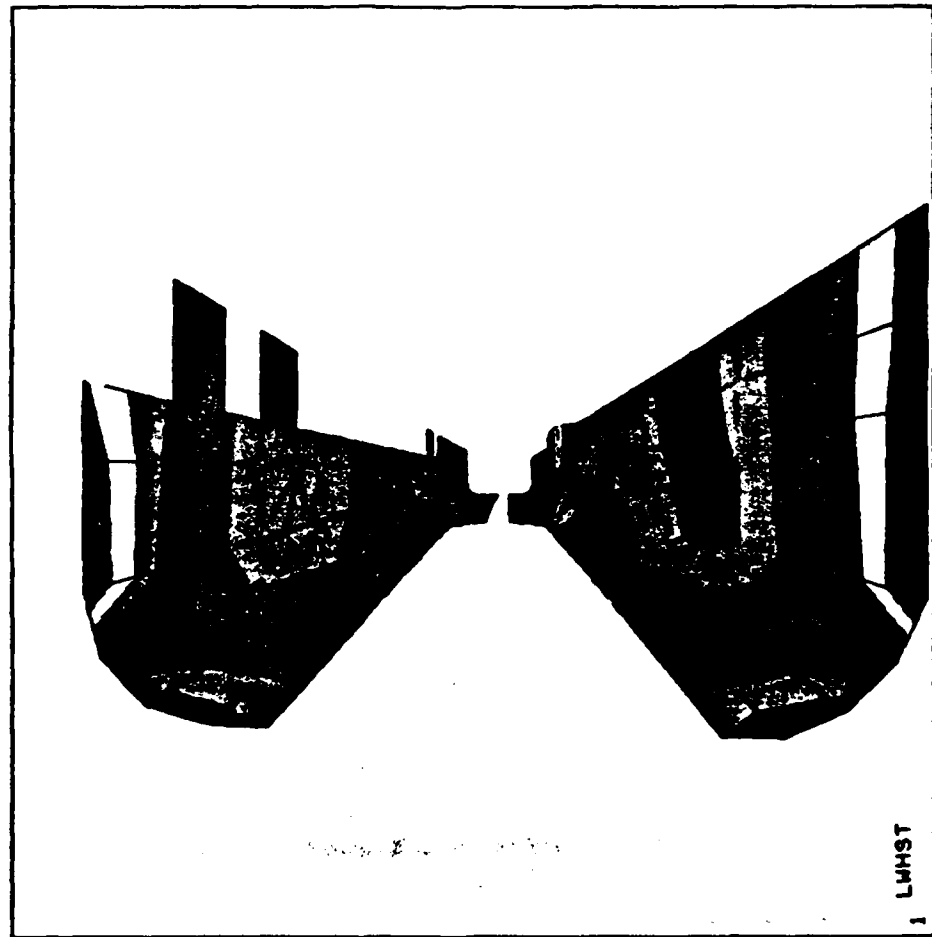
ANSYS 4.2B
FEB 6 1987
8:16:47
PLOT NO. 2
POST1 STRESS
STEP=1
ITER=1
SY
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.74
YF=1.45
ZF=-112
HIDDEN
MX=4756
MN=-2788
-1953
-1114
-275
564
1403
TOP 1

FIGURE 3
RECOIL



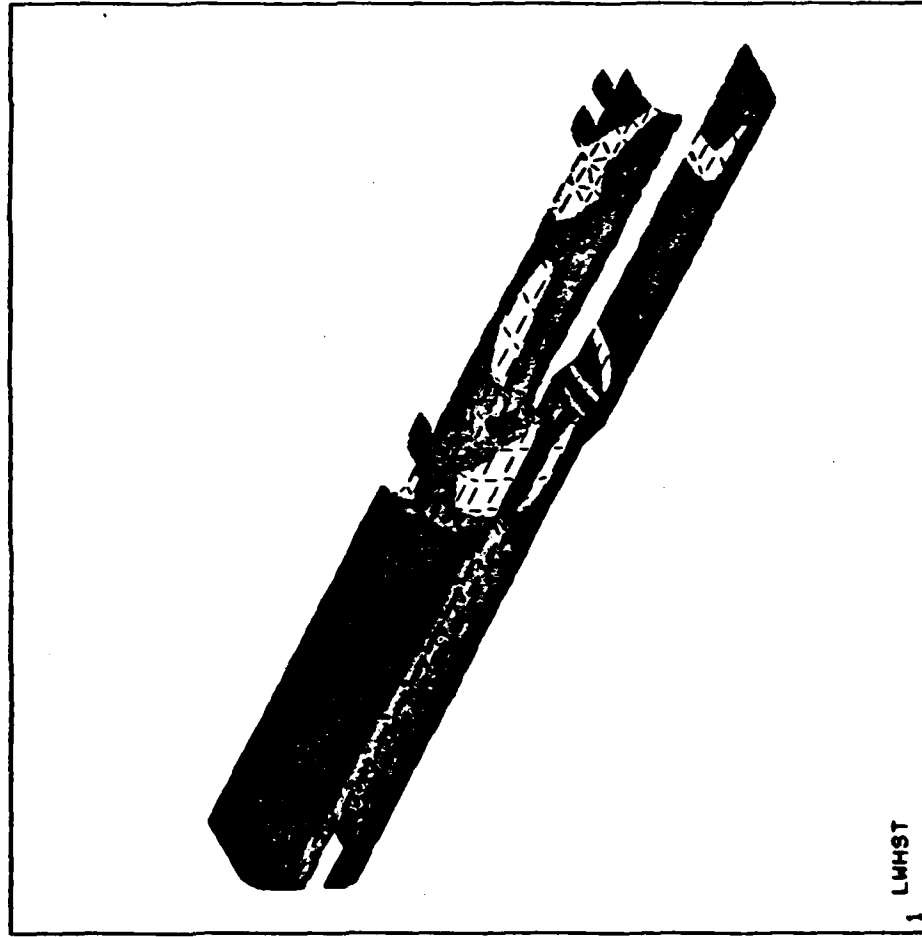
ANSYS 4.2B
FEB 6 1987
8:17:12
PLOT NO. 3
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=2110
MN=-10539
-9136
-7730
-6324
-4918
-3512
706
2112

FIGURE 4
RECOIL



ANSYS 4.2B
FEB 6 1987
8:17:35
PLOT NO. 4
POST1 STRESS
STEP=1
ITER=1
SY
TOP
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=4756
MN=-2788
-1953
-1114
-275
564
1403
3920
4759

FIGURE 3
RECOIL



ANSYS 4.2B
FEB 6 1987
8:18:15
PLOT NO. 5
POST1 STRESS
STEP=1
ITER=1
SX
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.74
YF=1.45
ZF=-112
HIDDEN
MX=1564
MN=-11972
-10468
-8964
-7460
-5956
-4452
-11111
-11111

FIGURE 6
RECOIL

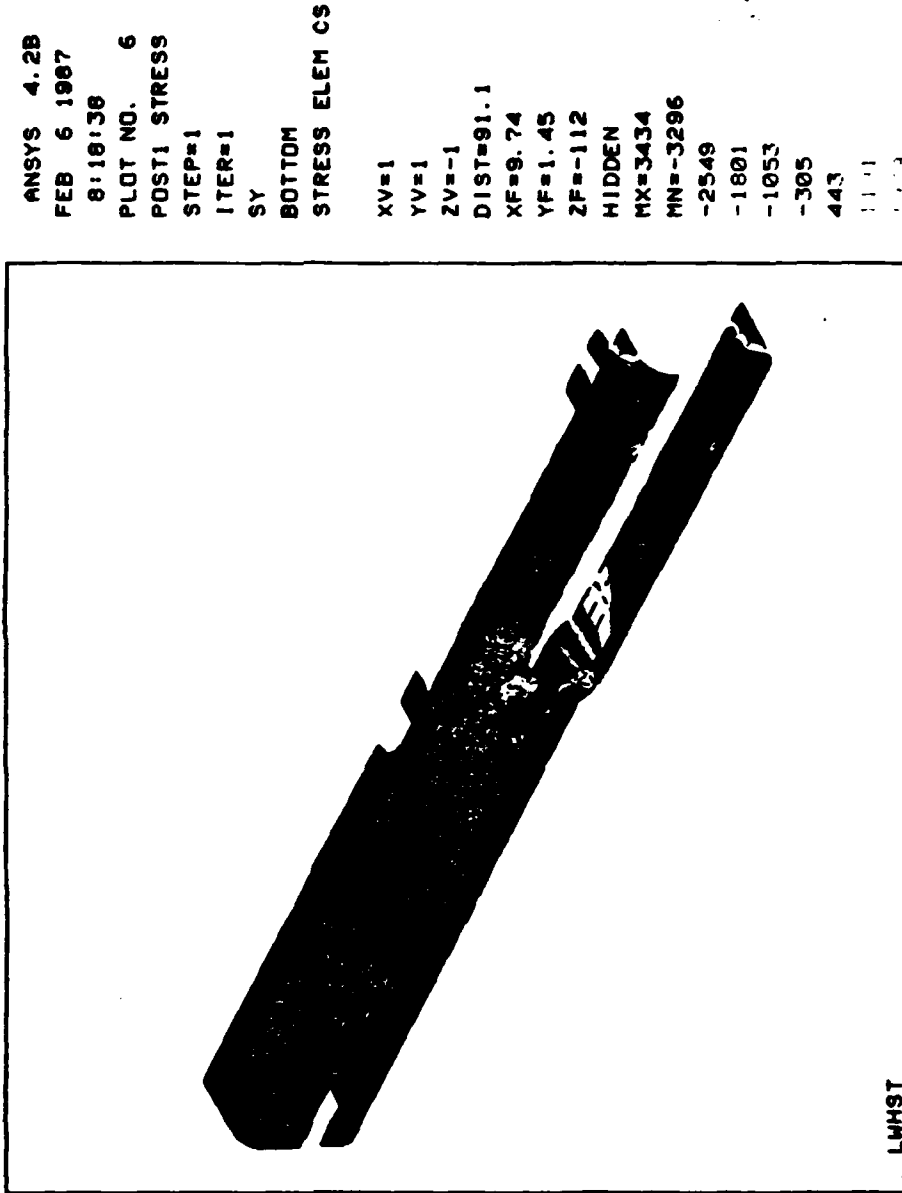
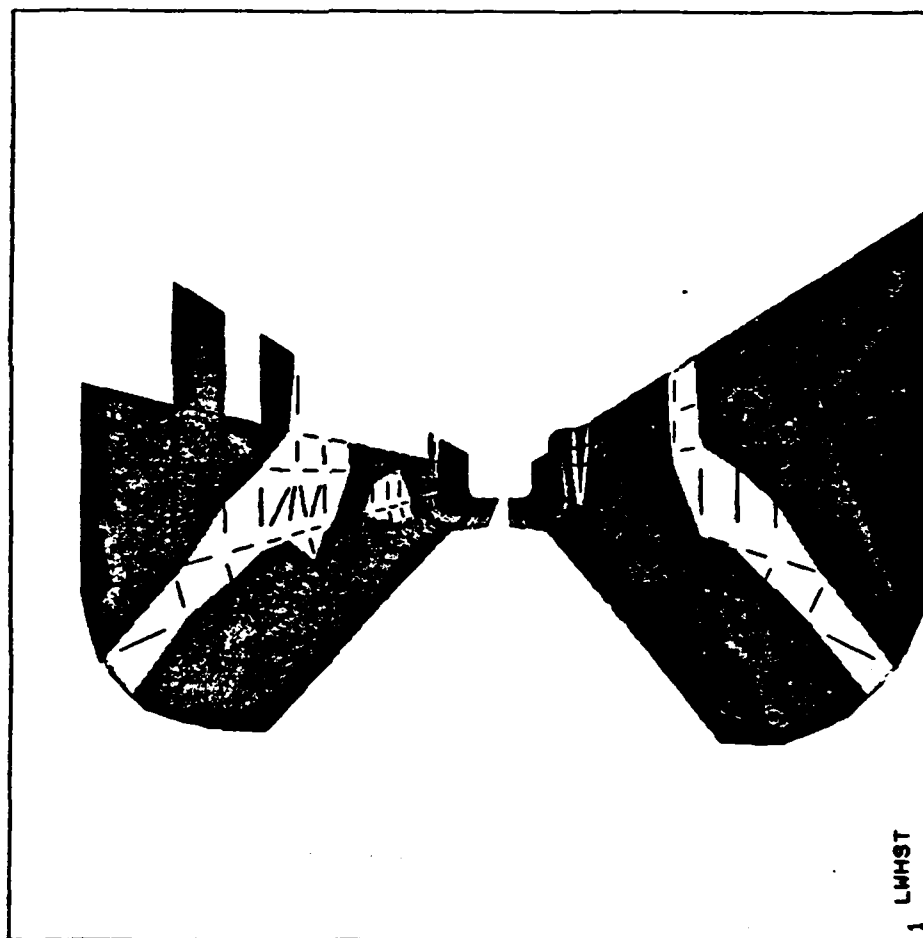
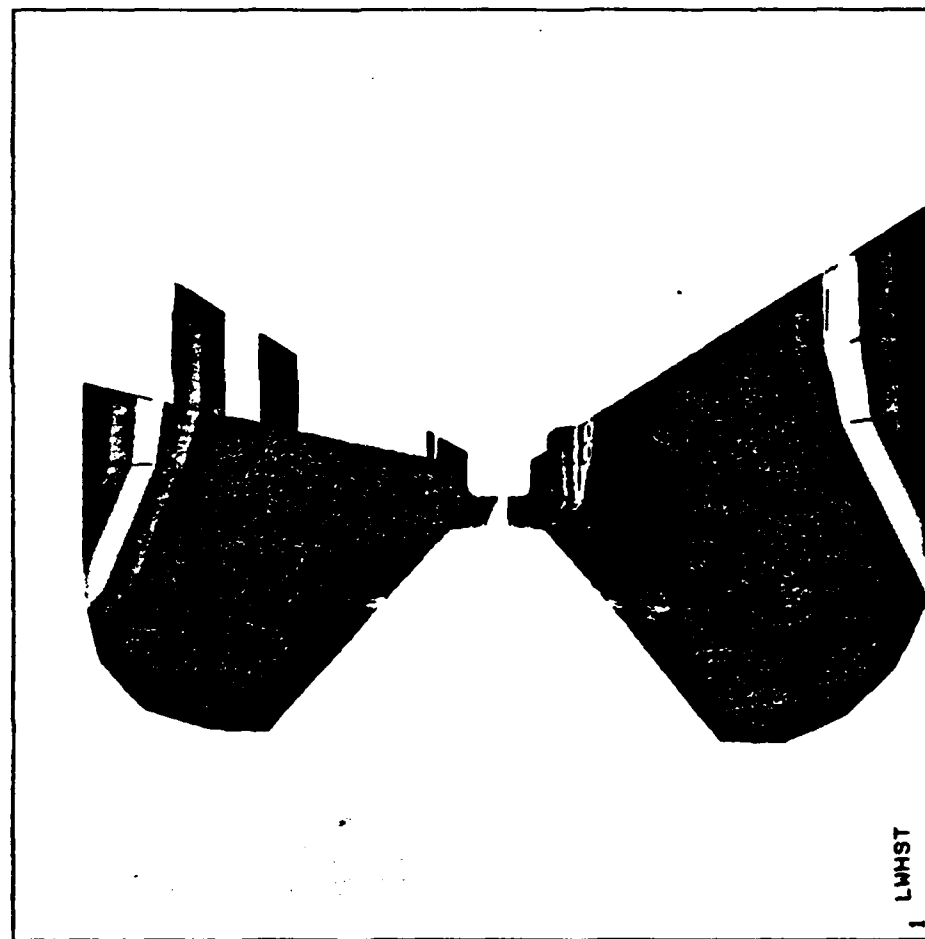


FIGURE 7
RECOIL



ANSYS 4.2B
FEB 6 1987
8:19:01
PLOT NO. 7
POST1 STRESS
STEP=1
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=1564
MN=-11972
-10468
-8964
-7460
-5956
-4452
60.4
1564

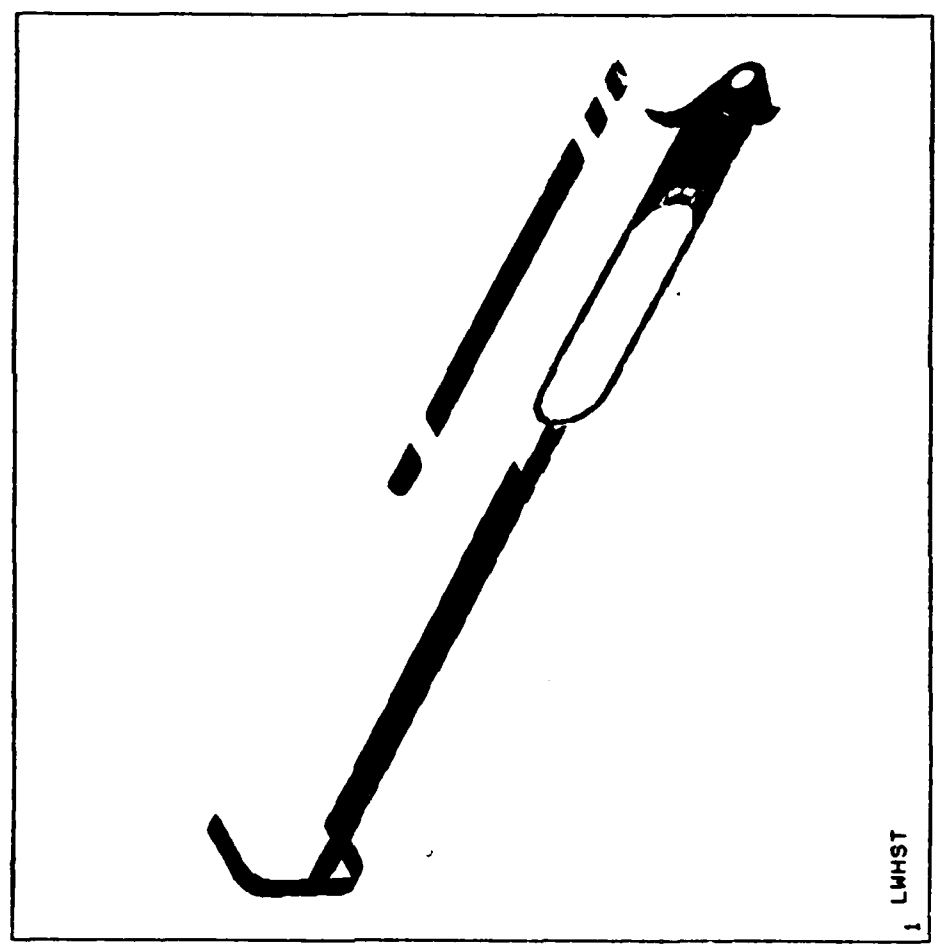
FIGURE 8
RECOIL



ANSYS 4.2B
FEB 6 1987
8:19:25
PLOT NO. 8
POST1 STRESS
STEP=1
ITER=1
SY
BOTTOM
STRESS ELEM CS

ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=3434
MN=-3296
-2549
-1801
-1053
-305
443
1 1
2687
3435

FIGURE 9
RECOIL

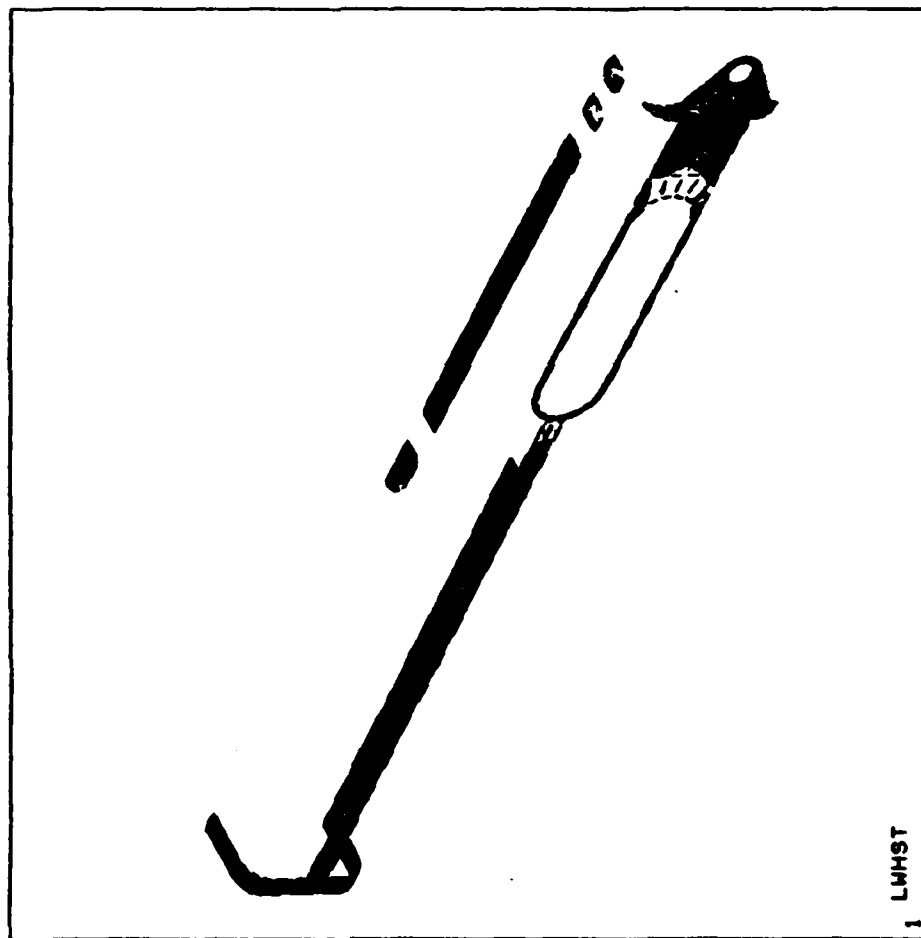


ANSYS 4.2B
FEB 6 1987
8:20:11
PLOT NO. 9
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=92.8
XF=10.5
YF=1.43
ZF=-111
HIDDEN
MX=7175
MN=-6589
-5062
-3532
-2002
-472
105R
111

FIGURE 10

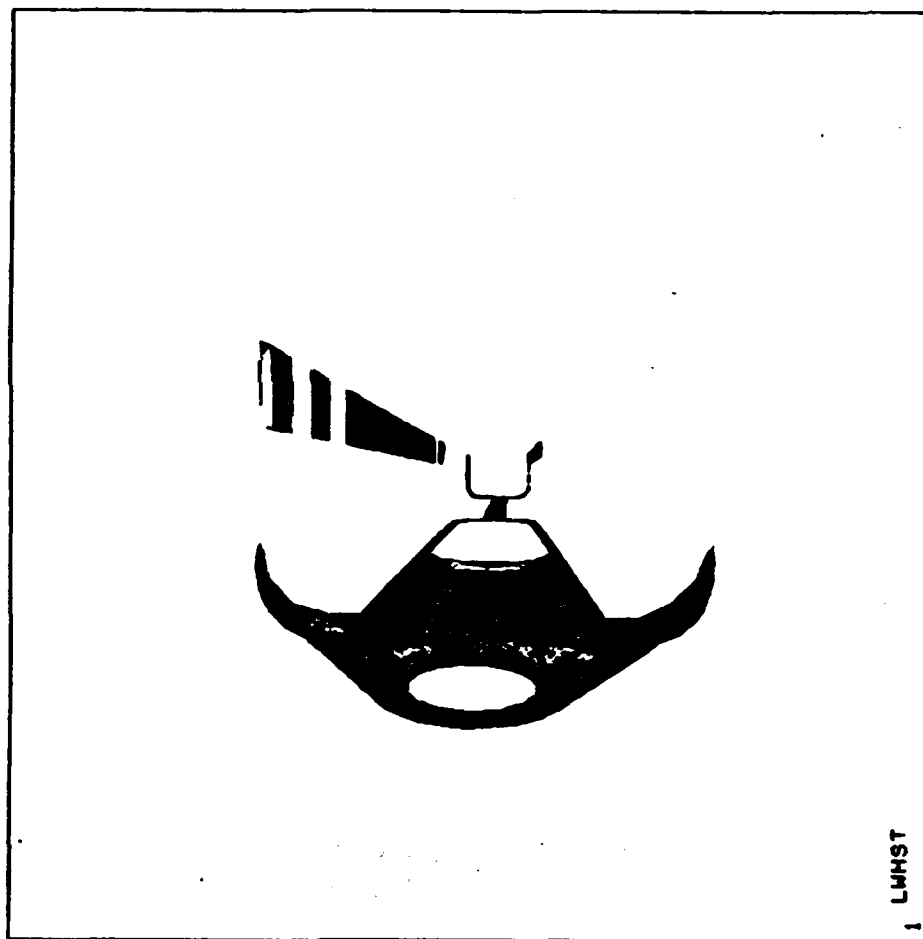
RECOIL



ANSYS 4.2B
FEB 6 1987
8:20:25
PLOT NO. 10
POST1 STRESS
STEP=1
ITER=1
SY
TOP
STRESS ELEM CS

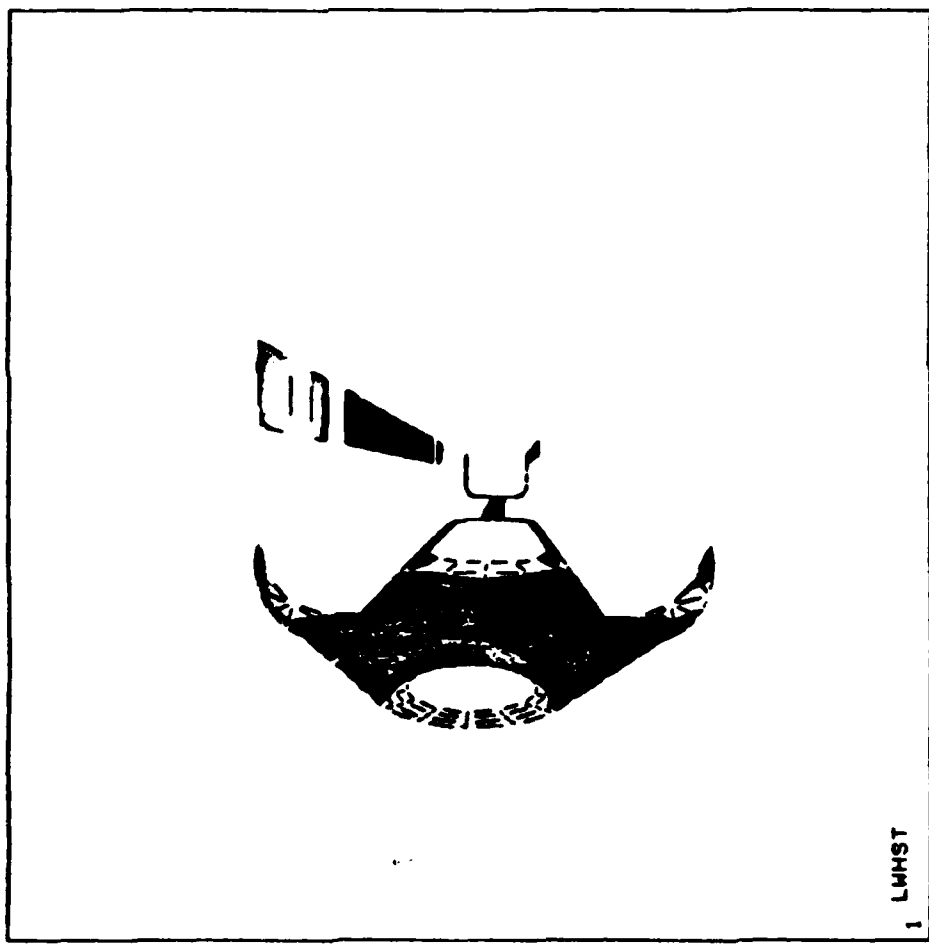
XV=1
YV=1
ZV=-1
DIST=92.8
XF=10.5
YF=1.43
ZF=-111
HIDDEN
MX=4515
MN=-11675
-9877
-8078
-6279
-4480
-2681

FIGURE 11
RECOIL



ANSYS 4.2B
FEB 6 1987
8:20:40
PLOT NO. 11
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=7175
MN=-6589
-5062
-3532
-2002
-472
1058
5648
7178

FIGURE 12
RECOIL



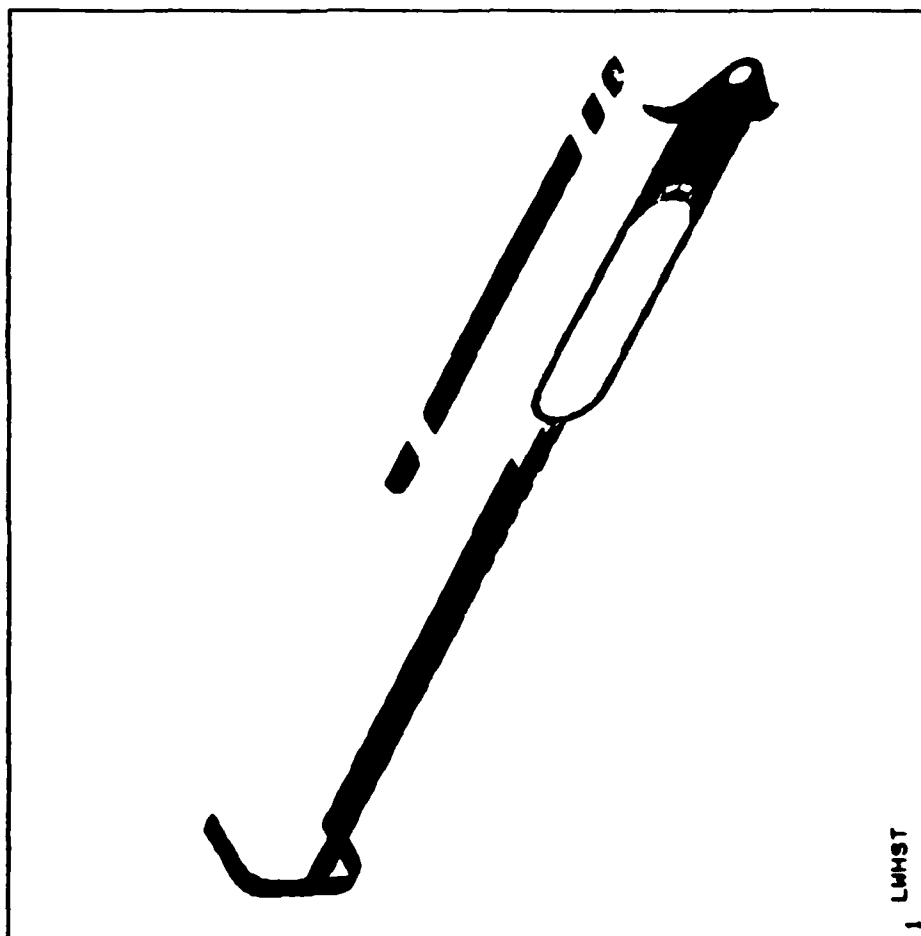
ANSYS 4.2B
FEB 6 1987
8:20:53
PLOT NO. 12
POST1 STRESS
STEP=1
ITER=1
SY
TOP
STRESS ELEM CS

ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=4515
MN=-11675
-9877
-8078
-6279
-4480
-2681

2716
4515

FIGURE 13

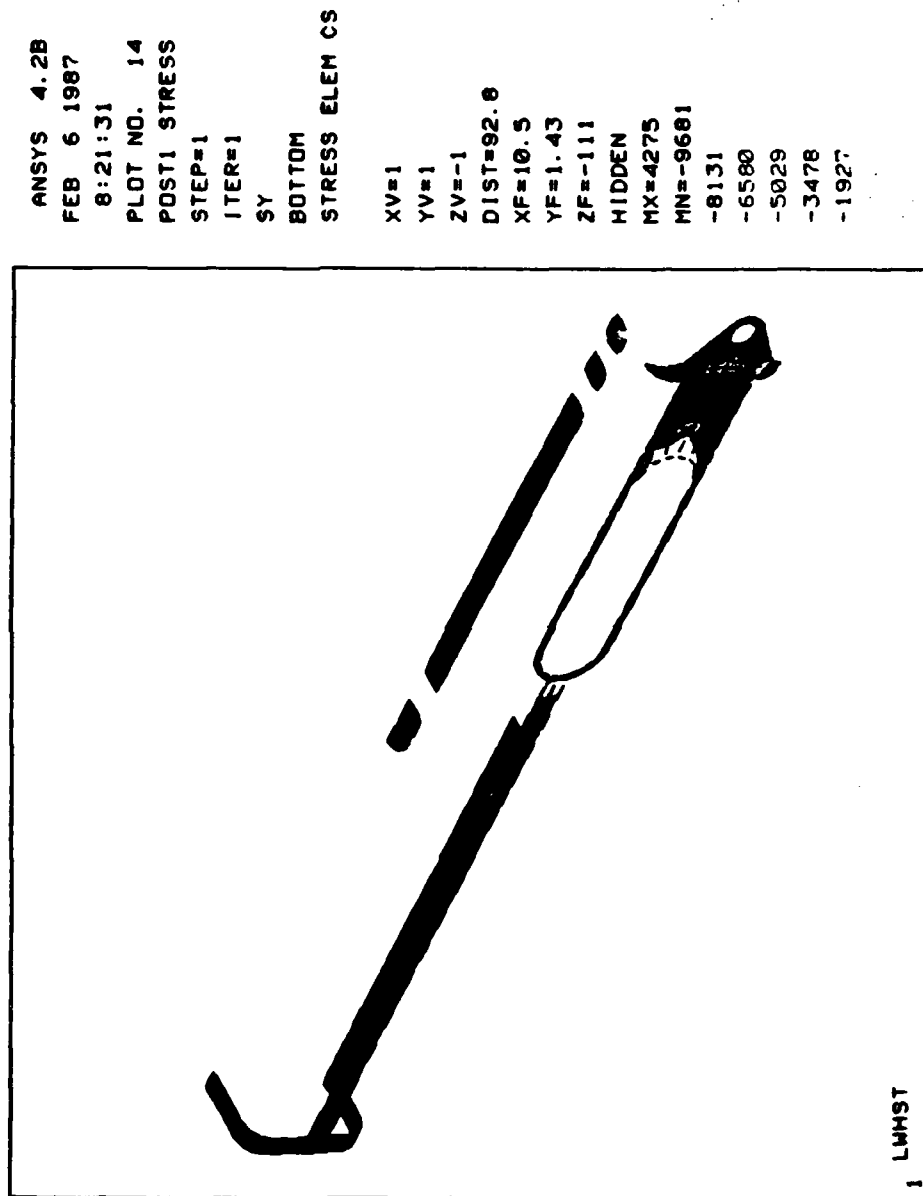
RECOIL



ANSYS 4.2B
FEB 6 1987
8:21:18
PLOT NO. 13
POST1 STRESS
STEP=1
ITER=1
SX
BOTTOM
STRESS ELEM CS

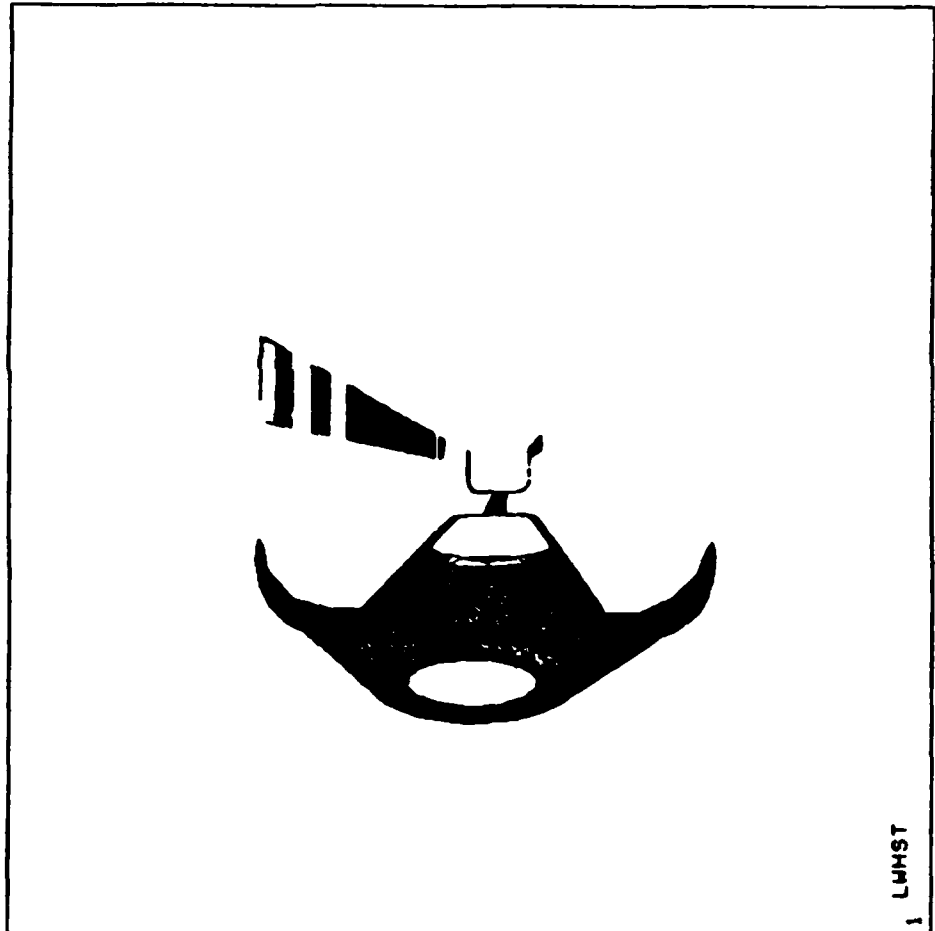
XV=1
YV=1
ZV=-1
DIST=92.8
XF=10.5
YF=1.43
ZF=-111
HIDDEN
MX=6698
MN=-6737
-5245
-3752
-2259
-766
727

FIGURE 14
RECOIL



①

FIGURE 13
RECOIL

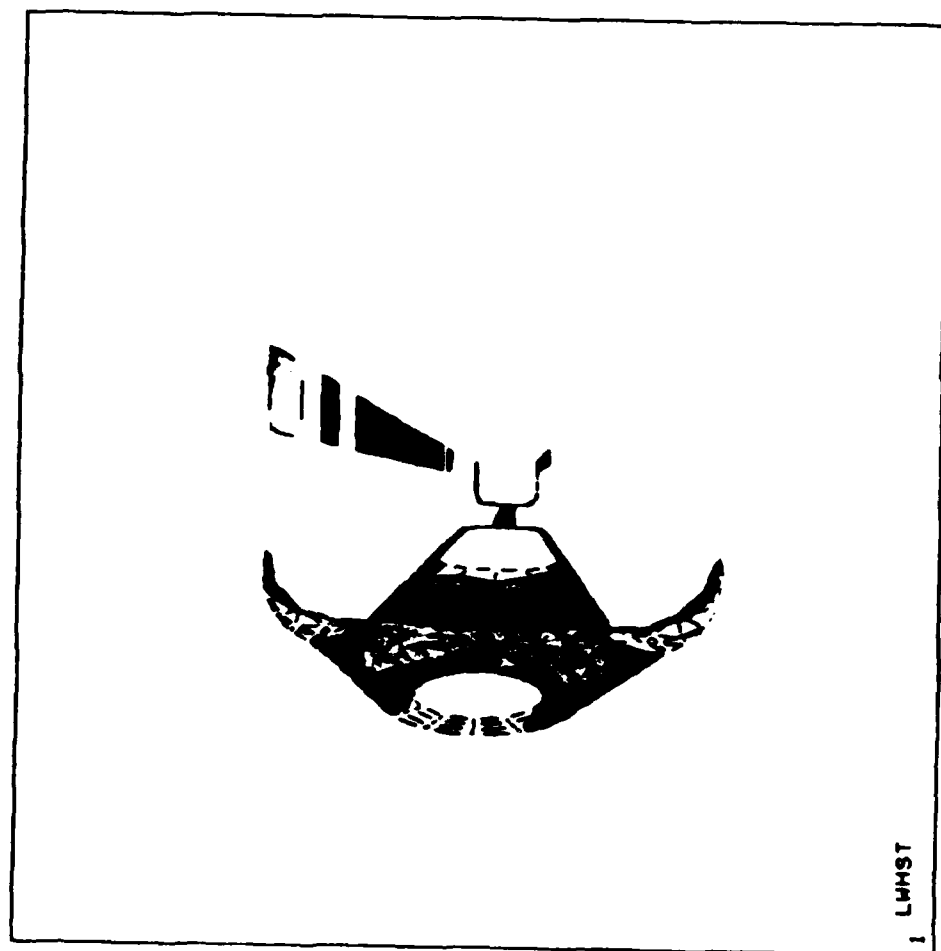


ANSYS 4.2B
FEB 6 1987
8:21:45
PLOT NO. 15
POST1 STRESS
STEP=1
ITER=1
SX
BOTTOM
STRESS ELEM CS

ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=6698
MN=-6737
-5245
-3752
-2259
-766
727

5206
6699

FIGURE 16
RECOIL

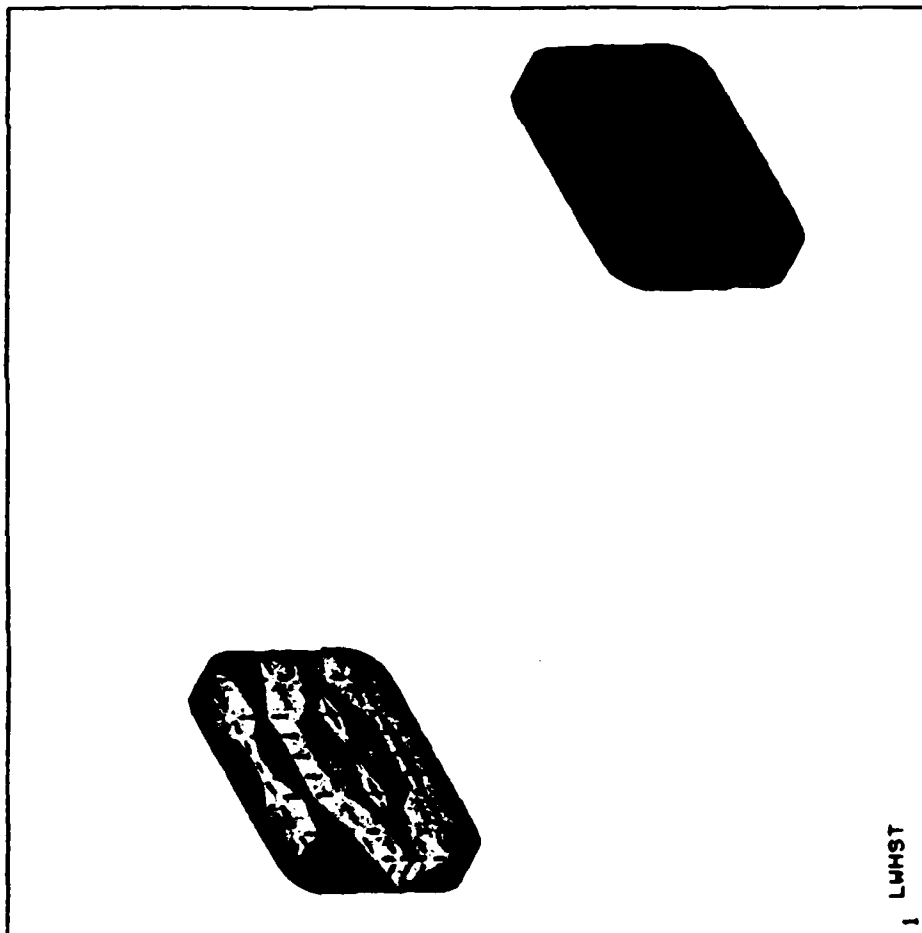


ANSYS 4.2B
FEB 6 1987
8:21:58
PLOT NO. 16
POST1 STRESS
STEP=1
ITER=1
SY
BOTTOM
STRESS ELEM CS

ZV=-1
DIST=139
XF=9.5
ZF=-119
CDNE=40
HIDDEN
MX=4275
MN=-9681
-8131
-6580
-5029
-3478
-1927

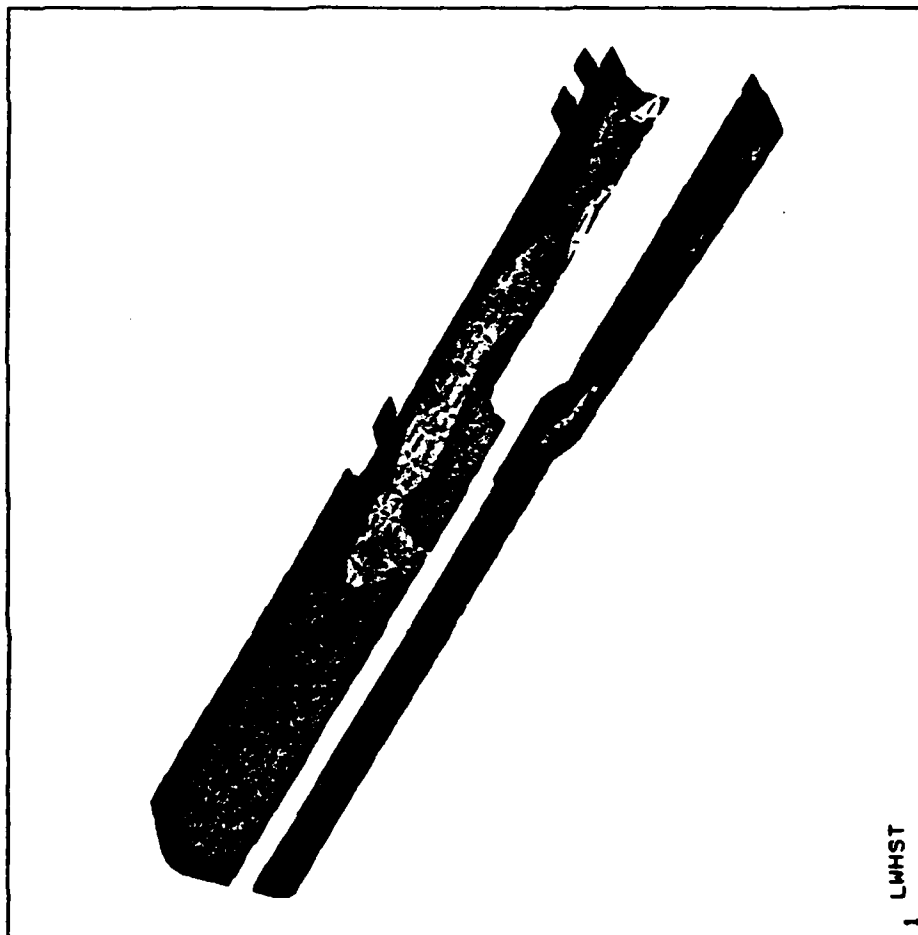
2726
4277

FIGURE 17
RECOIL



ANSYS 4.2B
FEB 6 1987
8:22:30
PLOT NO. 17
POST1 STRESS
STEP=1
ITER=1
SIDE
BOTTOM
XV=1
YV=1
ZV=-1
DIST=59.9
YF=1.63
ZF=-52
HIDDEN
MX=2120
MN=5.03
237
473
709
945
1181
1889
2125

FIGURE 18
TORQUE



ANSYS 4.2B
FEB 6 1987
8:24:44
PLOT NO. 18
POST1 STRESS
STEP=2
ITER=1
SX
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.74
YF=1.45
ZF=-112
HIDDEN
MX=22326
MN=-19561
-14910
-10255
-5600
-945
3710

FIGURE 19
TORQUE

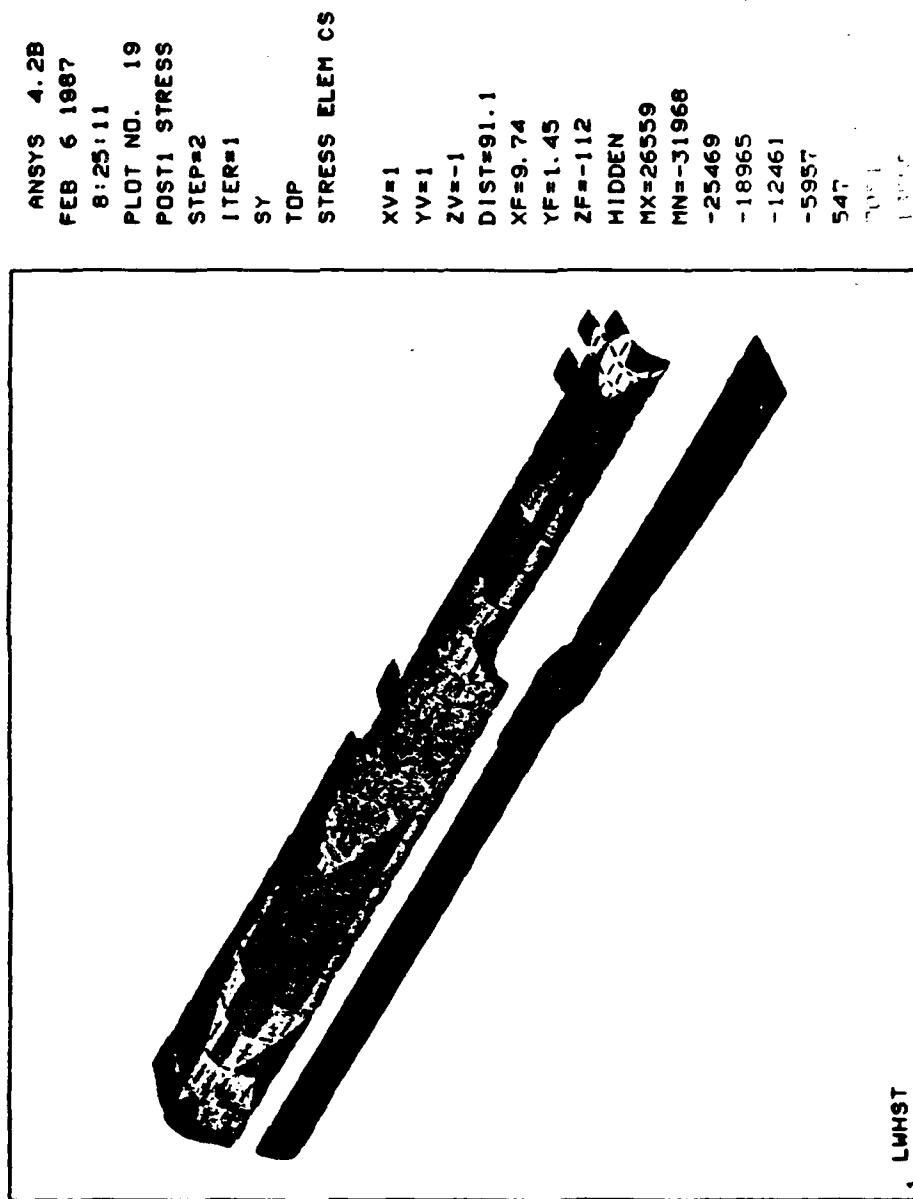
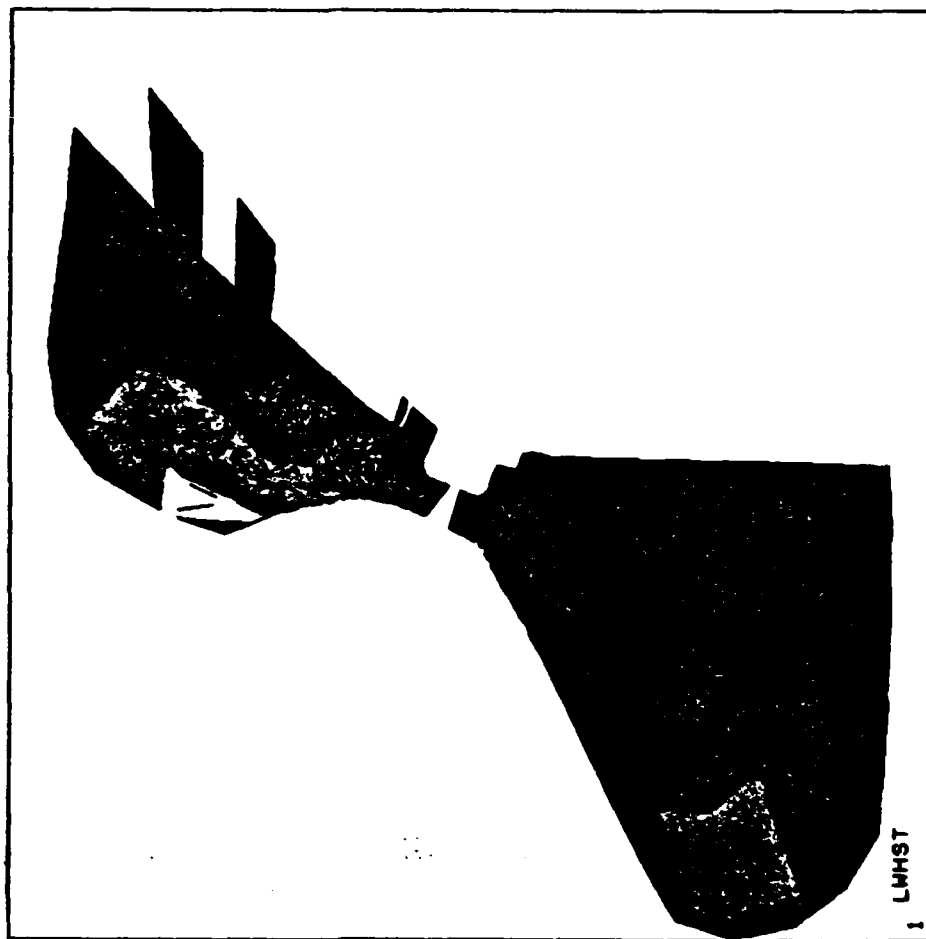
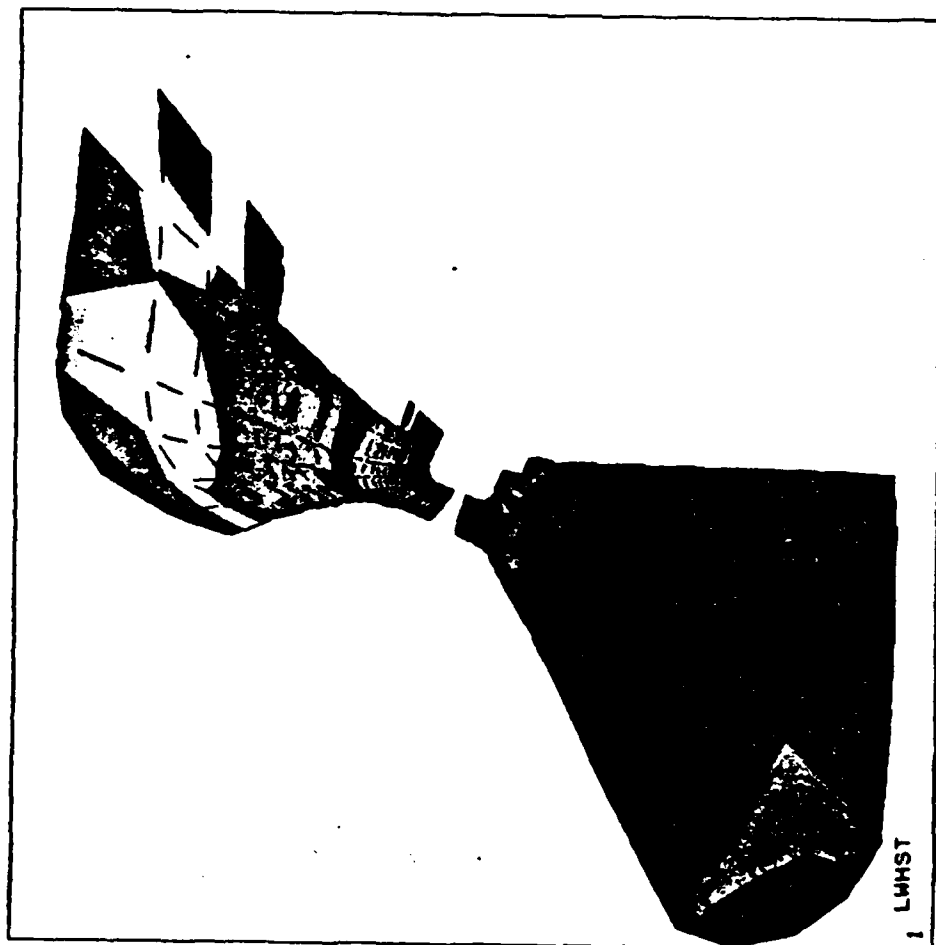


FIGURE 20
TORQUE



ANSYS 4.2B
FEB 6 1987
8:25:39
PLOT NO. 20
POST1 STRESS
STEP=2
ITER=1
SX
TOP
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=22326
MN=-19561
-14910
-10255
-5600
-945
3710
17675
22330

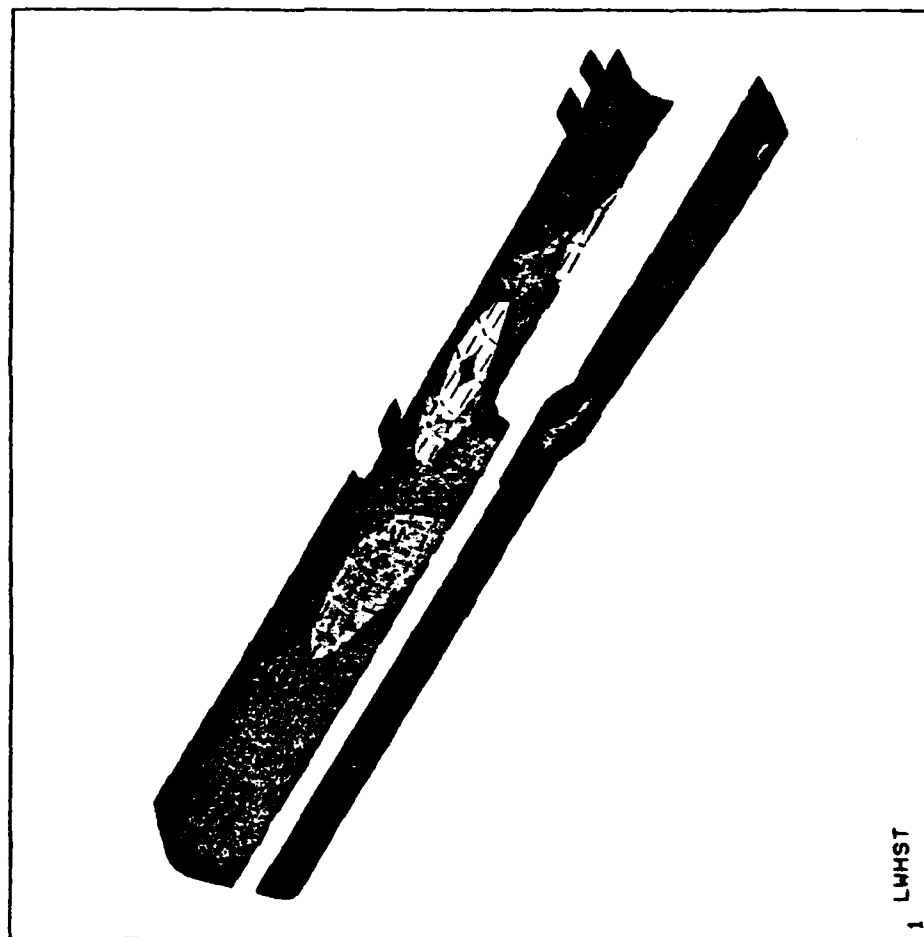
FIGURE 21
TORQUE



ANSYS 4.2B
FEB 6 1987
8:26:31
PLOT NO. 21
POST1 STRESS
STEP=2
ITER=1
SY
TOP
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=26559
MN=-31968
-25469
-18965
-12461
-5957
547
20059
26563

FIGURE 22

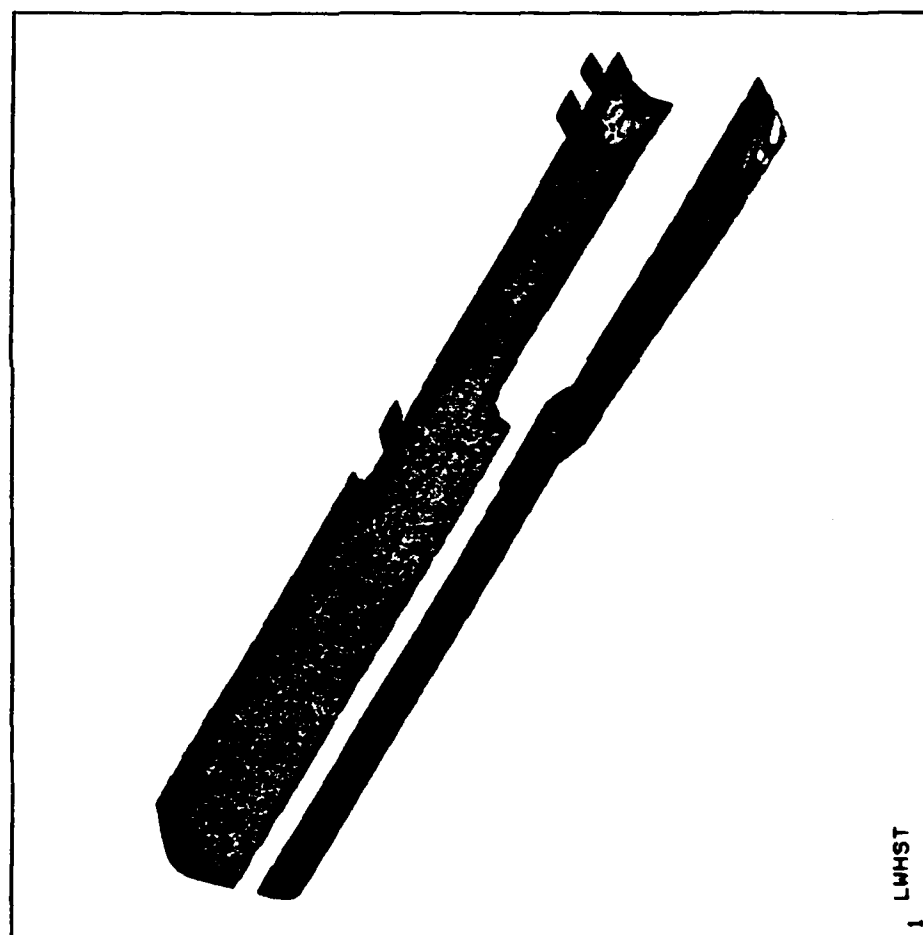
TORQUE



ANSYS 4.2B
FEB 6 1987
8:27:15
PLOT NO. 22
POST1 STRESS
STEP=2
ITER=1
SX
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.74
YF=1.45
ZF=-112
HIDDEN
MX=16854
MN=-14375
-10906
-7436
-3966
-496
2974
1111
1111

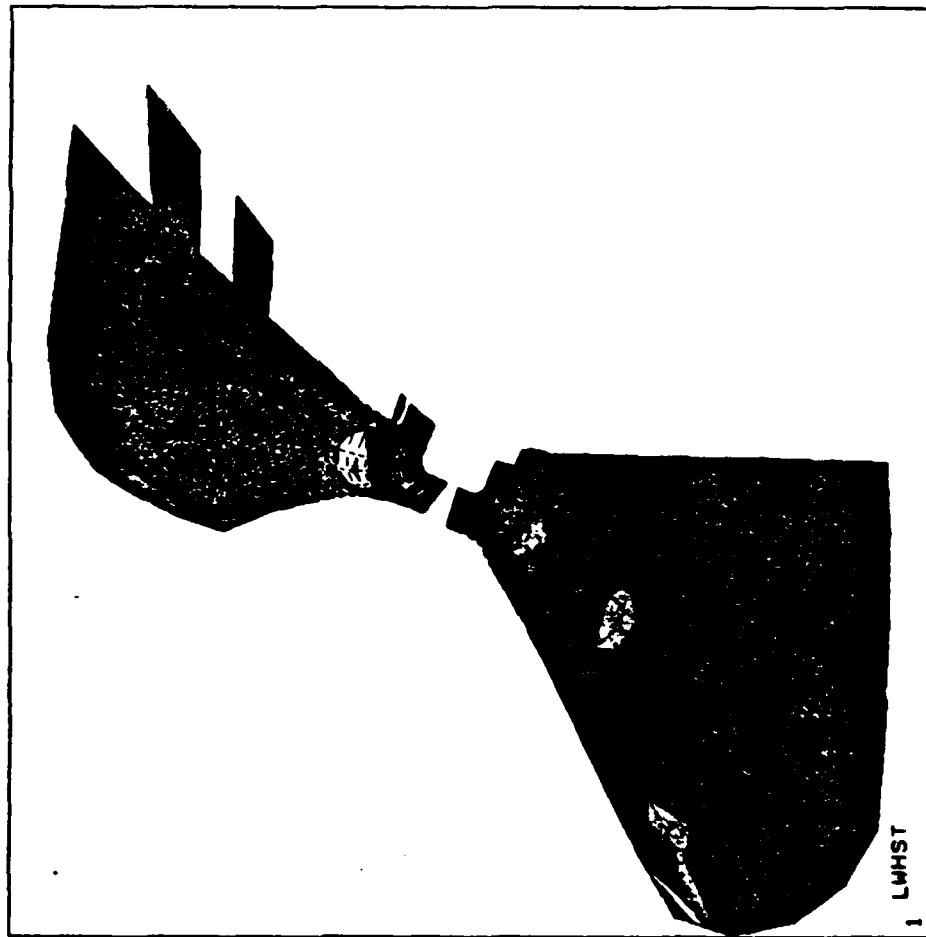
FIGURE 23

TORQUE



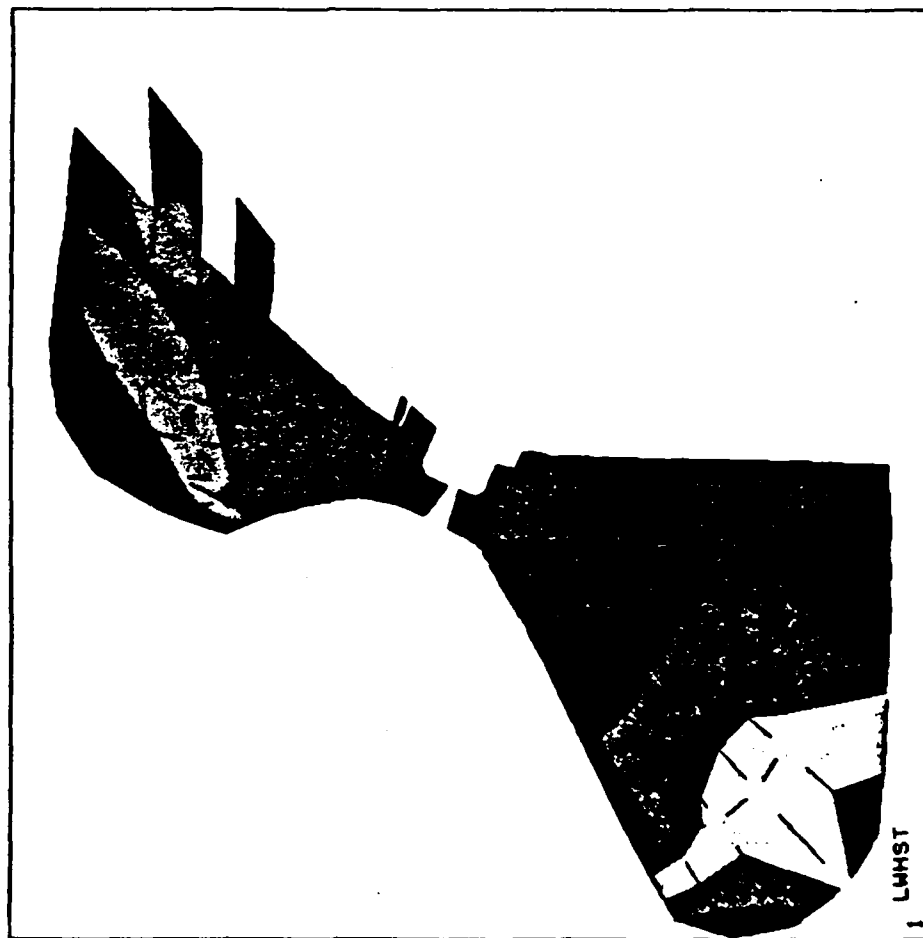
ANSYS 4.2B
 FEB 6 1987
 8:27:43
 PLOT NO. 23
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.74
 YF=1.45
 ZF=-112
 HIDDEN
 MX=18529
 MN=-17049
 -13099
 -9145
 -5191
 -1237
 2717

FIGURE 24
TORQUE



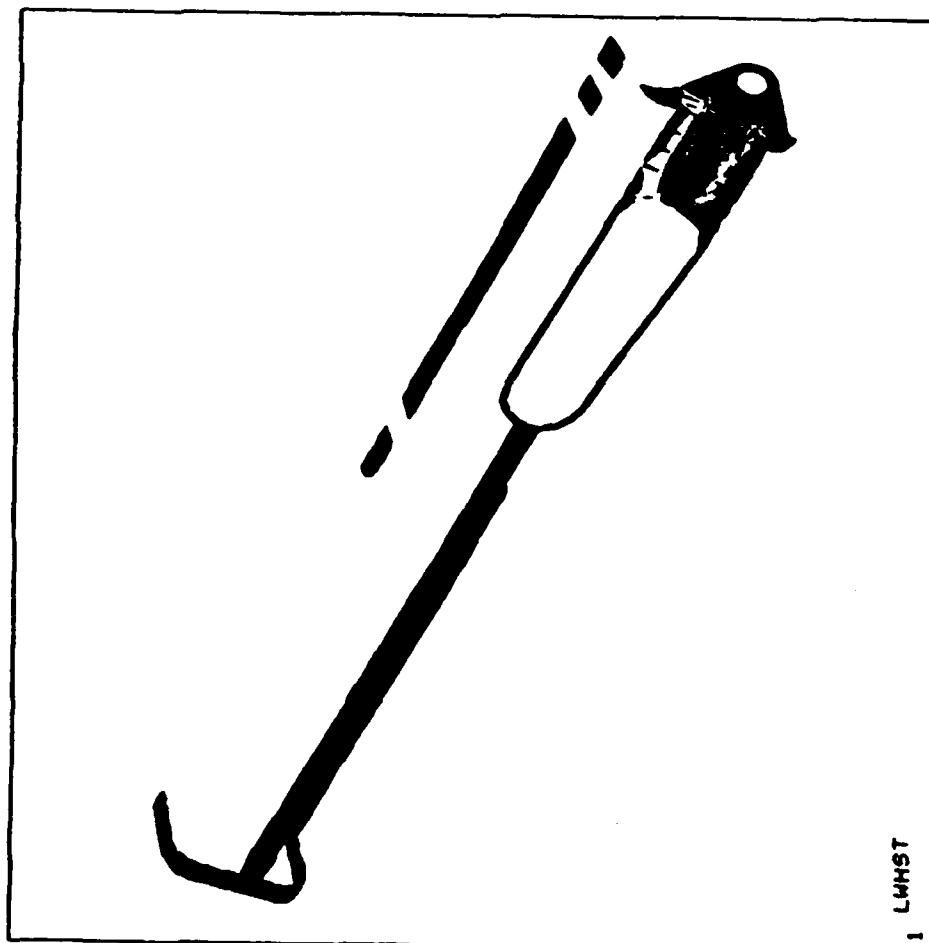
ANSYS 4.2B
FEB 6 1987
8:28:08
PLOT NO. 24
POST1 STRESS
STEP=2
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=16854
MN=-14375
-10906
-7436
-3966
-496
2974
13384
16854

FIGURE 25
TORQUE



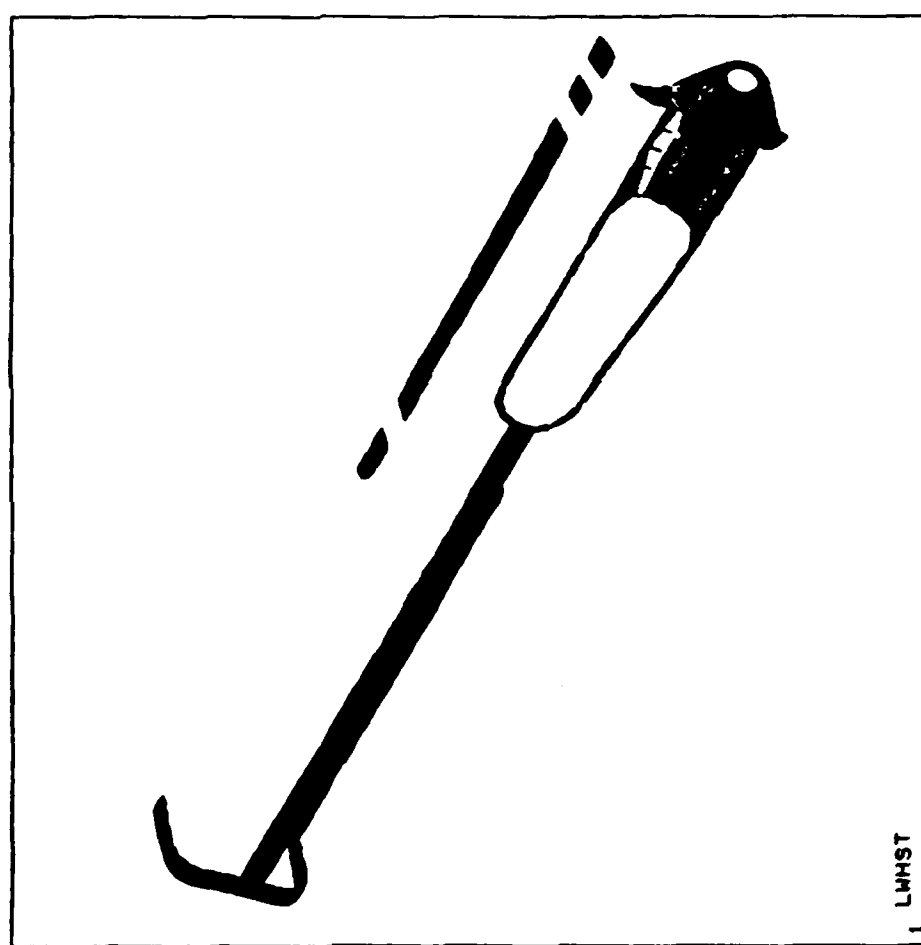
ANSYS 4.2B
FEB 6 1987
8:28:35
PLOT NO. 25
POST1 STRESS
STEP=2
ITER=1
SY
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=18529
MN=-17049
-13099
-9145
-5191
-1237
2717
14579
18533

FIGURE 26
TORQUE



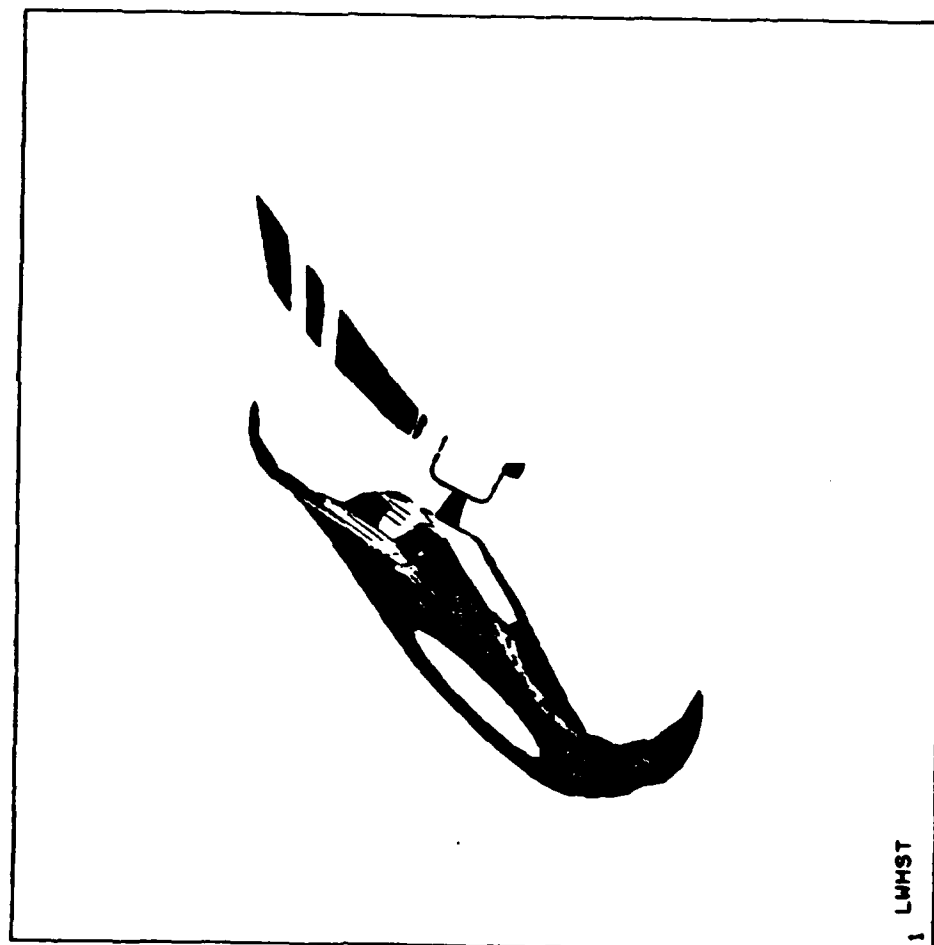
ANSYS 4.2B
FEB 6 1987
8:29:24
PLOT NO. 26
POST1 STRESS
STEP=2
ITER=1
SX
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.8
XF=10.5
YF=1.43
ZF=-111
HIDDEN
MX=39133
MN=-33113
-25088
-17060
-9032
-1004
TOP4

FIGURE 27
TORQUE



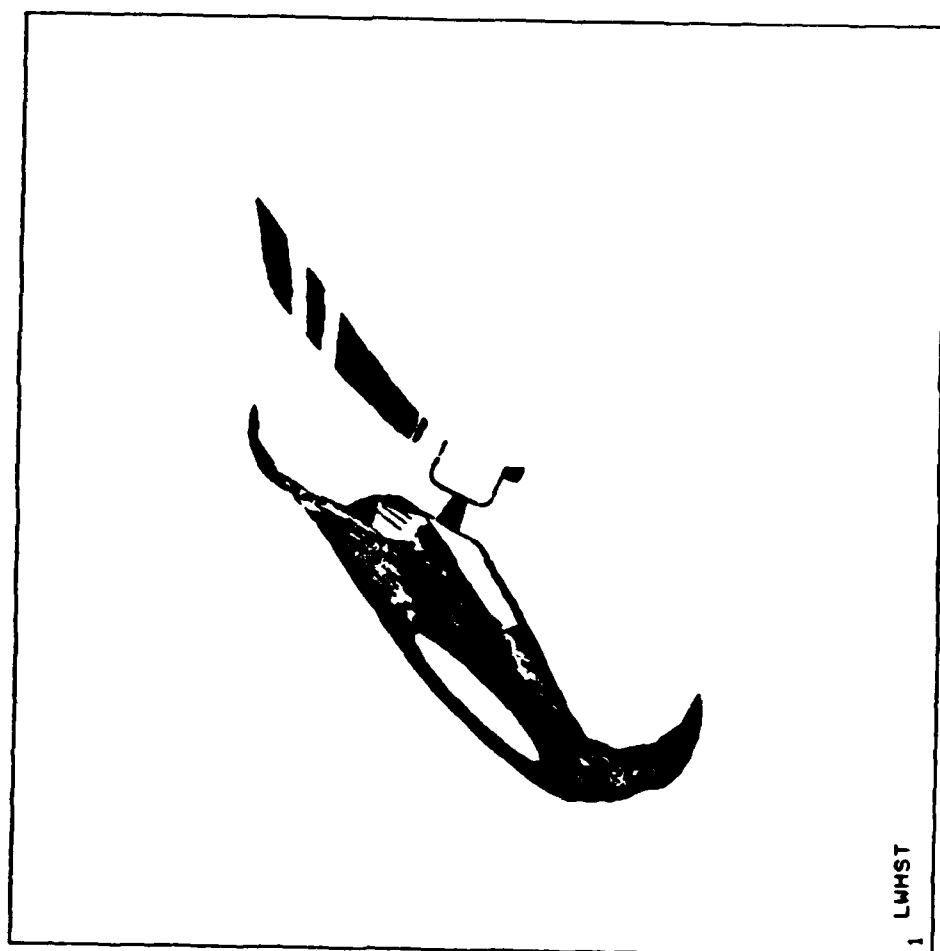
ANSYS 4.2B
FEB 6 1987
8:29:41
PLOT NO. 27
POST1 STRESS
STEP=2
ITER=1
SY
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.8
XF=10.5
YF=1.43
ZF=-111
HIDDEN
MX=21396
MN=-19813
-15235
-10656
-6077
-1498
30A1

FIGURE 28
TORQUE



ANSYS 4.2B
FEB 6 1987
8:29:55
PLOT NO. 28
POST1 STRESS
STEP=2
ITER=1
SX
TDP
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=39133
MN=-33113
-25088
-17060
-9032
-1004
7024
31108
39136

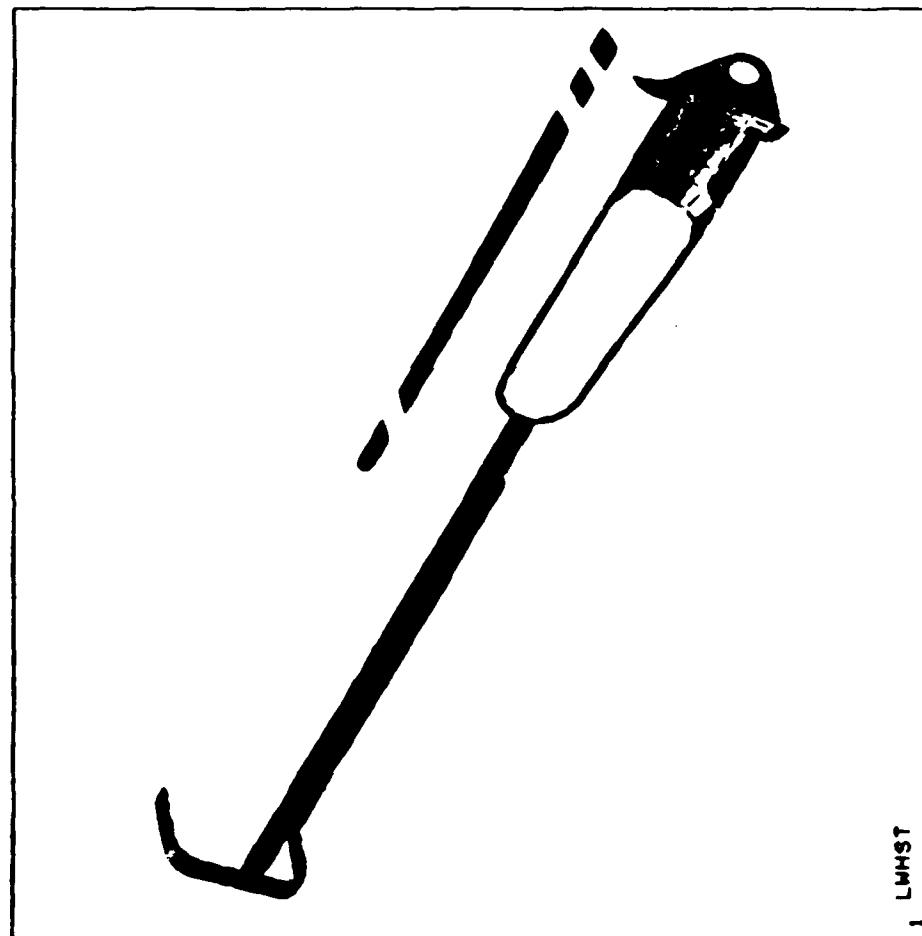
FIGURE 29
TORQUE



ANSYS 4.2B
FEB 6 1987
8:30:10
PLOT NO. 29
POST1 STRESS
STEP=2
ITER=1
SY
TOP
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=21396
MN=-19813
-15235
-10656
-6077
-1498
3081
16818
21397

FIGURE 30

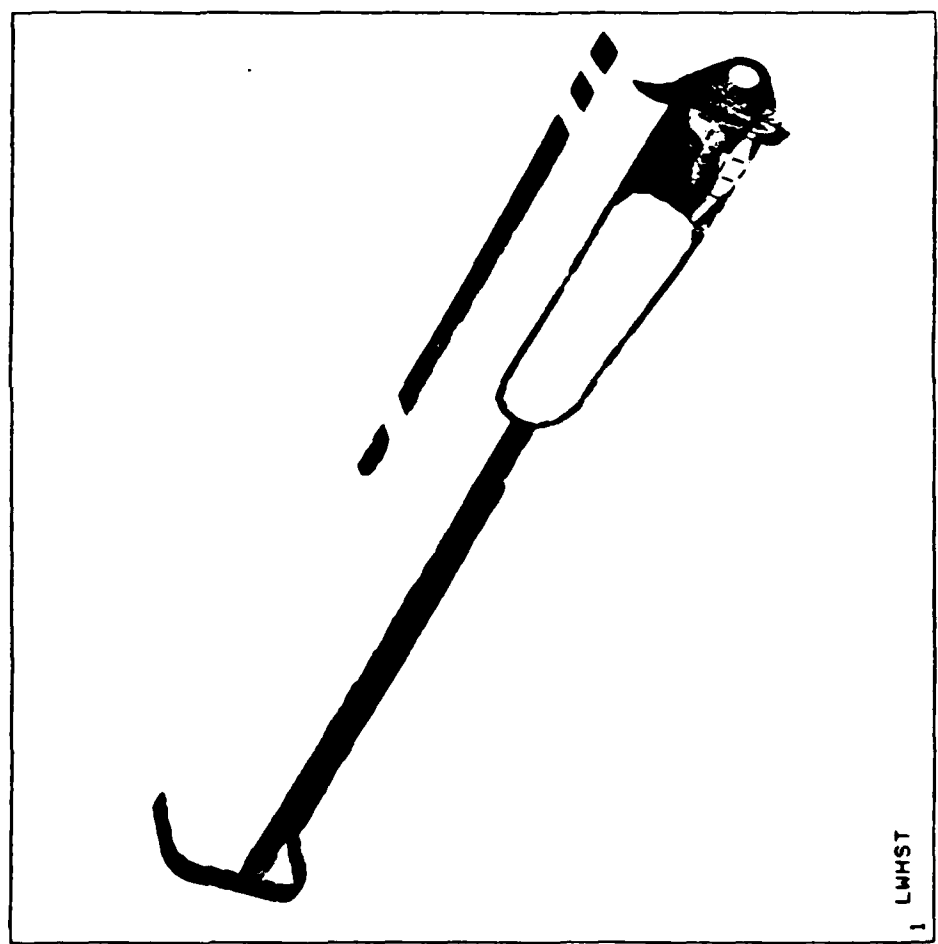
TORQUE



ANSYS 4.2B
 FEB 6 1987
 8:30:35
 PLOT NO. 30
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS

 XV=1
 YV=1
 ZV=-1
 DIST=92.8
 XF=10.5
 YF=1.43
 ZF=-111
 HIDDEN
 MX=32979
 MN=-37258
 -29457
 -21652
 -13847
 -6042
 1763

FIGURE 31
TORQUE



ANSYS 4.2R
FEB 6 1987
8:30:48
PLOT NO. 31
POST1 STRESS
STEP=2
ITER=1
SY
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.8
XF=10.5
YF=1.43
ZF=-111
HIDDEN
MX=18212
MN=-20428
-16137
-11843
-7549
-3255
1079

FIGURE 32
TORQUE



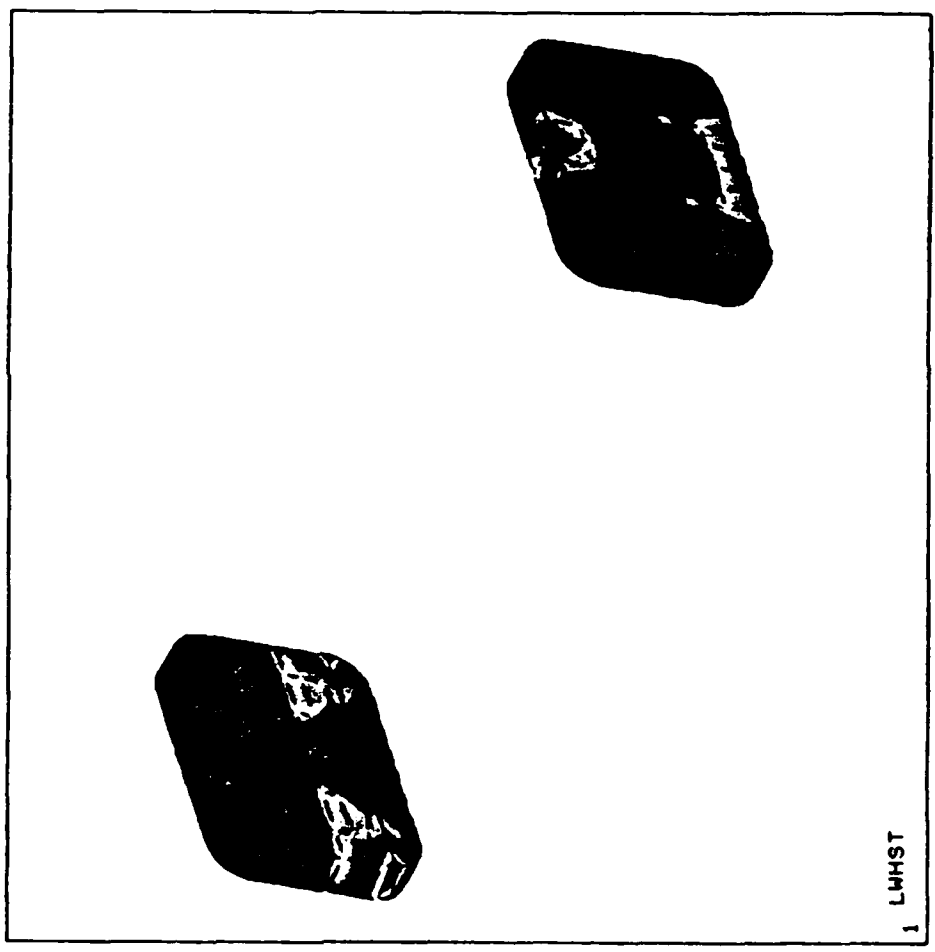
ANSYS 4.2B
FEB 6 1987
8:31:03
PLOT NO. 32
POST1 STRESS
STEP=2
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=32979
MN=-37258
-29457
-21652
-13847
-6042
1763
25178
32983

FIGURE 33
TORQUE



ANSYS 4.2B
FEB 6 1987
8:31:17
PLOT NO. 33
POST1 STRESS
STEP=2
ITER=1
SY
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=18212
MN=-20428
-16137
-11843
-7549
-3255
1039
13921
18215

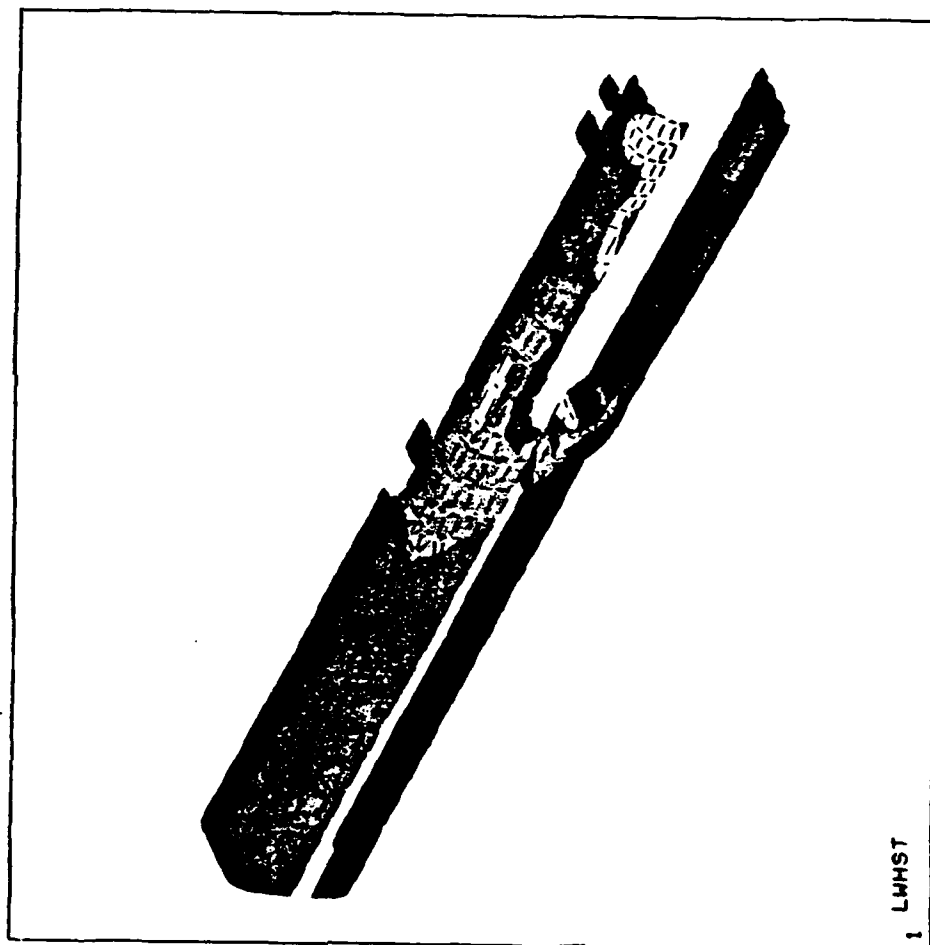
FIGURE 34
TORQUE



ANSYS 4.2B
FEB 6 1987
8:31:57
PLOT NO. 34
POST1 STRESS
STEP=2
ITER=1
SIGE
BOTTOM
XV=1
YV=1
ZV=-1
DIST=59.9
YF=1.63
ZF=-52
HIDDEN
MX=1393
MN=20.2
171
324
477
630
783
1242
1395

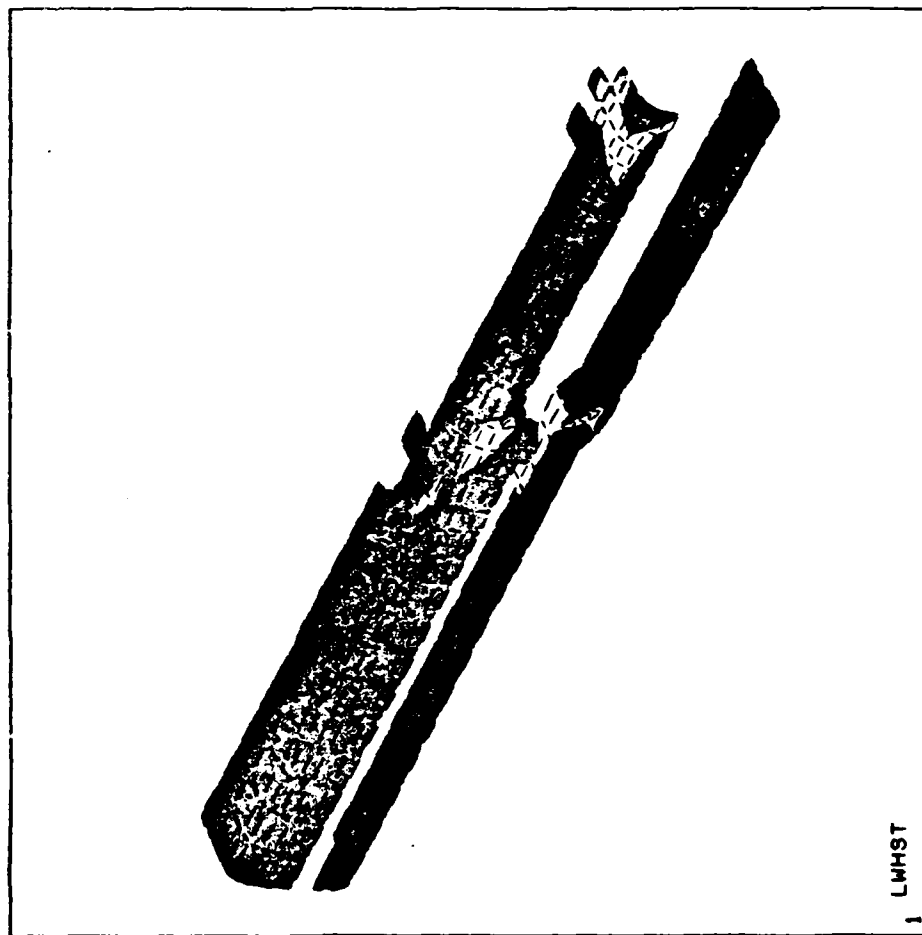
1 LWHST

FIGURE 35
COMBINED



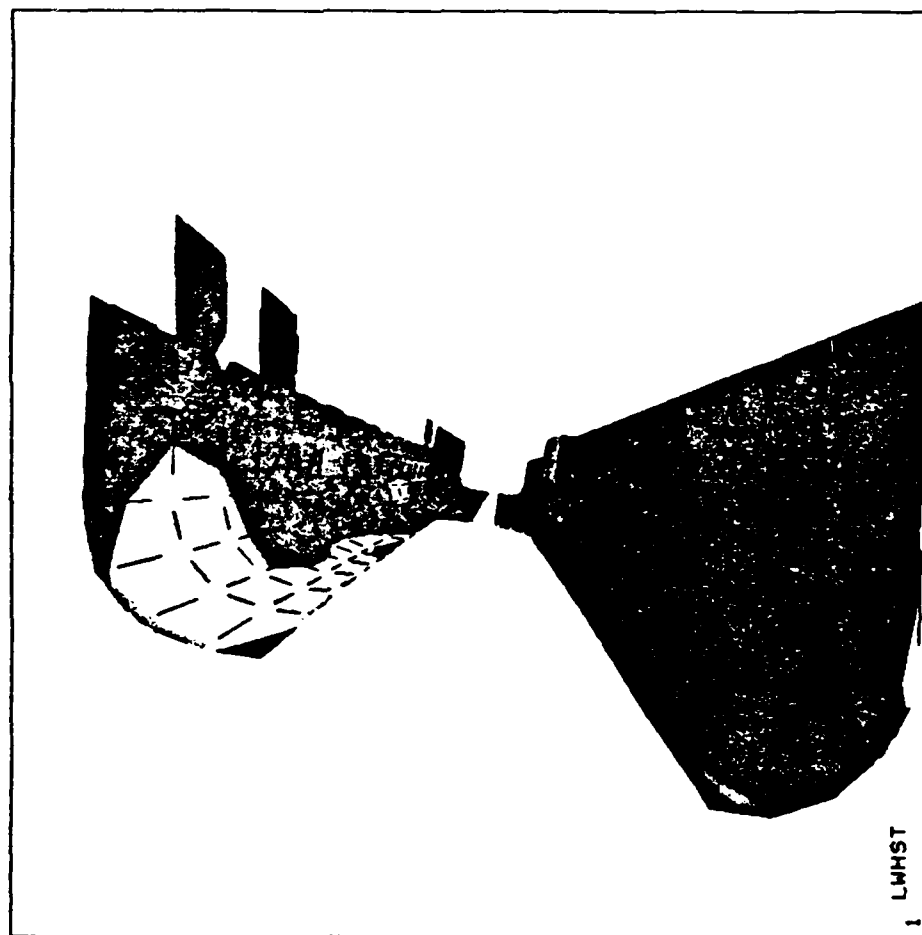
ANSYS 4.2B
FEB 6 1987
8:34:24
PLOT NO. 35
POST1 STRESS
STEP=3
ITER=1
SX
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.74
YF=1.45
ZF=-112
HIDDEN
MX=14787
MN=-27590
-22883
-18174
-13465
-8756
-4047

FIGURE 36
COMBINED



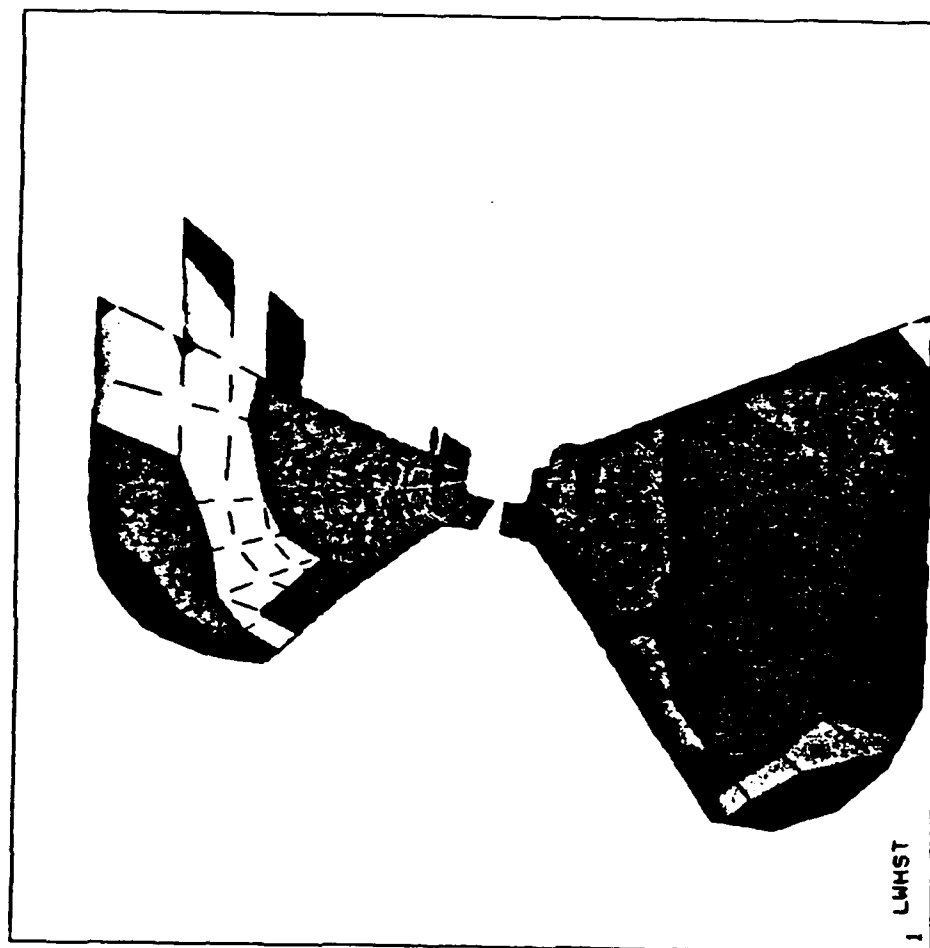
ANSYS 4.2B
FEB 6 1987
8:34:54
PLOT NO. 36
POST1 STRESS
STEP=3
ITER=1
SY
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.74
YF=1.45
ZF=-112
HIDDEN
MX=24030
MN=-34396
-27905
-21413
-14921
-8429
-1937

FIGURE 37
COMBINED



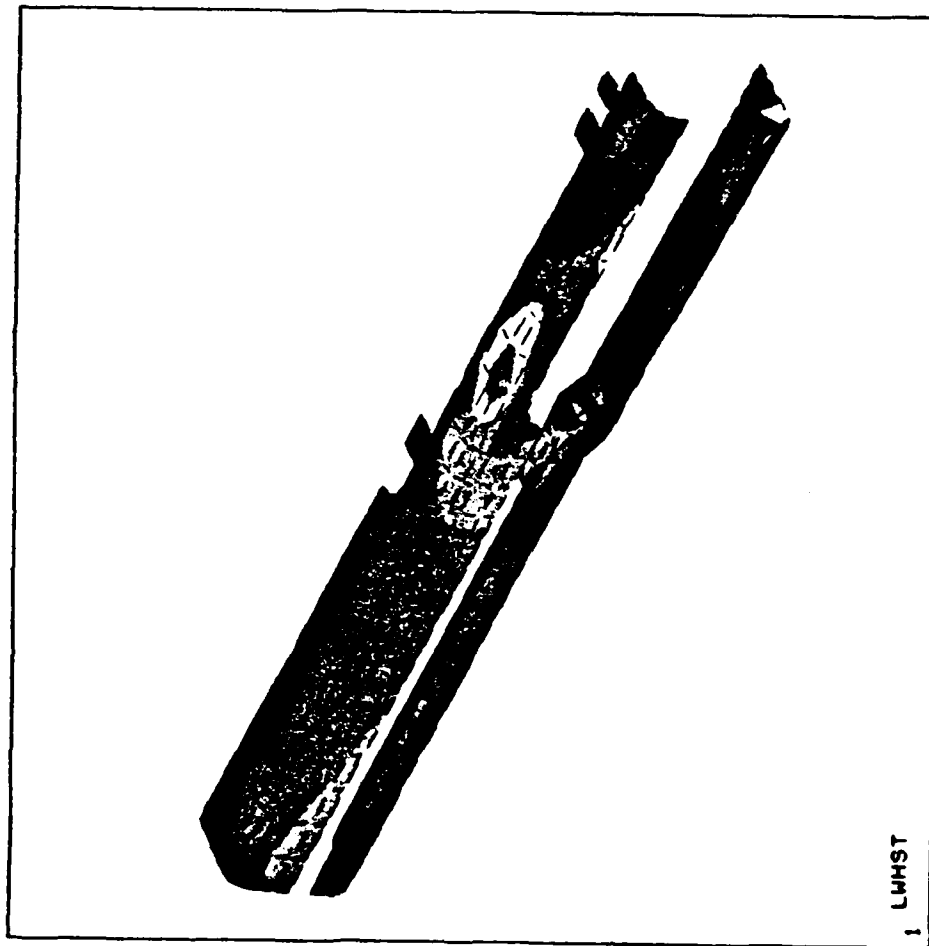
ANSYS 4.2B
FEB 6 1987
8:35:17
PLOT NO. 37
POST1 STRESS
STEP=3
ITER=1
SX
TOP
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=14787
MN=-27590
-22883
-18174
-13465
-8756
-4047
10080
14789

FIGURE 38
COMBINED



ANSYS 4.2B
FEB 6 1987
8:35:44
PLOT NO. 38
POST1 STRESS
STEP=3
ITER=1
SY
TOP
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=24030
MN=-34396
-27905
-21413
-14921
-8429
-1937
17539
24031

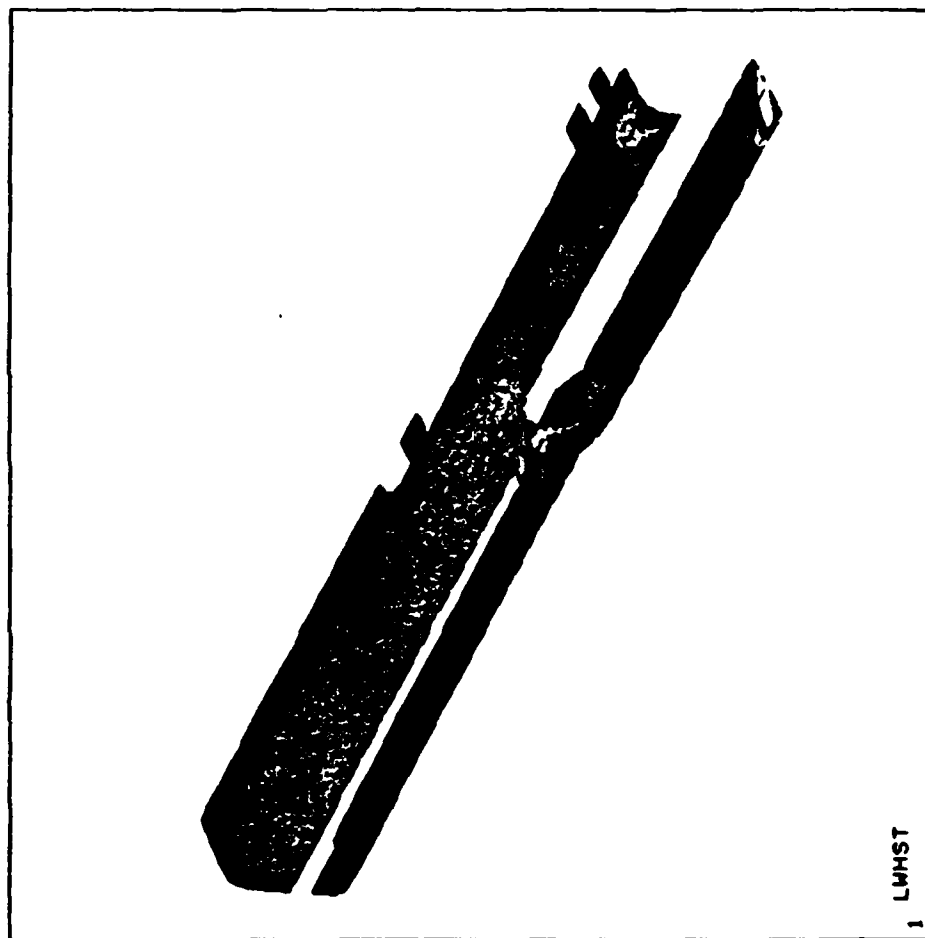
FIGURE 39
COMBINED



ANSYS 4.2B
FEB 6 1987
8:36:22
PLOT NO. 39
POST1 STRESS
STEP=3
ITER=1
SX
BOTTOM
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.74
YF=1.45
ZF=-112
HIDDEN
MX=11448
MN=-19668
-16213
-12755
-9297
-5839
-2381

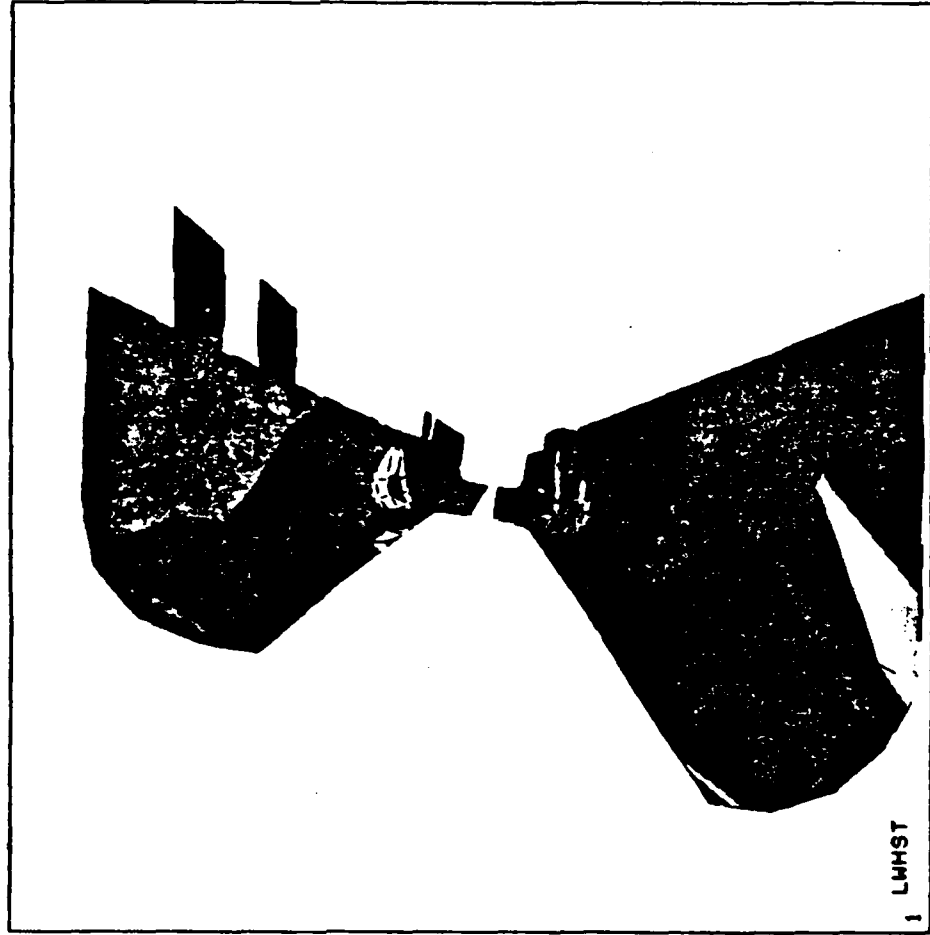
FIGURE 40
COMBINED



ANSYS 4.2B
FEB 6 1987
8:36:45
PLOT NO. 40
POST1 STRESS
STEP=3
ITER=1
SY
BOTTOM
STRESS ELEM CS

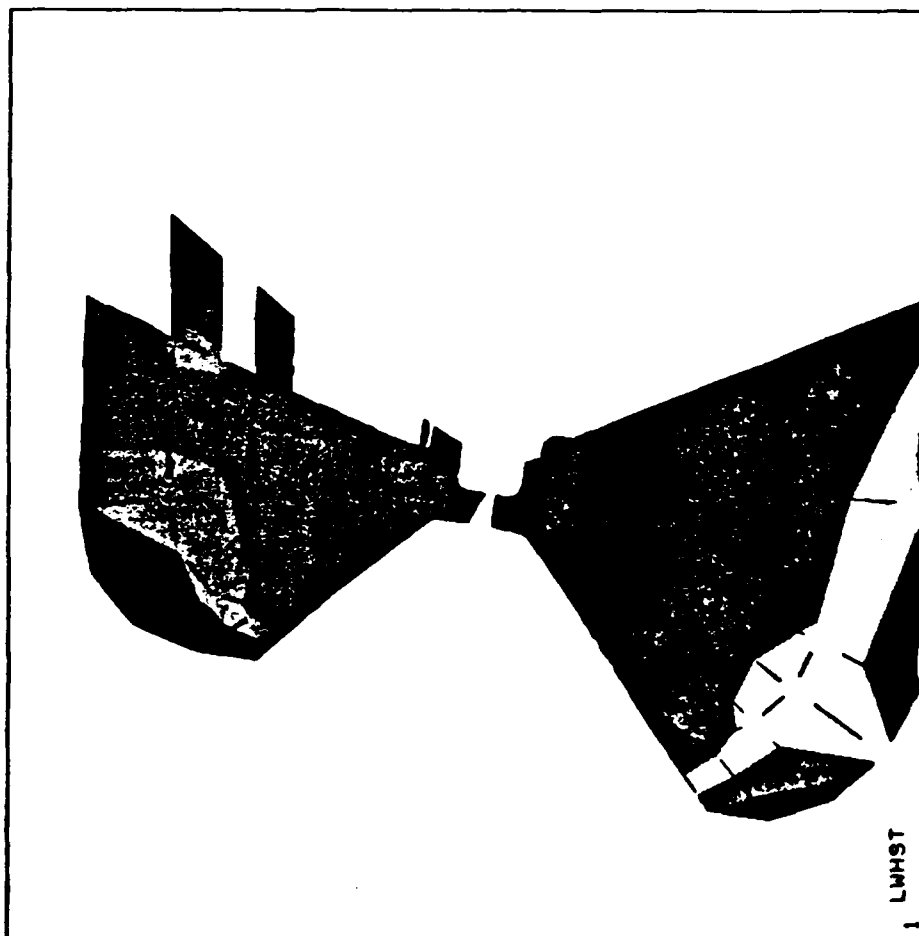
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.74
YF=1.45
ZF=-112
HIDDEN
MX=18720
MN=-18352
-14236
-10116
-5996
-1876
2244
1.0E+06
1.0E+06

FIGURE 41
COMBINED



ANSYS 4.2B
FEB 6 1987
8:37:11
PLOT NO. 41
POST1 STRESS
STEP=3
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=11448
MN=-19668
-16213
-12755
-9297
-5839
-2381
7993
11451

FIGURE 42
COMBINED



ANSYS 4.2B
FEB 6 1987
8:37:38
PLOT NO. 42
POST1 STRESS
STEP=3
ITER=1
SY
BOTTOM
STRESS ELEM CS

ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=18720
MN=-18352
-14236
-10116
-5996
-1876
2244

14604
18724

FIGURE 43
COMBINED

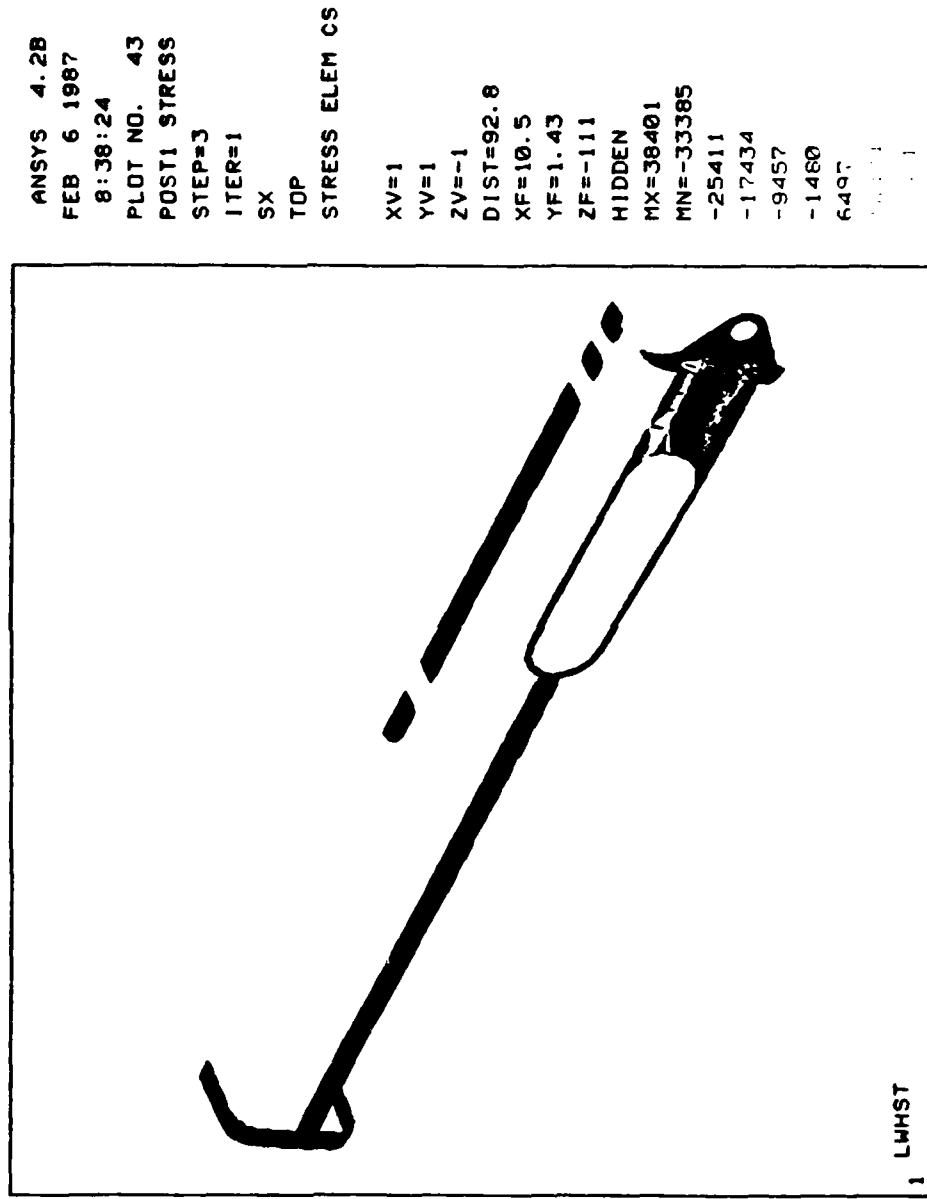
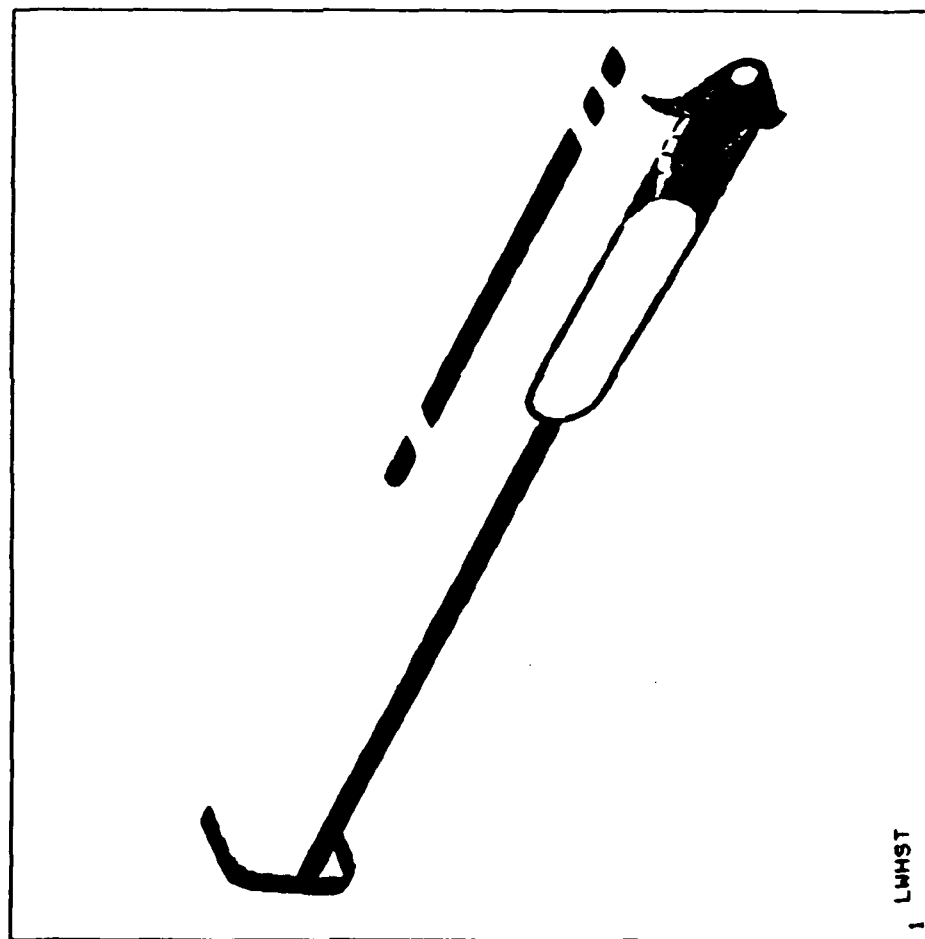


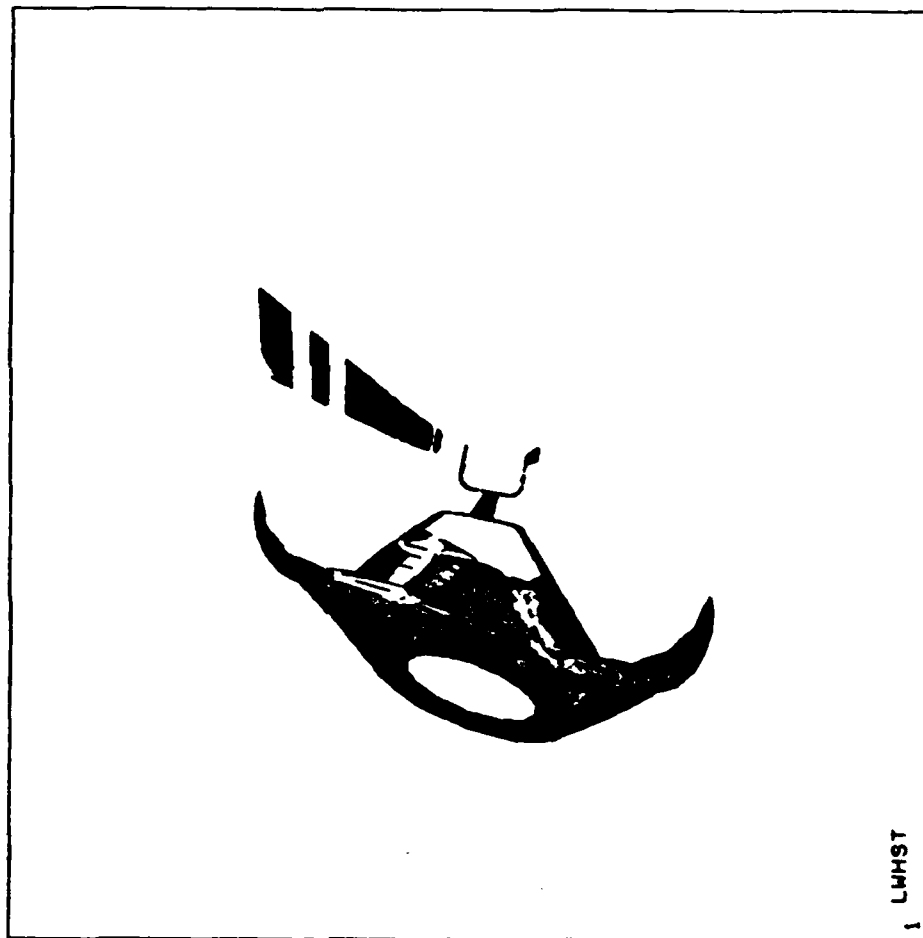
FIGURE 44
COMBINED



1 LWHST

ANSYS 4.2B
FEB 6 1987
8:38:37
PLOT NO. 44
POST1 STRESS
STEP=3
ITER=1
SY
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.8
XF=10.5
YF=1.43
ZF=-111
HIDDEN
MX=21013
MN=-24667
-19593
-14517
-9441
-4365
711

FIGURE 45
COMBINED



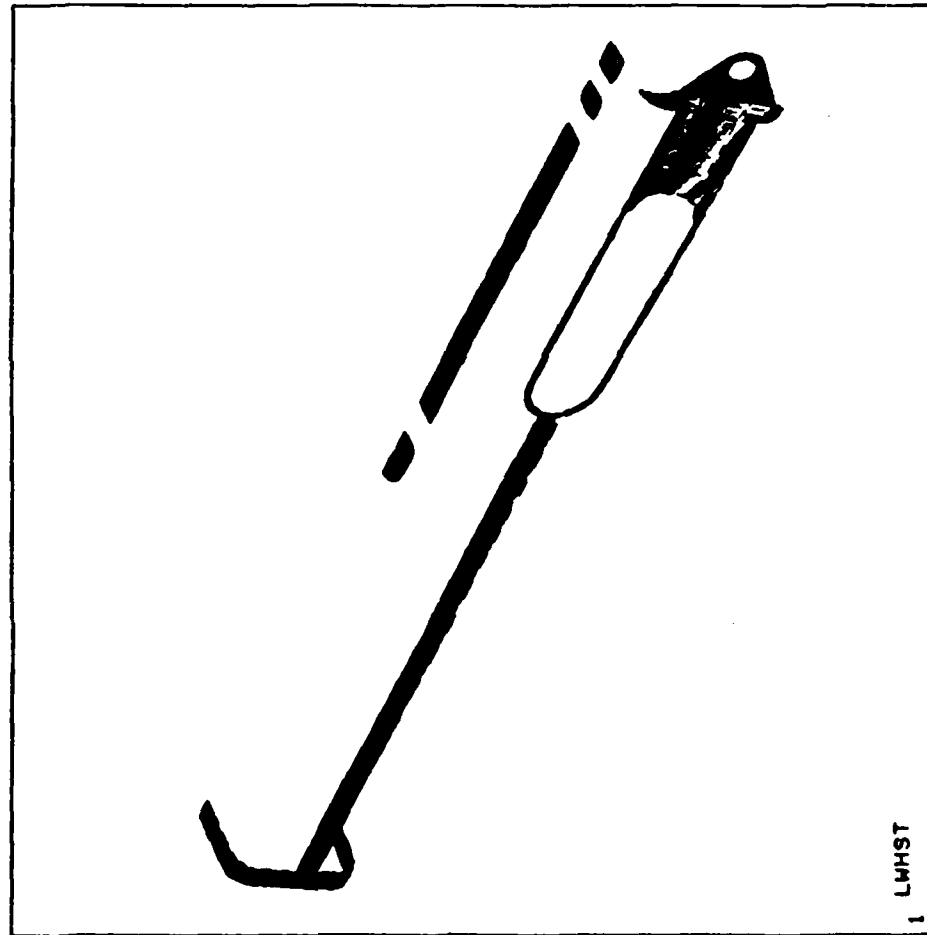
ANSYS 4.2B
FEB 6 1987
8:38:52
PLOT NO. 45
POST1 STRESS
STEP=3
ITER=1
SX
TOP
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=38401
MN=-33385
-25411
-17434
-9457
-1480
6497
30428
38405

FIGURE 46
COMBINED



ANSYS 4.2B
FEB 6 1987
8:39:06
PLOT NO. 46
POST1 STRESS
STEP=3
ITER=1
SY
TOP
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=21013
MN=-24667
-19593
-14517
-9441
-4365
711
15939
21015

FIGURE 47
COMBINED



ANSYS 4.28
FEB 6 1987
8:39:31
PLOT NO. 47
POST1 STRESS
STEP=3
ITER=1
SX
BOTTOM
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=92.8
XF=10.5
YF=1.43
ZF=-111
HIDDEN
MX=32552
MN=-36544
-28869
-21191
-13513
-5835
1843

FIGURE 48
COMBINED

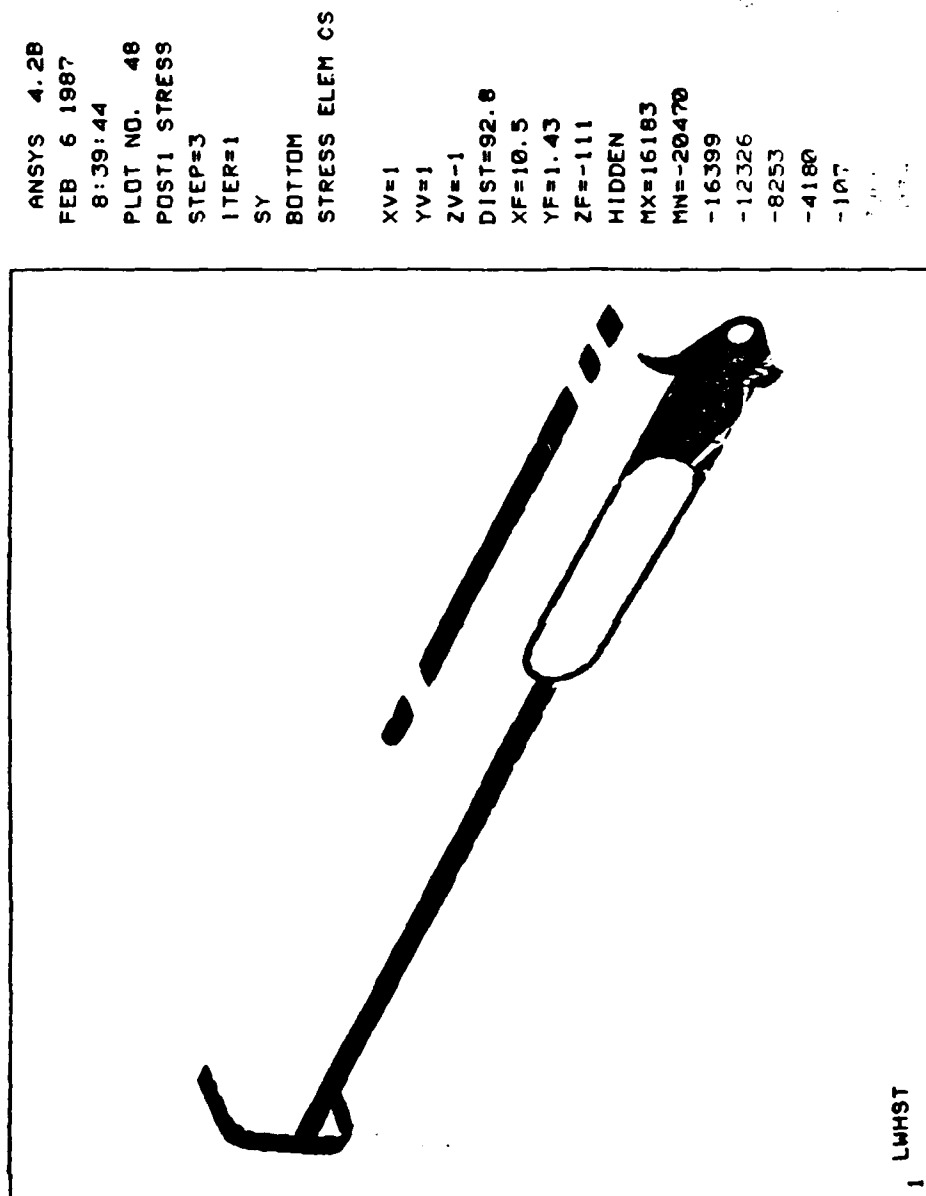
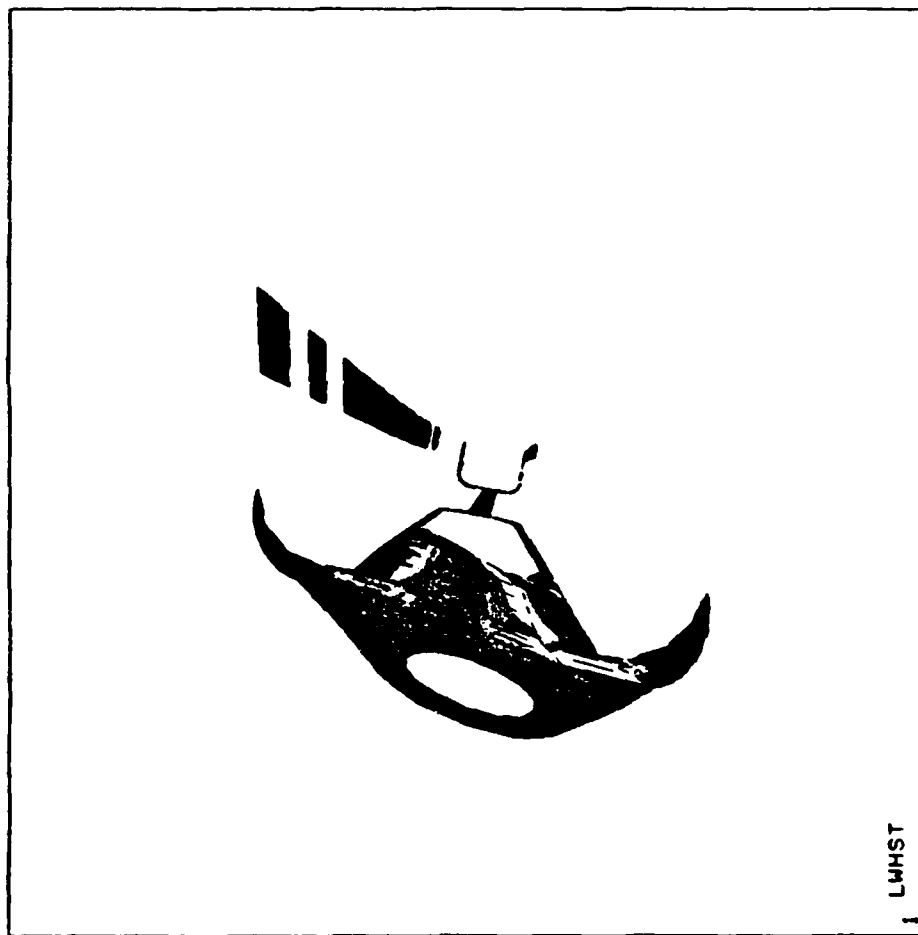
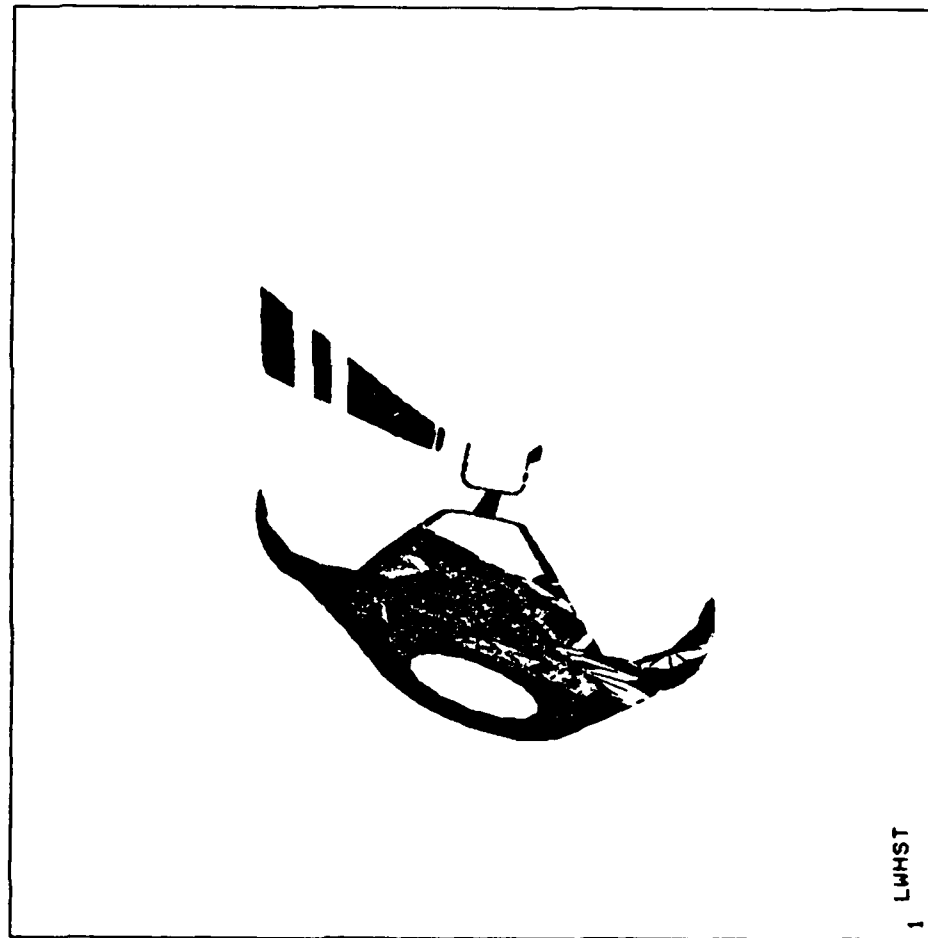


FIGURE 49
COMBINED



ANSYS 4.2B
FEB 6 1987
8:40:07
PLOT NO. 49
POST1 STRESS
STEP=3
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=32552
MN=-36544
-28869
-21191
-13513
-5835
1841
24877
32555

FIGURE 58
COMBINED

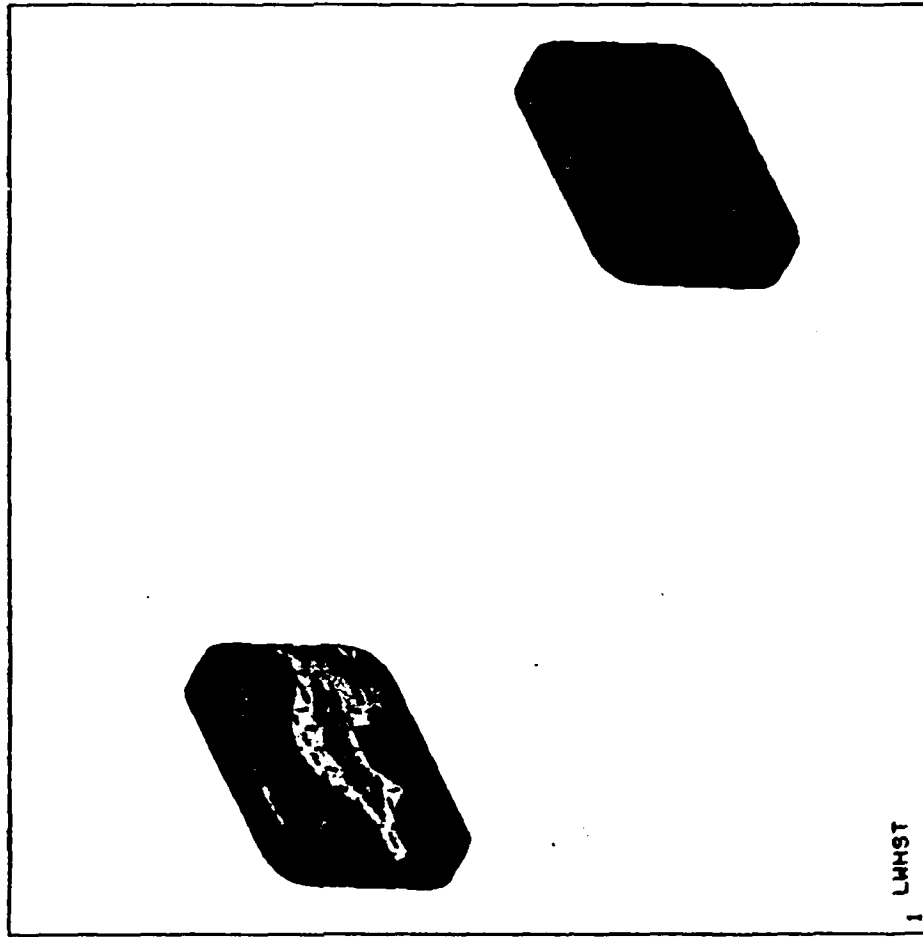


ANSYS 4.2B
FEB 6 1987
8:40:20
PLOT NO. 50
POST1 STRESS
STEP=3
ITER=1
SY
BOTTOM
STRESS ELEM CS

ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=16183
MN=-20470
-16399
-12326
-8253
-4180
107

12112
16185

FIGURE 51
COMBINED



ANSYS 4.2B
FEB 6 1987
8:41:04
PLOT NO. 51
POST1 STRESS
STEP=3
ITER=1
SIDE
BOTTOM
XV=1
YV=1
ZV=-1
DIST=59.9
YF=1.63
ZF=-52
HIDDEN
MX=3423
MN=25.9
401
779
1157
1535
1913
3047
3425

D2/270

COMPUTER RESULTS - MODEL 11

/FRGEE-1
 /FRGEE-2
 /TITL-1
 /TITL-2
 /TITL-3
 /TITL-4
 /TITL-5
 /TITL-6
 /TITL-7
 /TITL-8
 /TITL-9
 /TITL-10
 /TITL-11
 /TITL-12
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 /TITL-89
 /TITL-90
 /TITL-91
 /TITL-92
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 /TITL-94
 /TITL-95
 /TITL-96
 /TITL-97
 /TITL-98
 /TITL-99
 /TITL-100

LTND CRADLE

Model 11

RCVD

LJL

2-9-87

f 2-5 w

#15, #1
 #16, #1
 #17, #110
 #121, #12
 #12
 #133, #13
 #141
 #147, #14
 #153
 #164, #4
 TYPE=1
 #165, #4, #12
 #15, #17
 #10, #44
 #19, #71
 #14, #78
 #13, #15
 #18, #92
 #16, #101
 #10, #107
 #112, #113
 #164, #5
 TYPE=1
 #165, #51
 #14
 #13
 #18
 #19
 #12
 #12
 #10
 #10, #
 #111
 #12
 #125
 #128
 #134
 #137
 #140
 #148
 #146
 #134
 #140, #7
 TYPE=1
 #165, #4
 #18
 #12
 #18
 #104
 #114
 #140, #8
 TYPE=1
 #165, #114, #115
 #120, #127
 #165, #130, #102
 #130, #13
 #140, #141
 #150, #151
 #140, #6
 TYPE=1
 #165, #10
 #10
 #13
 #10
 #14
 #17

REAL,11
TYPE,2
APES,124,167
C=00
ELEM,16
TYPE,2
APES,124,167
C=00
MODIFY TOP ELEMENTS FOR ADDED CCRS
TYPE,1
REAL,6
EPOC,240,231,5
C=30
TYPE,1
REAL,7
EPC,520,532,6
C=00
PALIFC,15
NPRS,1,15
REEL,2,1,4,1,0,0,CC1
REEL,2,5,11,1,0,0,1
REEL,2,10,15,1,0,0,CC1
RFUS,1,15
REEL,2,11,0,12,1,0,4,5,6
REEL,2,12,0,0,0,0,4,5,6
REEL,2,15,0,15,0,1,0,0,0
REEL,2,16,0,0,0,1,0,0,0
REEL,2,0,0,0,0,1,0,0,0
C=15,13
L=117,116,3
C=15,11
L=135,140,3
C=15
A=95,10,0,0,0,0,0,0,0
A=100,11,0,1,0,0,0,0,0
A=110,117,1,0,0,0,0,0,0
A=200,0,0,0,0,0,0,0,0
A=207,1,0,0,0,0,0,0,0
A=107,1,0,0,0,0,0,0,0
A=155,110,1,0,0,0,0,0,0
A=237,2,0,0,0,0,0,0,0
A=205,1,0,0,0,0,0,0,0
A=105,1,0,0,0,0,0,0,0
A=100,1,0,0,0,0,0,0,0
A=235,2,0,0,0,0,0,0,0
A=216,1,0,0,0,0,0,0,0
A=100,1,0,0,0,0,0,0,0
A=170,1,0,0,0,0,0,0,0
A=170,1,0,0,0,0,0,0,0
A=215,2,0,0,0,0,0,0,0
A=217,1,0,0,0,0,0,0,0
A=167,1,0,0,0,0,0,0,0
A=177,1,0,0,0,0,0,0,0
A=200,2,0,0,0,0,0,0,0
A=215,1,0,0,0,0,0,0,0
A=105,1,0,0,0,0,0,0,0
A=105,1,0,0,0,0,0,0,0
A=201,2,0,0,0,0,0,0,0
A=215,1,0,0,0,0,0,0,0
A=105,1,0,0,0,0,0,0,0
A=175,1,0,0,0,0,0,0,0
A=200,2,0,0,0,0,0,0,0
A=200,1,0,0,0,0,0,0,0
A=200,1,0,0,0,0,0,0,0

C=00 PY,1510,2
C=00 PY,4510,4
C=00 PY,1,13,2
C=00 PY,4513,4
C=00 PY,226,2
C=00 PY,5054,4
C=00 PY,2201,2
C=00 PY,5051,4
LPR,1,5CC
FINI
/EXEC
/INP,27
/INP,23
FINI
/EOF

D2/271

COMPUTER RESULTS - MODEL 11

***** ANALYSIS INPUT DATA LISTING (FILE 1) *****

```
1 /COPPER/200000
2 /PAC/2
3 /PAC/2
4 /PAC/2
5 /PAC/2
6 /PAC/2
7 /PAC/2
8 /PAC/2
9 /PAC/2
10 /PAC/2
11 /PAC/2
12 /PAC/2
13 /PAC/2
14 /PAC/2
15 /PAC/2
16 /PAC/2
```

LTHD CRADLE
Model 11

RCVD
LJL
2-9-87

***** REPORT REQUEST FROM /COPPER *****
PACIPUM FINEC
PACIPUM TEMP
PACIPUM VIRTUAL 200000

***** REPORT OBTAINED *****
FINEC = 200000
TEMP =
VIRTUAL 200000

***** PLOTS FOR PLOTS (PACIPUM ACCES)

PAETI - ENGINEERING ANALYSIS SYSTEM, RELEASE 4.2.2 (1988)
(C) SHARON ANALYSIS SYSTEMS, INC. MCLESTER PENNSYLVANIA 15342
FOR SUPPORT CALL WAKA ACCOUNTER PHONE (403) 736-1036 TWR

JJA 1,1985

9.5500 FEB 6,1987 CPU 2.276

/P0311

***** ANALYSIS RESULTS INTERPRETATION (P10311) *****

STAGE FOR ELEMENT TYPE STEP 4 PREP STEP 1

PARAMETER 2 1.000 1.000 0.

BEGIN MACRO PAC

USE LOAD STEP 1 ITERATION 1 SECTION 1 FOR LOAD CASE 1

*** NOTE *** PLOT12 CONTAINS STRESS ELEMENTS.
P10 STRESSES ARE NOT AVAILABLE FOR THESE ELEMENTS.
SELECT TOP CA SECTION STRESSES.

ELEMENTARY STORED FOR 10214 NODES 1012 ELEMENTS
TITLE= LONST

DISPLACEMENT STORED FOR 10214 NODES

STRESSES STORED FOR 1 SELECTED STOPS

GLOBAL STRESSES AND TENSEL STORED FOR 1516 ELEMENTS

ITERATION SUPPLY INFORMATION STORED

GLOBAL FORCES STORED FOR 1012 ELEMENTS

REACTIONS STORED FOR 15 REACTIONS

FOR LOAD STEP 1 ITERATION 1 SECTION 1
TIME = 0.000000
TITLE= LONST

MODE FOR LABEL MODE FROM 1000 TO 1002 BY 1

12 MODES (CF 0466 REFINED) SELECTED BY NAME COMPARE.

PRINT MODAL DISPLACEMENTS

INSTE - ENGINEERING ANALYSIS SYSTEMS - AFFIDAVIT 4.2 B (PER)
 (C) SHAWSON ANALYTICAL SYSTEMS, INC. HOUSTON, PENNSYLVANIA 15342
 FOR SUPPORT CALL MARK RECAPPER PHONE (408) 726-1036 TX

JUN 1 1985

9.6CT5 FEB 6 1957 CPO 62.642

LDHST

***** POST1 ACCEL DISPLACEMENT LISTING *****

ACCEL STEP 1 ITERATION 1 SECTION 1
 TIME= C. LOAD CASE= 1

THE FOLLOWING X,Y,Z DISPLACEMENTS ARE IN INCHES. COORDINATES

Recoil

NODE	UX	UY	UZ	ROTX	ROTY	ROTZ
10001	-C.7826509E-11	-2.339J50E	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10002	-C.1472650E-11	-1.572E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10003	-C.6445537E-11	-1.56E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10004	-C.282272E-11	-1.56E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10005	-C.445537E-11	-1.56E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10006	-C.445537E-11	-1.56E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10007	-C.445537E-11	-1.56E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10008	-C.445537E-11	-1.56E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10009	-C.445537E-11	-1.56E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10010	-C.445537E-11	-1.56E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10011	-C.445537E-11	-1.56E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13
10012	-C.445537E-11	-1.56E-12	C.	0.7826509E-11	-C.1462240E-13	-C.2371652E-13

PARAMS 10012 10011 10004 10001 10012
 ACCE VALUE -C.1472650E-11 -C.2371652E-13 -C.2371652E-13 -C.2371652E-13 -C.2371652E-13

BASE FOR LABELS STEP FROM 4 TO 4.7 1

* ELEMENTS (CF 101E DEFINED) SELECTED BY BASE COMMAND.

PRINT ELEMENT STRESS STEPS PER ELEMENT

ANST - ENGINEERING ANALYSIS SYSTEMS REVISION 4.2 P (PCB)
(C) SWANSON ANALYSIS SYSTEMS, INC. HOLSTEN, PENNSYLVANIA 15502
FOR SUPPORT CALL PARK ROCHAMBER PHONE (408) 726-1636 TWX

JUN 1, 1985

9.6086 FEB 6, 1987 CPU 64.761

***** POST1 ELEMENT STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
TIME= C. LOAD CASE= 1

ELEM FAX
1610 C-65280755
1611 C-65280816
1612 C-65280755
1613 C-65280816

1610 ELEMENTS (CF 1613 DEFINED) SELECTED BY BALL COMMAND.

END PACNC

EXECUTE PACNC MAC 2 TYPES WITH MULTIPLIER FROM 1 TO 2 IN STEPS OF 1

USE LOAD STEP 2 ITERATION 1 SECTION 1 FOR LOAD CASE 1

DISPLACEMENT STORED FOR 1610A NODES

STRESSES STORED FOR 1 SELECTED STEPS

ACTUAL STRESSES AND TEMPS. STORED FOR 1610 ELEMENTS

ITERATION SUPPLY INFORMATION STORED

ACTUAL FORCES STORED FOR 1610 ELEMENTS

REACTIONS STORED FOR 15 REACTICS

FOR LOAD STEP= 2 ITERATION= 1 SECTION= 1
TIME= C. LOAD CASE= 1
TITLE= LHM17

ASSE FOR LABEL= ACDE #PCP 10001 TO 10012 BY 1

12 MODES (CF 4268 DEFINED) SELECTED BY ARTE COMMAND.

PRINT MODAL DISPLACEMENTS

ANSTS - ENGINEERING ANALYSIS SYSTEM REVISION 4.2.9 (RCH)
(C) SHAPSON ANALYSIS SYSTEMS, INC. HOLLISTON, PENNSYLVANIA 15362
FOR SUPPORT CALL PARK RECDARPER PHONE (412) 726-1626 TX

JUN 1, 1985

9.6322 FEB 6, 1987 CP= 97.532

***** PCST11 NODAL DISPLACEMENT LISTING *****

LOAD STEP 2 ITERATION= 1 SECTION= 1
TIME= C. LGAE CASE= 1

fyne

THE FOLLOWING X,Y,Z DISPLACEMENTS ARE IN NODAL COORDINATES

NODE	LX	LY	LZ	ROTX	ROTY	ROTZ
100C1	-C.41C34112	-C.75329233E-C6	0.	0.23545177E-08	-C.31948454E-02	C.41800036E-01
100C2	-C.42722446	-C.47120879E-C6	0.	C.25C19603E-08	-C.31948454E-C2	C.41800036E-01
100C3	-C.4C812144	-C.42737156E-C6	0.	0.22824130E-08	-C.315711C5E-C2	0.41788877E-01
100C4	-C.34219C0E-C6	-C.34219C0E-C6	0.	C.21588403E-08	-C.27578725E-02	C.41728631E-01
100C5	-C.1C754353	-C.2424622E-C6	0.	0.22678553E-08	-C.3028251E-C2	C.41668386E-01
100C6	-C.8516223E-C1	-C.2125922E-C6	0.	0.22728479E-08	-C.3C586C14E-02	C.41661C78E-C1
100C7	C.	C.	C.	-C.31584171E-C2	C.	-C.22C84476E-C2
100C8	-C.44829512E-C1	C.356C2282	0.34570917E-C1	-C.31584193E-02	-C.97378196E-18	-C.22C84476E-02
100C9	-C.93859C34E-C1	C.782C4359	0.45111852E-C1	-C.31584210E-02	-C.13172230E-17	-C.22C84476E-02
100C10	C.	C.	C.	C.31584233E-02	C.	-C.22C84476E-02
100C11	-C.44829512E-C1	-C.356C2282	-C.34571C24E-C1	0.31984230E-02	-C.97378196E-18	-C.22C84476E-02
100C12	-C.93859C34E-C1	-C.782C4359	-C.45111969E-C1	0.31984208E-02	-C.14094628E-17	-C.22C84476E-02

PARAPLVS 100C1 10C12 10C10 100C1
ACOE 100C1 10C12 10C10 100C1
VALOF -C.81C34112 -C.752C4E50 -C.752C4E50 -C.31948454E-C2 C.41800036E-C1

BASE FOR LABEL= STEP PCY 4 TO 4 BY 1

4 ELEMENTS (CF 1418 OFFINED) SELECTED BY ERSE COMPAND.

PRINT ELEMENT STRESS STEPS PER ELEMENT

ALPHA - CALCULATING STRESS AND STRAIN FOR ALL ELEMENTS
(1) LOADS AND STRESSES FOR ALL ELEMENTS
FOR SUPPORT CASES AND STRESS FOR ALL ELEMENTS

JUN 1, 1965

0.0331 PER 0.0157 CPM 09.109

UNIT

***** PERCENT ELEMENT STRESS LISTING *****

LOAD STEP 1 STRESSING 1 SECTION 1
100% C.

STEP 100%
100%
100%
100%
100%

10% ELEMENTS OF 10% APPLIED STRESS BY ALL ELEMENTS

USE LOAD STEP 1 STRESSING 1 SECTION 1 FOR LOAD CASE 1

DISPLACEMENT STRESS FOR ALL ELEMENTS

STRESS STEP 1 1 SECTION 1

LOCAL STRESS AND TENSILE STRESS FOR ALL ELEMENTS

ITERATION SUPPORTING STRESS

LOCAL STRESS STEP 1 1 SECTION 1

ITERATION STRESS FOR 1 SECTION 1

FOR LOAD STEP 1 STRESSING 1 SECTION 1

100% C.

100% C.

100% C.

10% ELEMENTS OF 10% APPLIED STRESS BY ALL ELEMENTS

UNIT

STATE - PENNSYLVANIA
 COUNTY - ALLEGANY
 TOWNSHIP - ALLEGANY
 FOR ALLEGANY COUNTY RECORDS
 (100)
 ALLEGANY PENNSYLVANIA 15340
 15340

JUL 1, 1963

9.4331 PLS 6,106.7 CPM 131.340

ALLEGANY COUNTY RECORDS LISTING

ALLEGANY COUNTY RECORDS LISTING
 TOWN C. ALLEGANY TOWNSHIP 1

ALLEGANY
 15340
 15340
 15340
 15340
 15340

15340 ALLEGANY COUNTY RECORDS LISTING AT LALL COMPANY.

ALLEGANY COUNTY RECORDS LISTING AT LALL COMPANY.

ALLEGANY COUNTY RECORDS LISTING AT LALL COMPANY.

ALLEGANY COUNTY RECORDS LISTING AT LALL COMPANY.

D2/280

MCR MEMO: FEBRUARY 11, 1987

MCR

ASSOCIATES, INC.

111 W. Evelyn Ave., Suite 301
Sunnyvale, California 94086
(408) 736-1636

February 11, 1987

Wark

Larry Libhardt
FMC Corporation
3989 Central Ave NE
Minneapolis, Minn 55421

M-22-11

*transient
only*

Dear Larry,

Here are the results of the latest dynamics model. Figures 1 to 11 are the similar set of elements and area plots from before so you can determine the real properties. I have included a listing of the input that was used to run the transient analysis. Figure 12 is the recoil pulse in pounds. The recoil force is applied to 2 nodes so the total recoil force was divided by 2. Figure 13 is the torque pulse shown in inch-pounds per node. There are 8 nodes having the applied load and they are located 6 inches from the center-line. The same integration time constant was used for the different runs so I only used half of the torque pulse force values which accounts for the non-smooth nature of Figure 13.

CVS
JSL
2-12-87

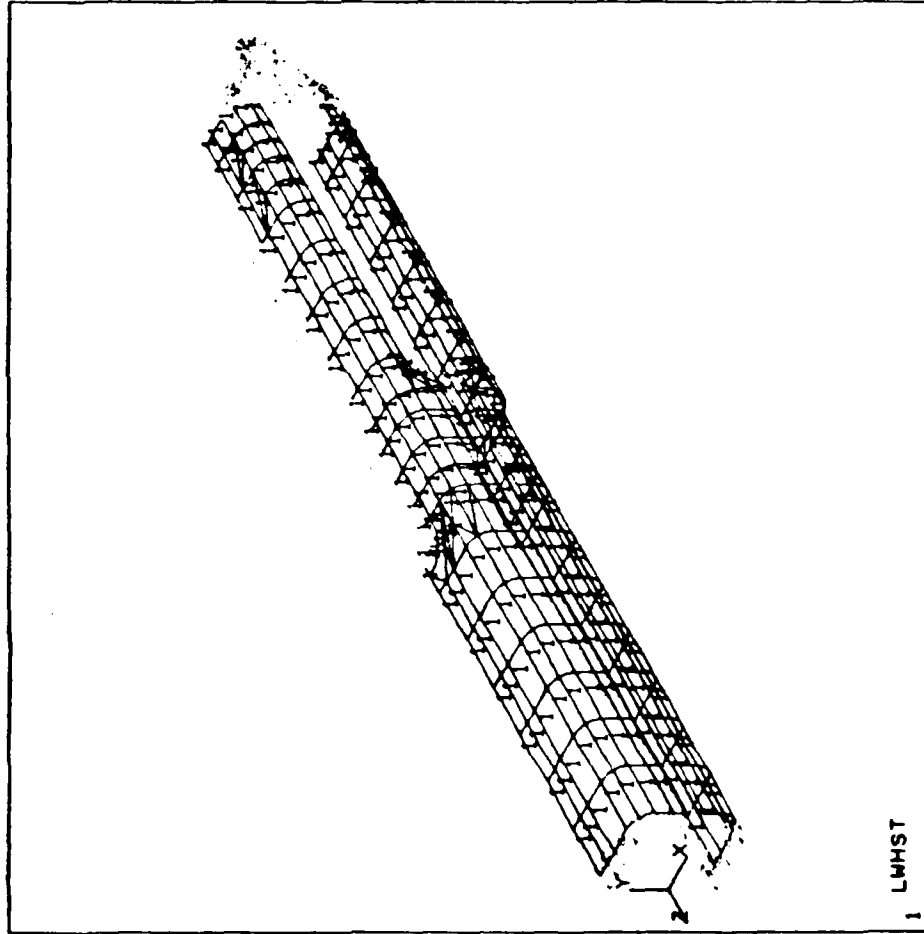
We ran the model first with the recoil force only and then did a restart for the torque case. Figures 14 to 20 are plots of displacement vs. time. Node 1353 is one of the nodes where the recoil load is applied and is located at X=6". Node 4352 is the node of the other side of the manifold in the -X direction. The rear manifold has its node numbers incremented by 500 so node 1853 is at the front surface of the middle manifold. Node 4853 is located at X=6 opposite 1853. The plot labeled ****BEX is the X displacement for the node located at the end of the barrel. The same nodes are plotted vs. time for the torque load case on Figures 21 to 27. It appears that the X displacement of the end of the barrel is much less under the torque load than we experienced before. Let me know if there is any additional work you need done.

Best regards,

Mark C. Rodamaker

Mark C. Rodamaker

FIGURE 1

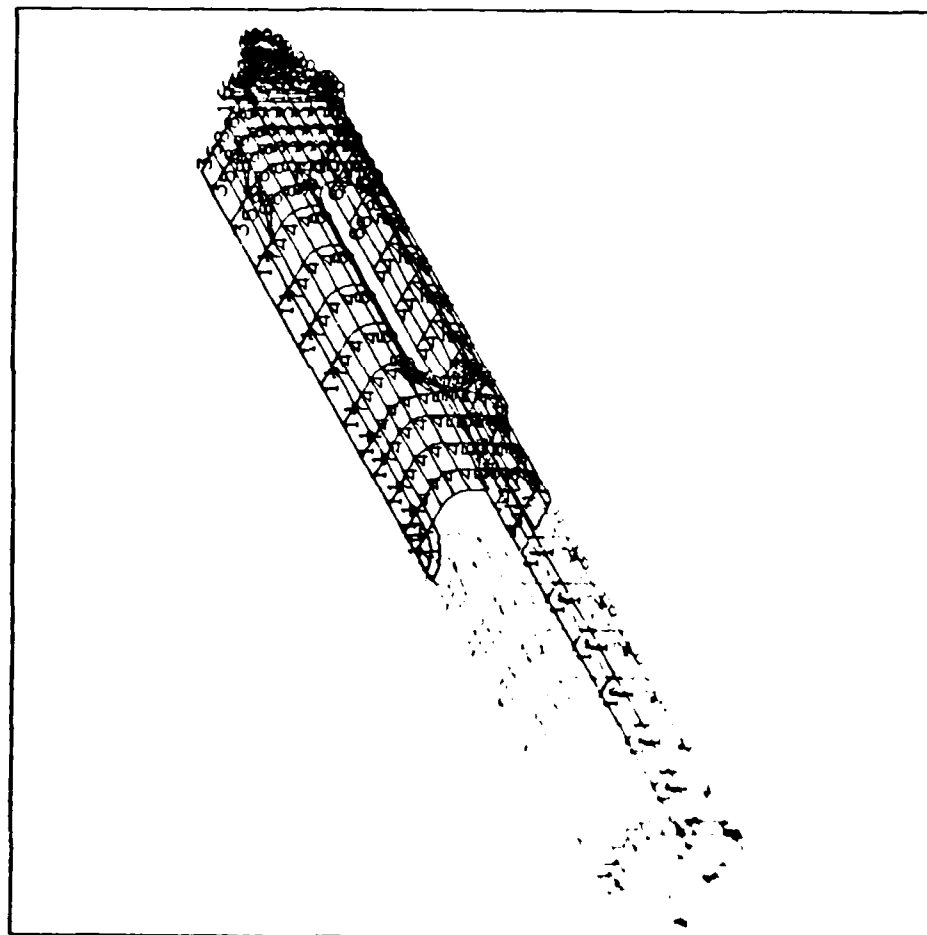


ANSYS 4.2B
FEB 9 1987
13:14:51
PLOT NO. 1
PREP7 ELEMENTS
TNUM=1

XV=1
YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.24
ZF=-115

1 LHMST

FIGURE 2



ANSYS 4.2B
FEB 9 1987
13:15:08
PLOT NO. 2
PREP7 ELEMENTS
RNUM=1

XV=1
YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.24
ZF=-115

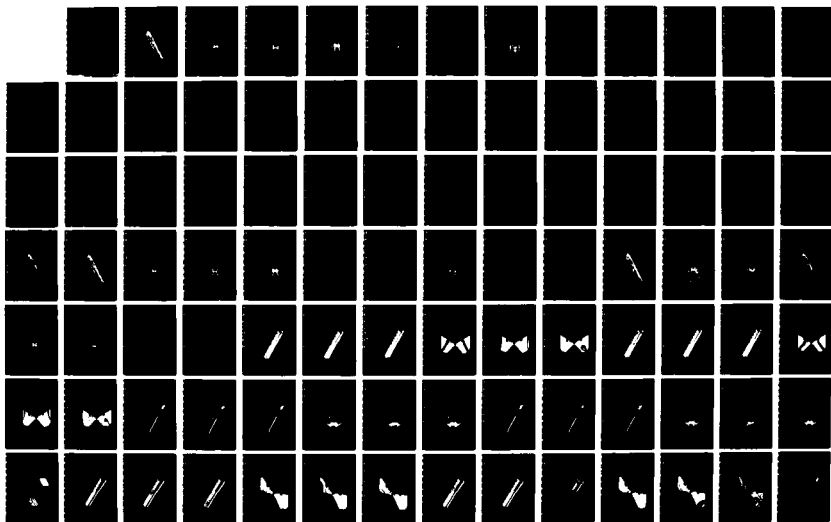
2/5

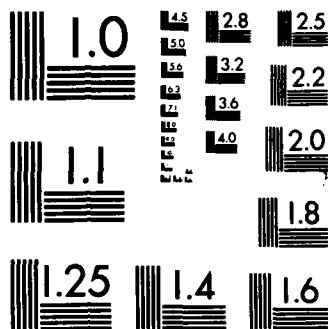
UNCLASSIFIED

ENC-F-3041-VOL-D2-PT-3 DAAA21-86-C-0047

F/G 19/6

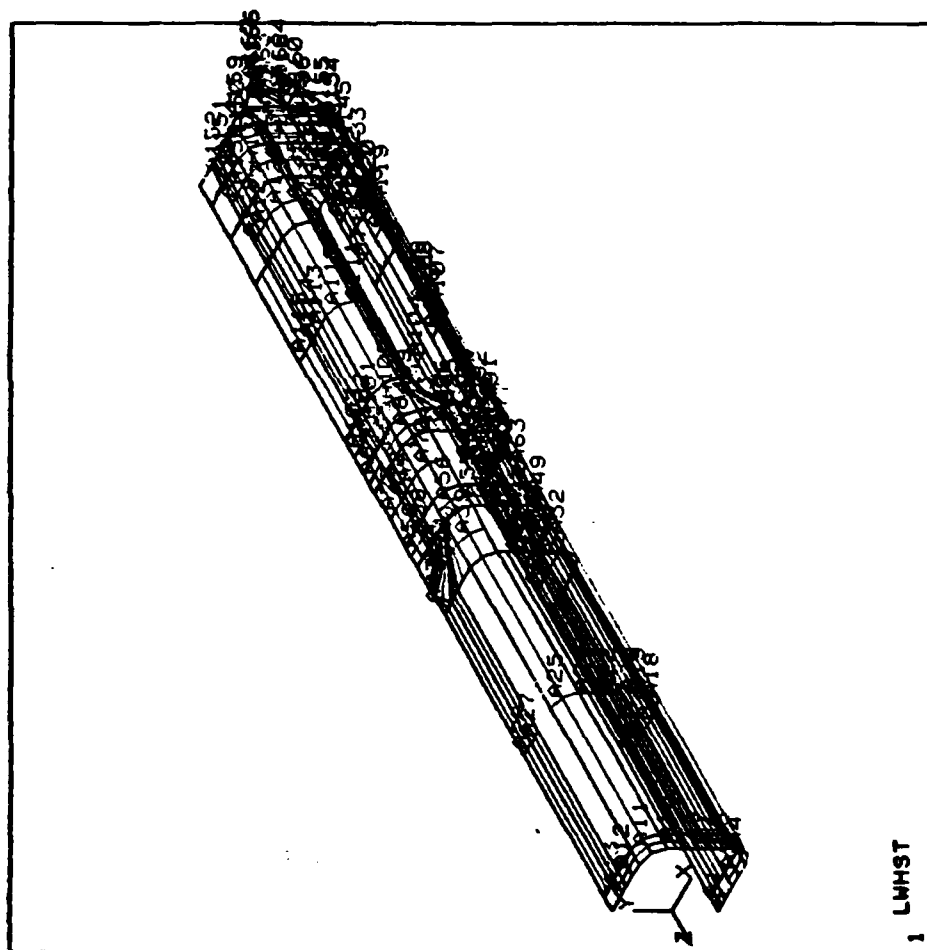
NI





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

FIGURE 3



ANSYS 4.2B
FEB 9 1987
13:15:23
PLOT NO. 3
PREP7 AREAS

XV=1
YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.33
ZF=-116

FIGURE 4

ANSYS 4.2B
FEB 9 1987
13:15:58
PLOT NO. 4
PREP7 ELEMENTS
TNUM=1

ZV=-1
* DIST=139
* ZF=-119
CONE=40

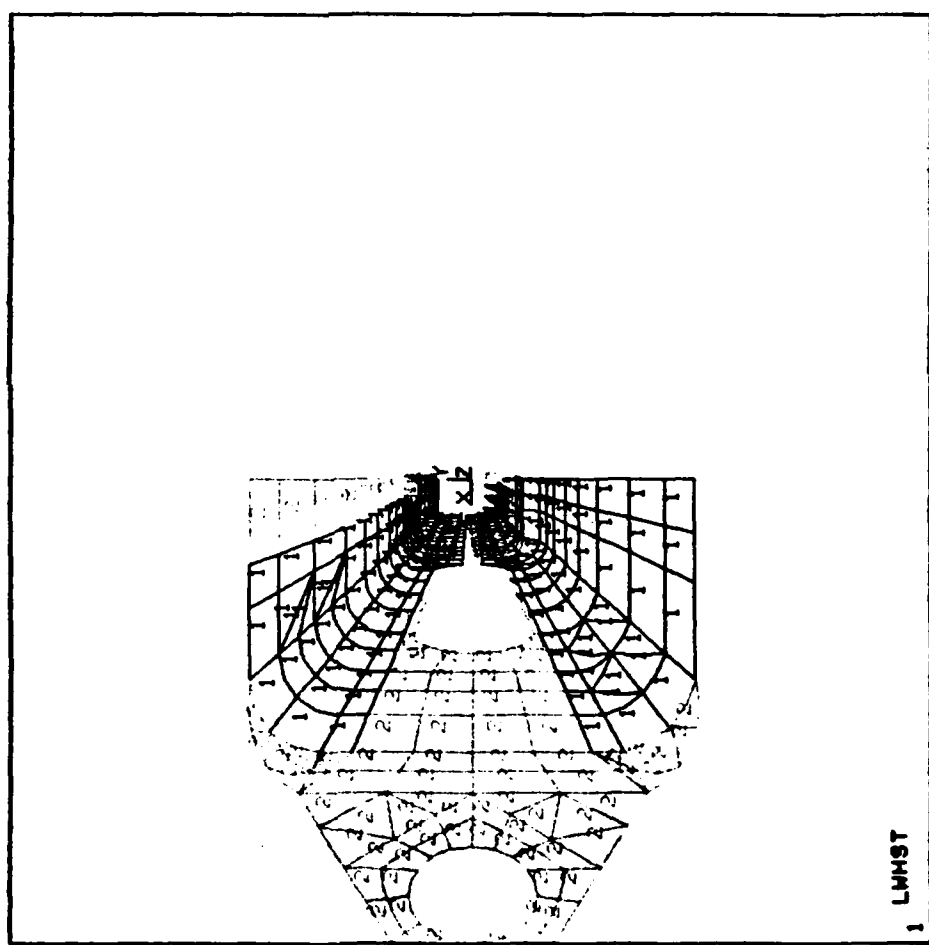


FIGURE 5

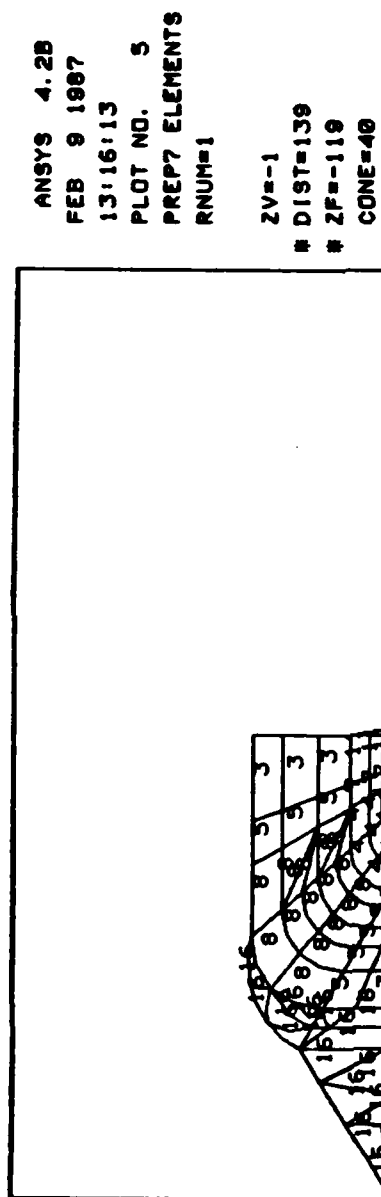
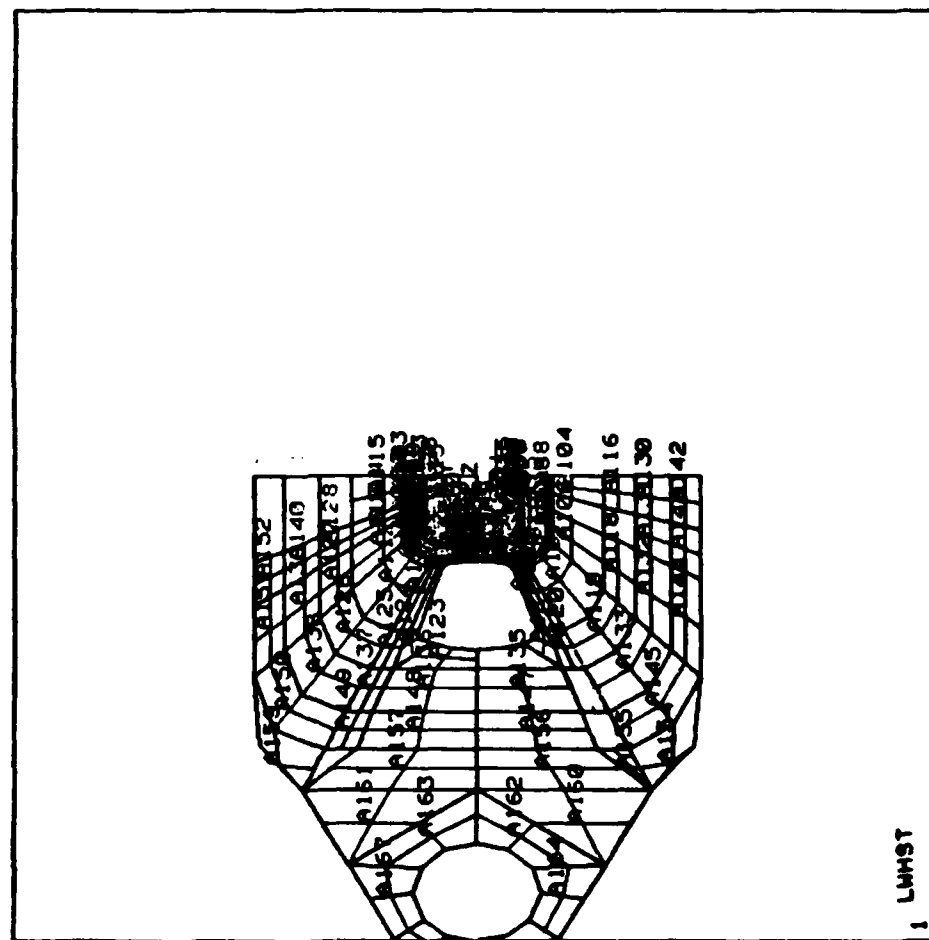


FIGURE 6

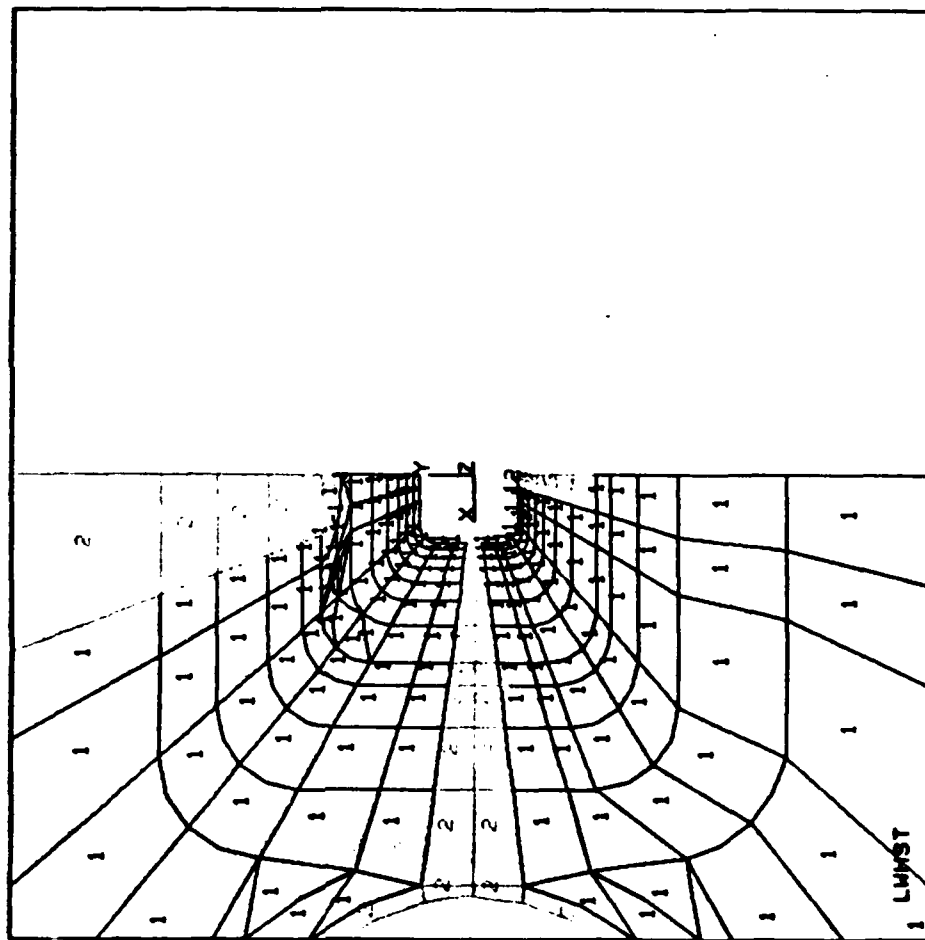


ANSYS 4.2B
FEB 9 1987
13:16:28
PLOT NO. 6
PREP7 AREAS

ZV=-1
#DIST=139
#ZF=-119
CONE=40

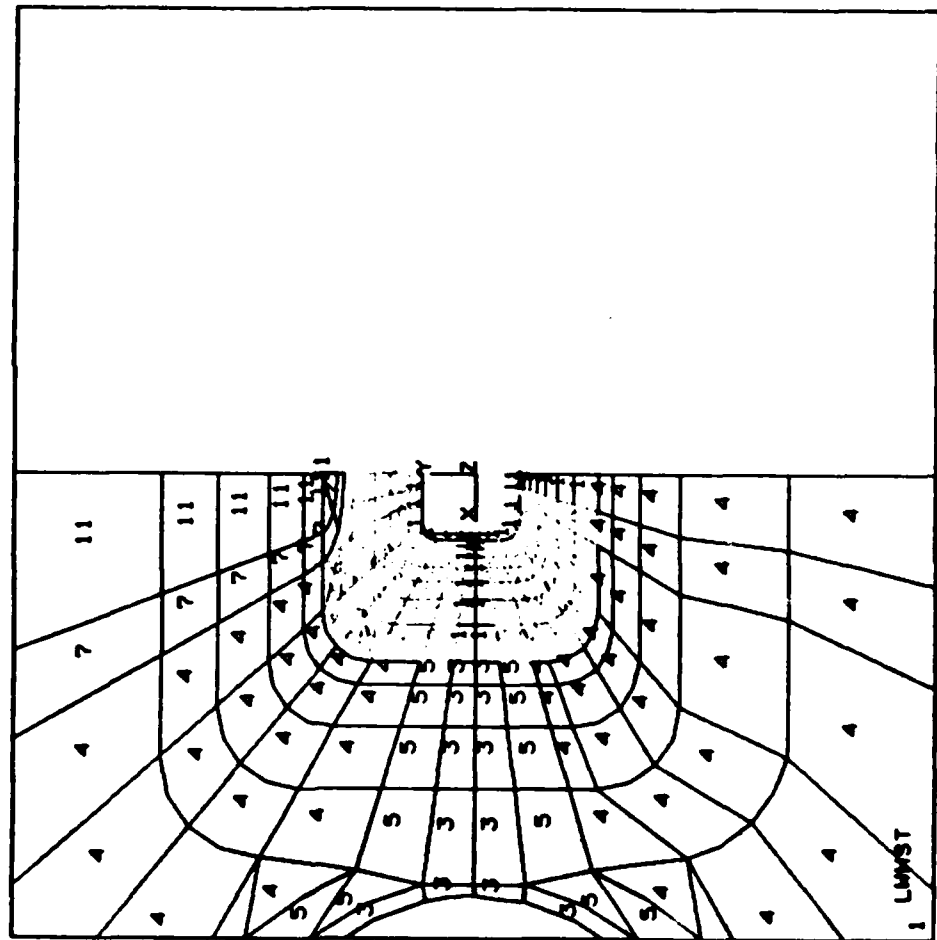
1 LHMST

FIGURE 7



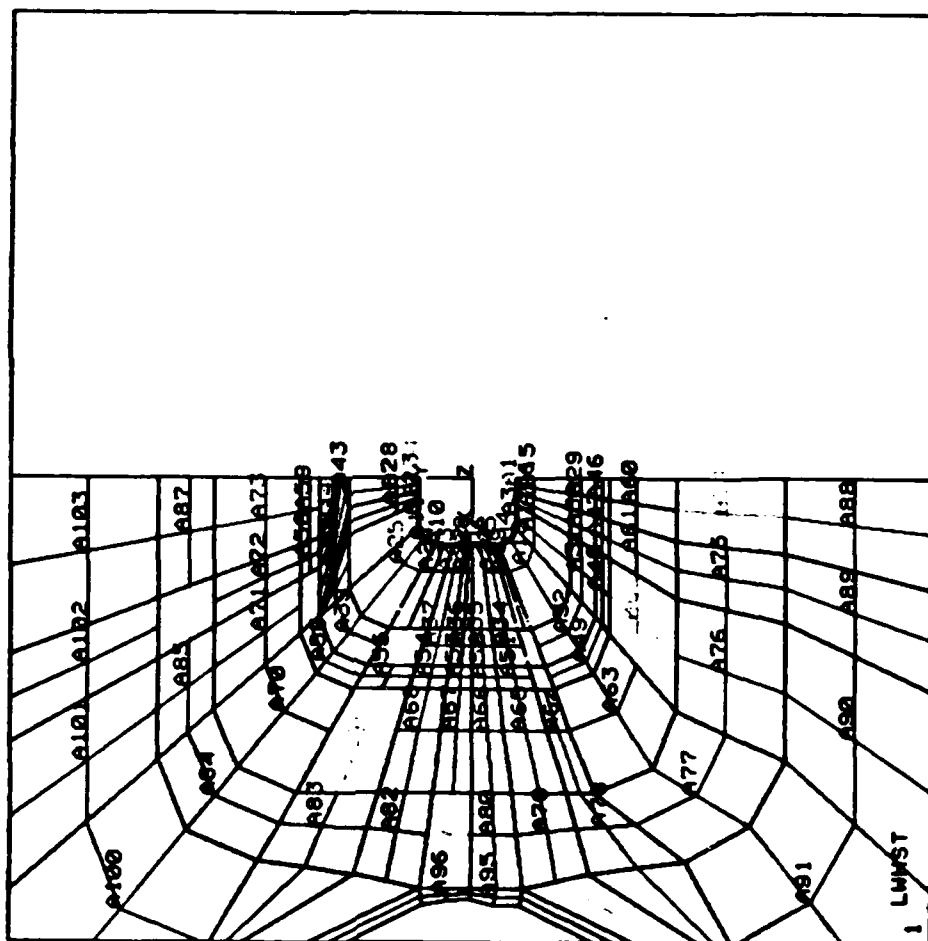
ANSYS 4.28
FEB 9 1987
13:17:01
PLOT NO. 7
PREP7 ELEMENTS
TNUM=1
ZV=-1
DIST=160
CONE=40

FIGURE 8



ANSYS 4.2B
FEB 9 1987
13:17:10
PLOT NO. 8
PREP7 ELEMENTS
RNUM=1
ZV=-1
* DIST=160
CONE=40

FIGURE 9



ANSYS 4.2B
FEB 9 1987
13:17:20
PLOT NO. 9
PREP7 AREAS

ZV=-1
DIST=160
CONE=40

FIGURE 10

ANSYS 4.2B
FEB 9 1987
13:17:44
PLOT NO. 10
PREP7 ELEMENTS
RNUM=1
XV=1
YV=1
ZV=1
DIST=160

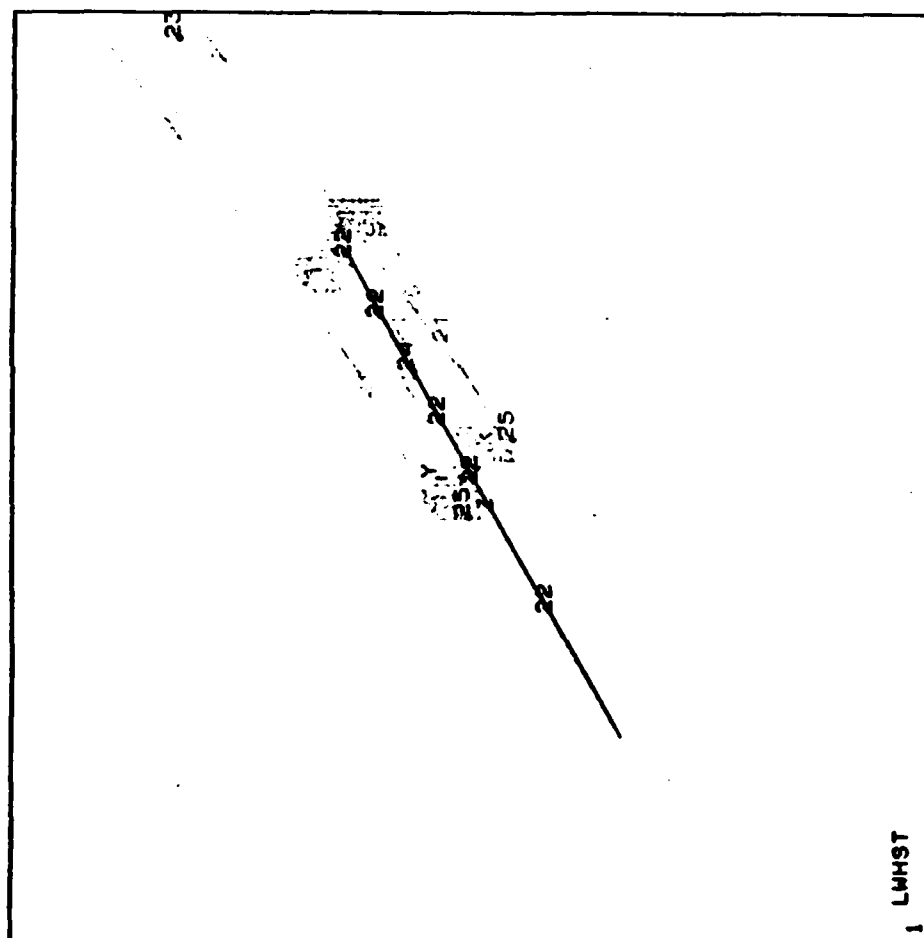


FIGURE 11

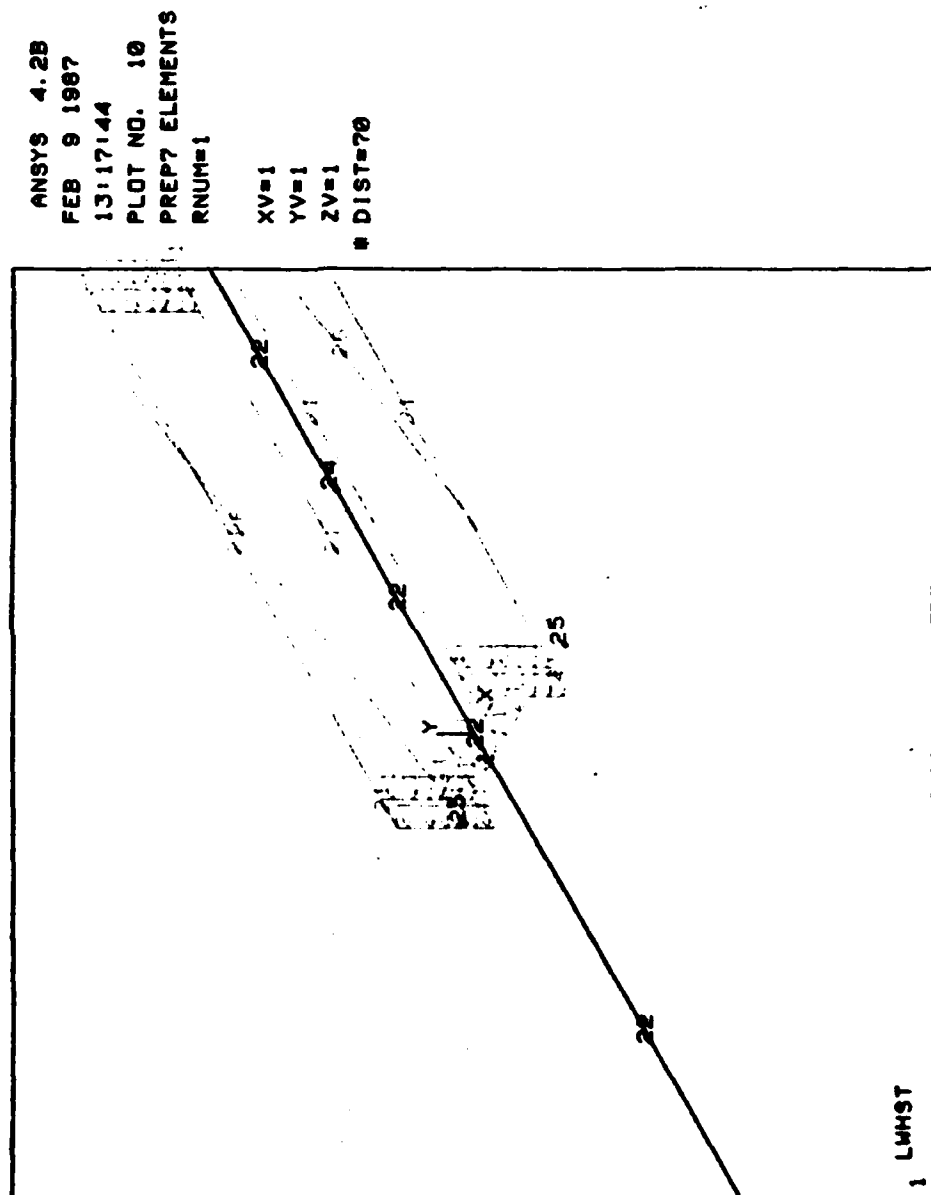
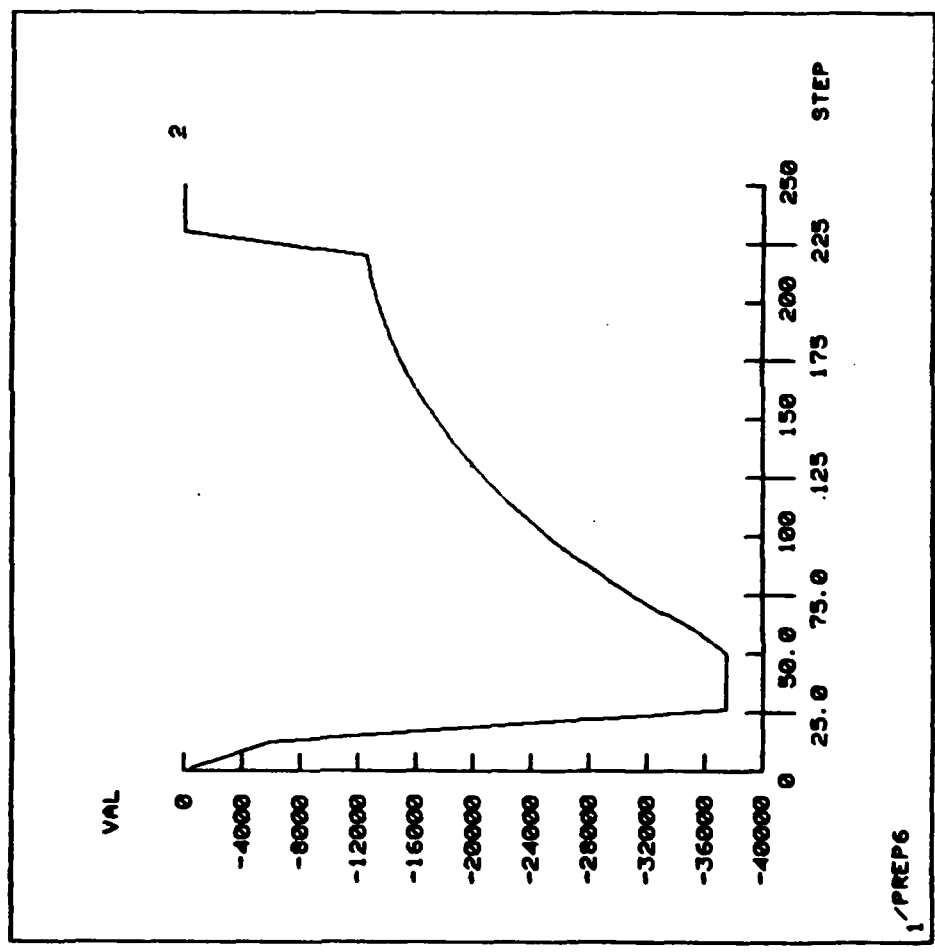


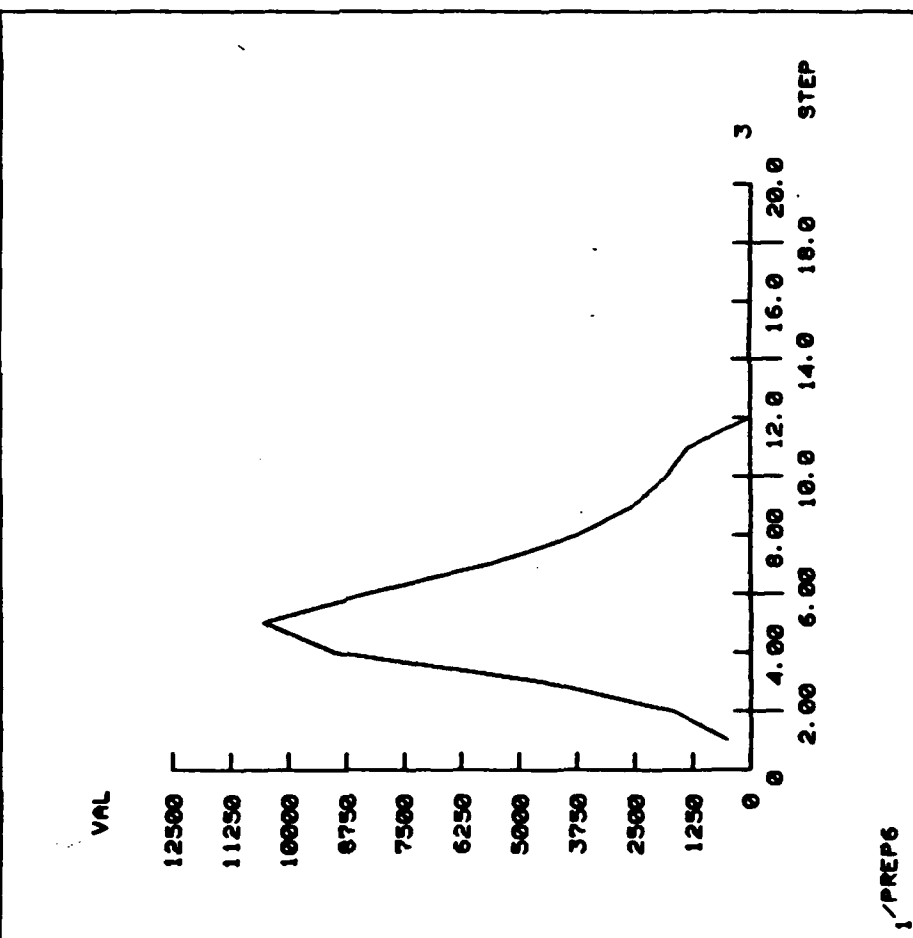
FIGURE 12
RECOIL LOAD

ANSYS 4.2B
FEB 9 1987
16:36:34
PREP6
ZV=1
DIST=1.43



1/PREP6

FIGURE 13
TORQUE LOAD



ANSYS 4.28
FEB 9 1987
16:36:12
PREP6
ZV=1
DIST=1.43

1/PREP6

FIGURE 17
RECOIL LOAD

ANSYS 4.2B
FEB 9 1987
16:49:32
PLOT NO. 4
POST26
ZV=1
DIST=1.38

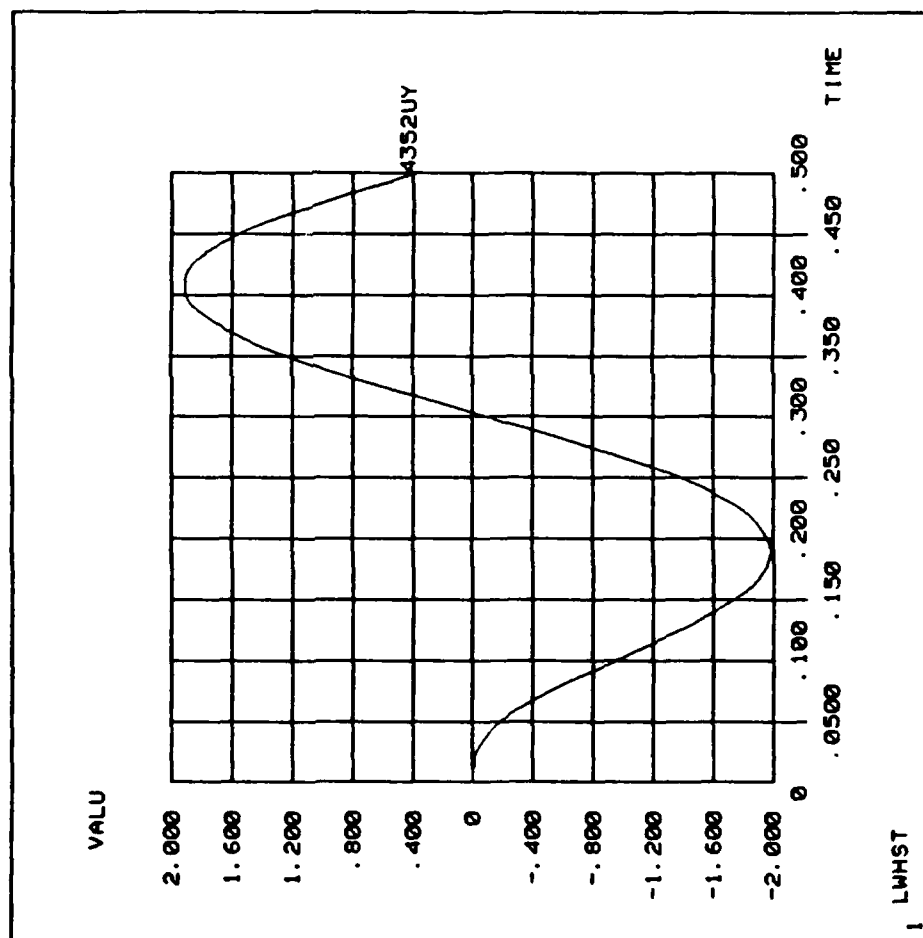
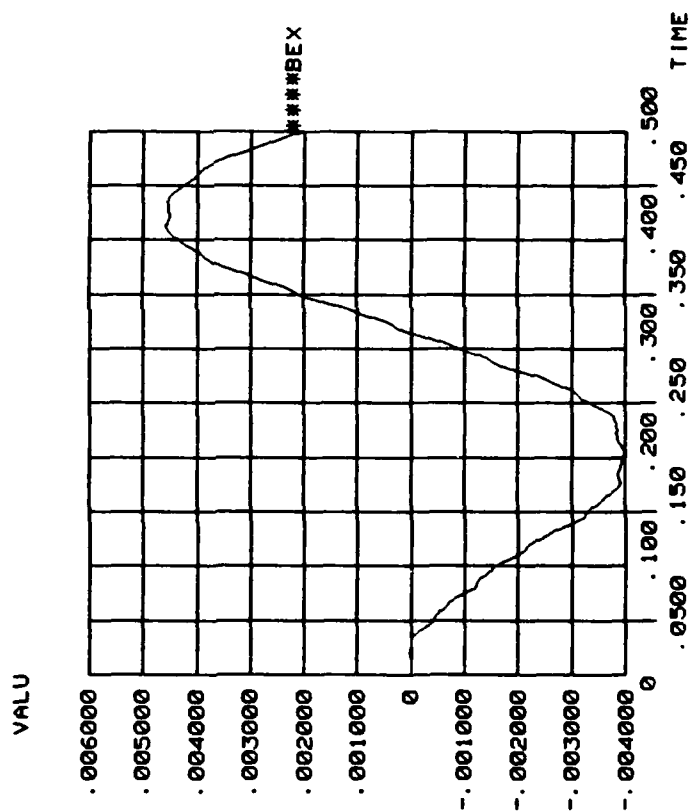


FIGURE 20
RECOIL FORCE
BARREL END - UX

ANSYS 4.2B
FEB 9 1987
16:49:43
PLOT NO. 7
POST26
ZV=1
DIST=1.54



1 LWHST

FIGURE 14

RECOIL LOAD

ANSYS 4.2B
 FEB 9 1987
 16:49:16
 PLOT NO. 1
 POST26
 ZV=1
 DIST=1.43

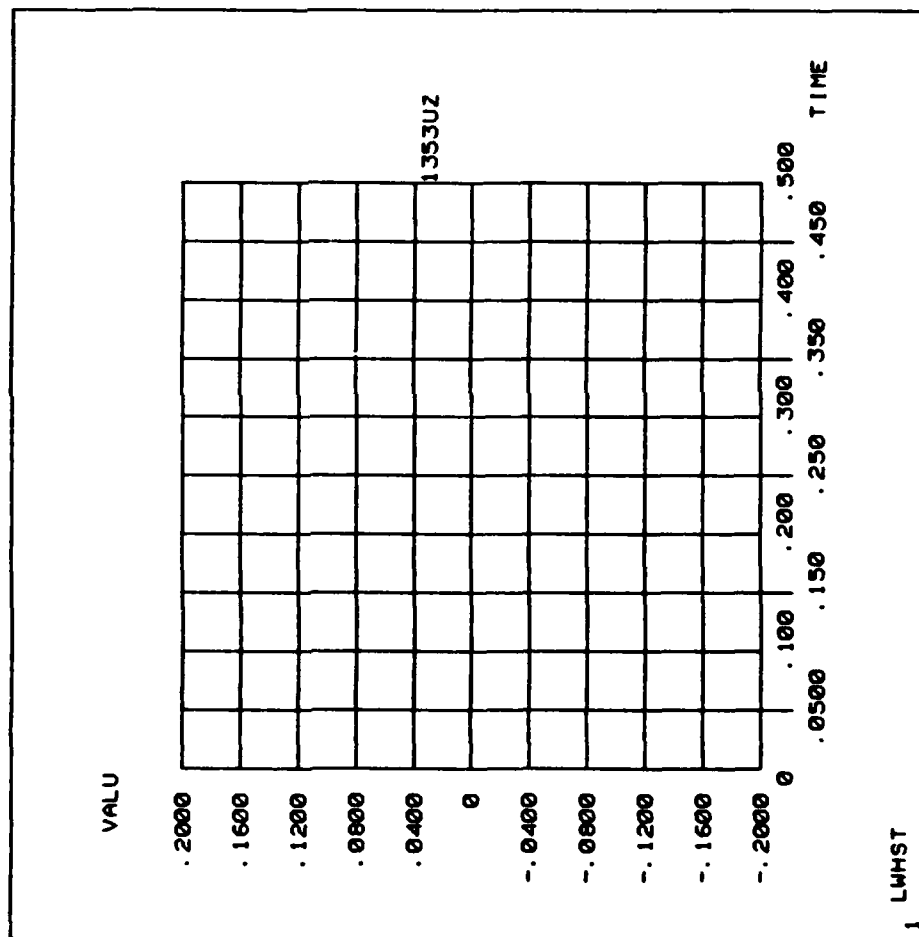
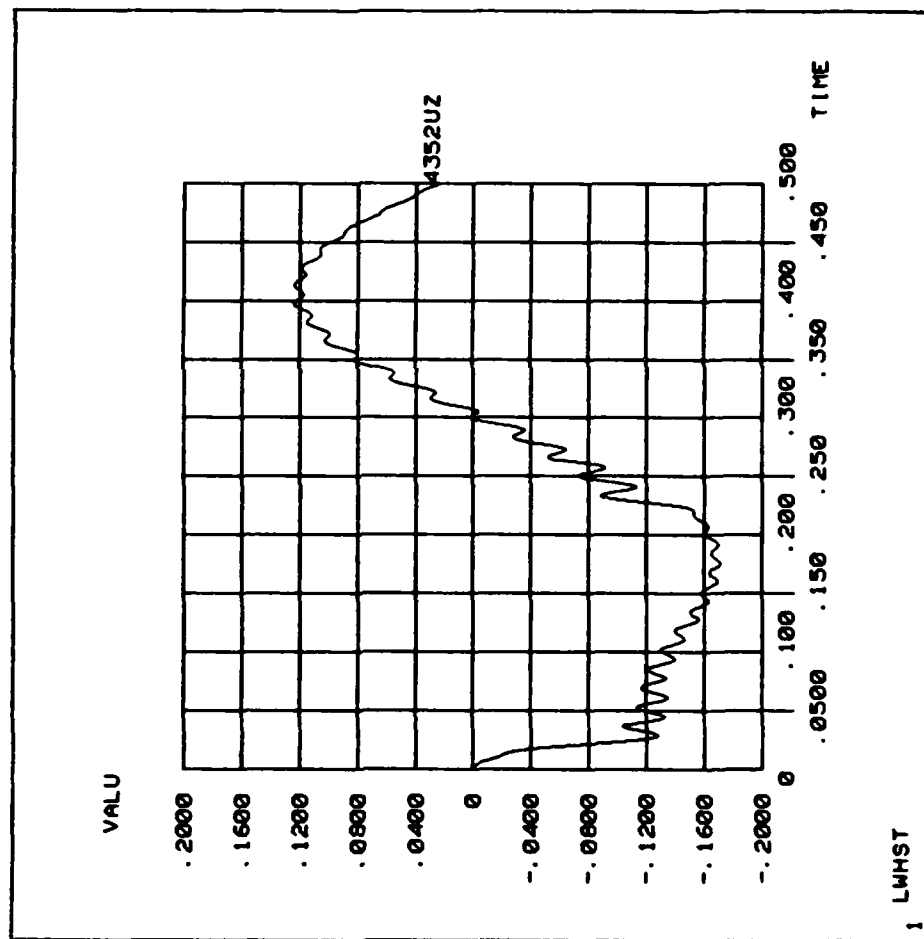


FIGURE 15
RECOIL LOAD



ANSYS 4.28
FEB 9 1987
16:49:22
PLOT NO. 2
POST26
ZV=1
DIST=1.43

FIGURE 16

RECOIL LOAD

ANSYS 4.2B
FEB 9 1987
16:49:25
PLOT NO. 3
POST26

ZV=1
DIST=1.38

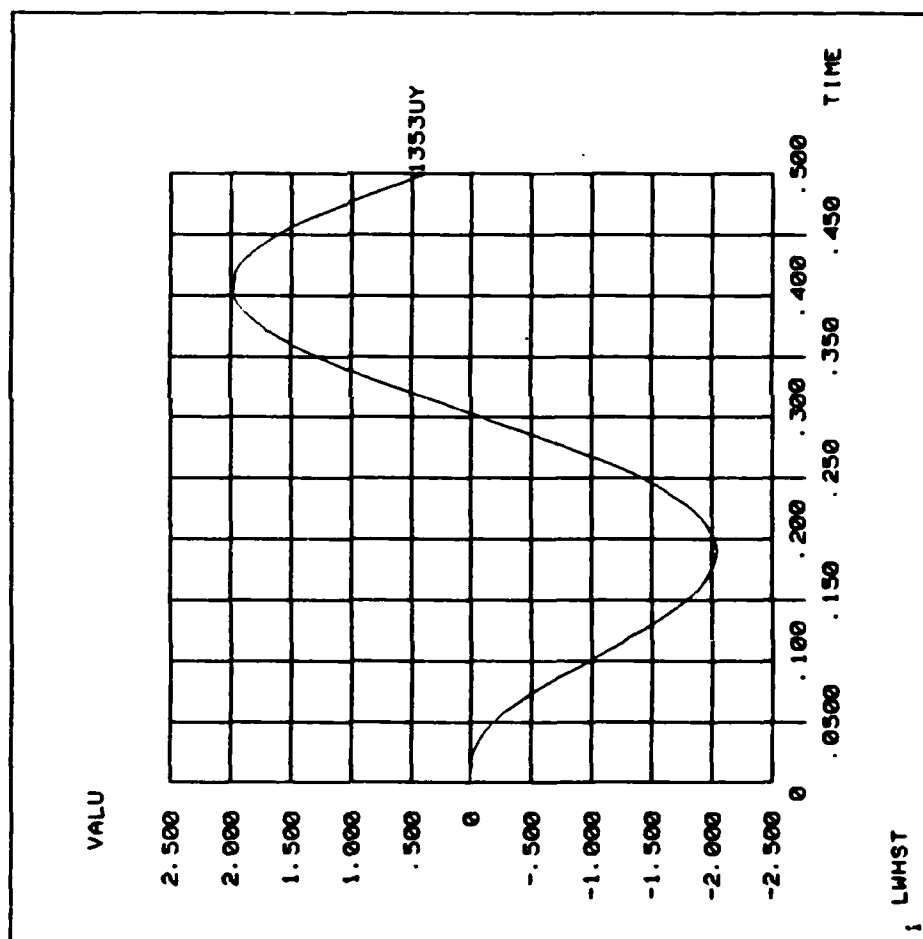


FIGURE 18
RECOIL LOAD

ANSYS 4.2B
FEB 9 1987
16:49:35
PLOT NO. 5
POST26

ZV=1
DIST=1.38

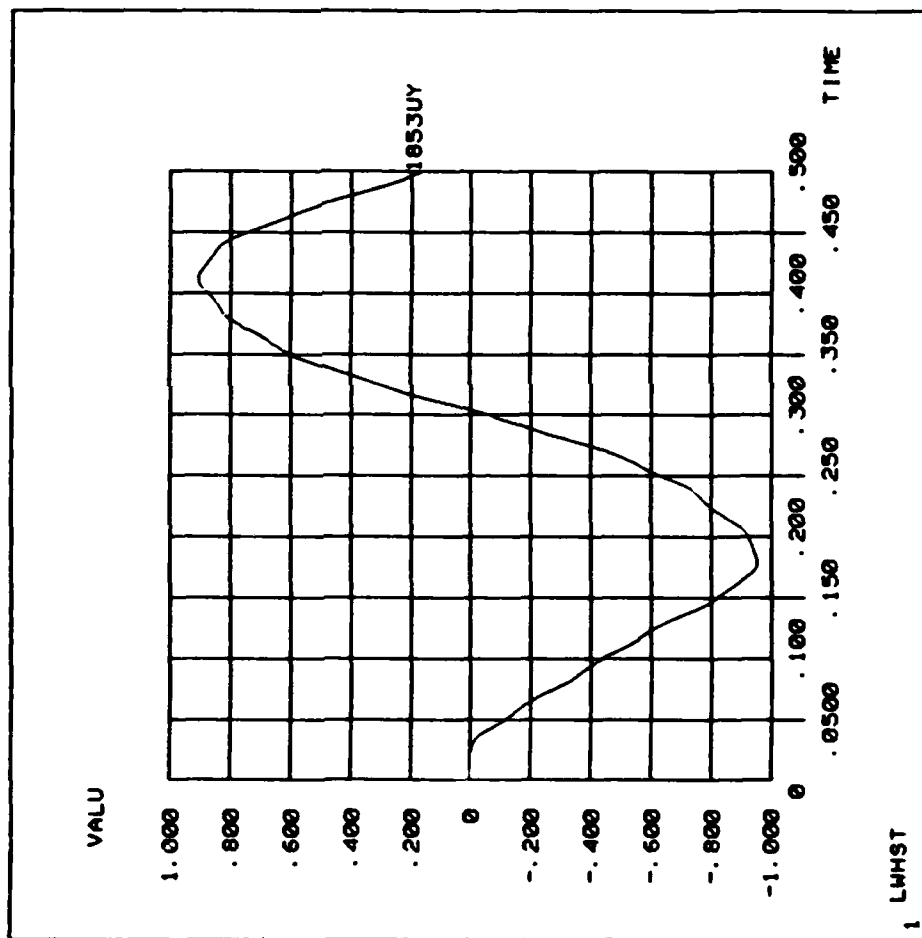


FIGURE 19
RECOIL LA00

ANSYS 4.2B
FEB 9 1987
16:49:39
PLOT NO. 6
POST26
ZV=1
DIST=1.38

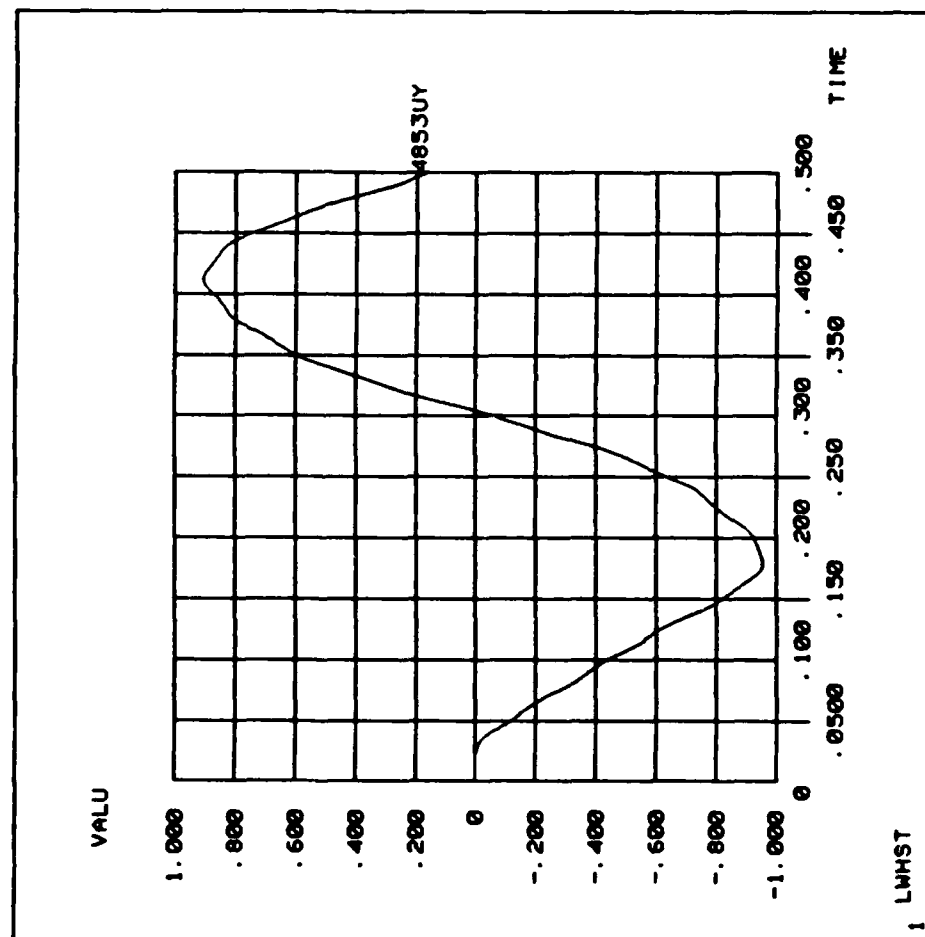
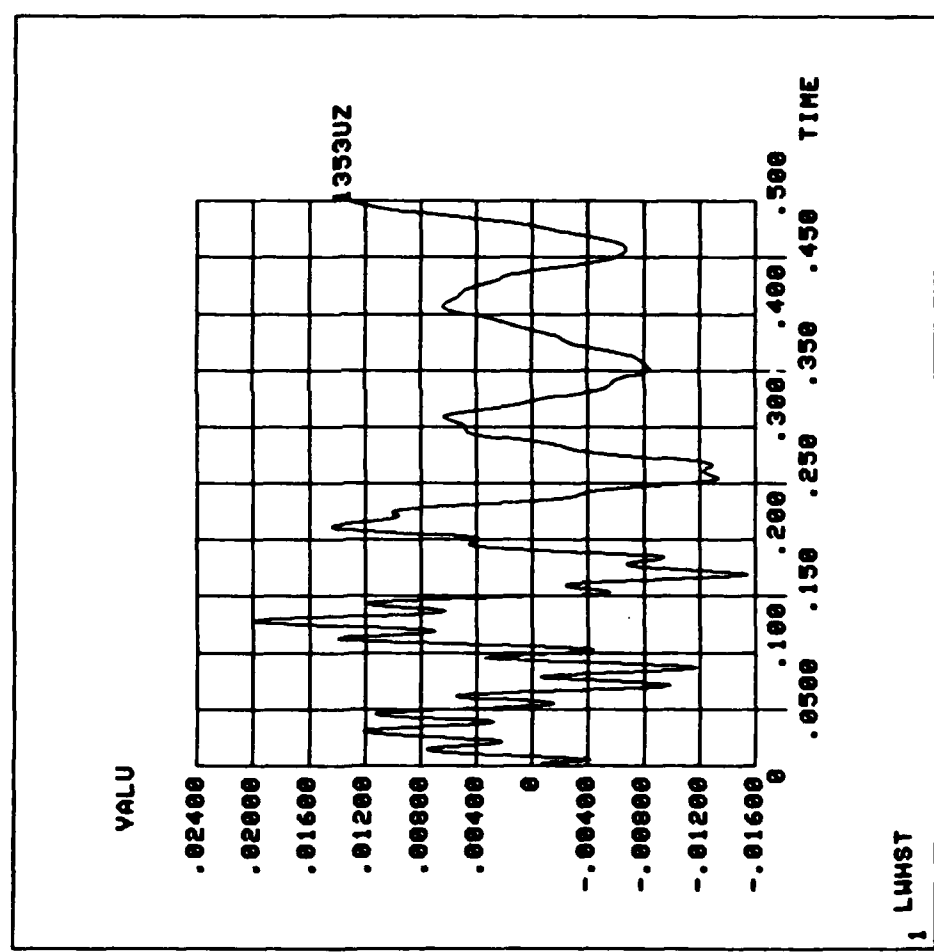


FIGURE 21
TORQUE LOAD

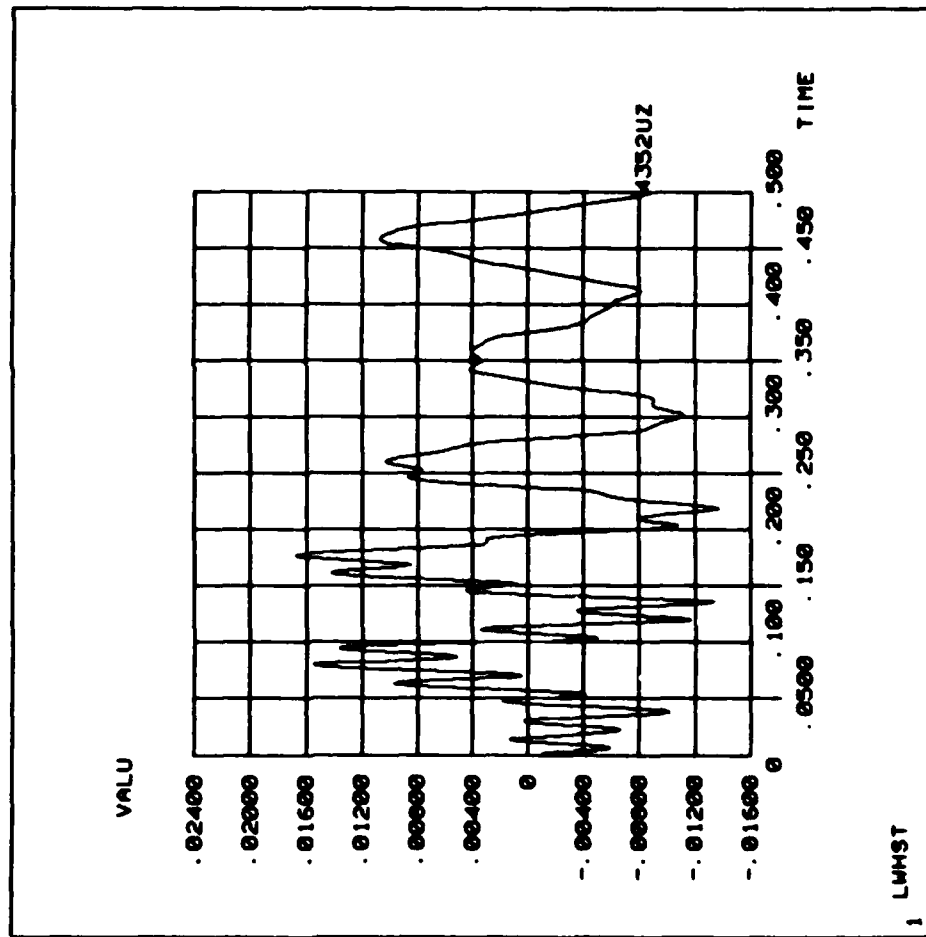
ANSYS 4.23
FEB 10 1987
12:20:39
PLOT NO. 1
POST26

ZV=1
DIST=1.49



1, LHMST

FIGURE 22
TORQUE LOAD



ANSYS 4.2B
FEB 10 1987
12:21:05
PLOT NO. 2
POST26

ZV=1
DIST=1.49

1 LHMST

FIGURE 23

TORQUE LOAD

ANSYS 4.28
FEB 10 1987
12:21:07
PLOT NO. 3
POST26

2V=1
DIST=1.43

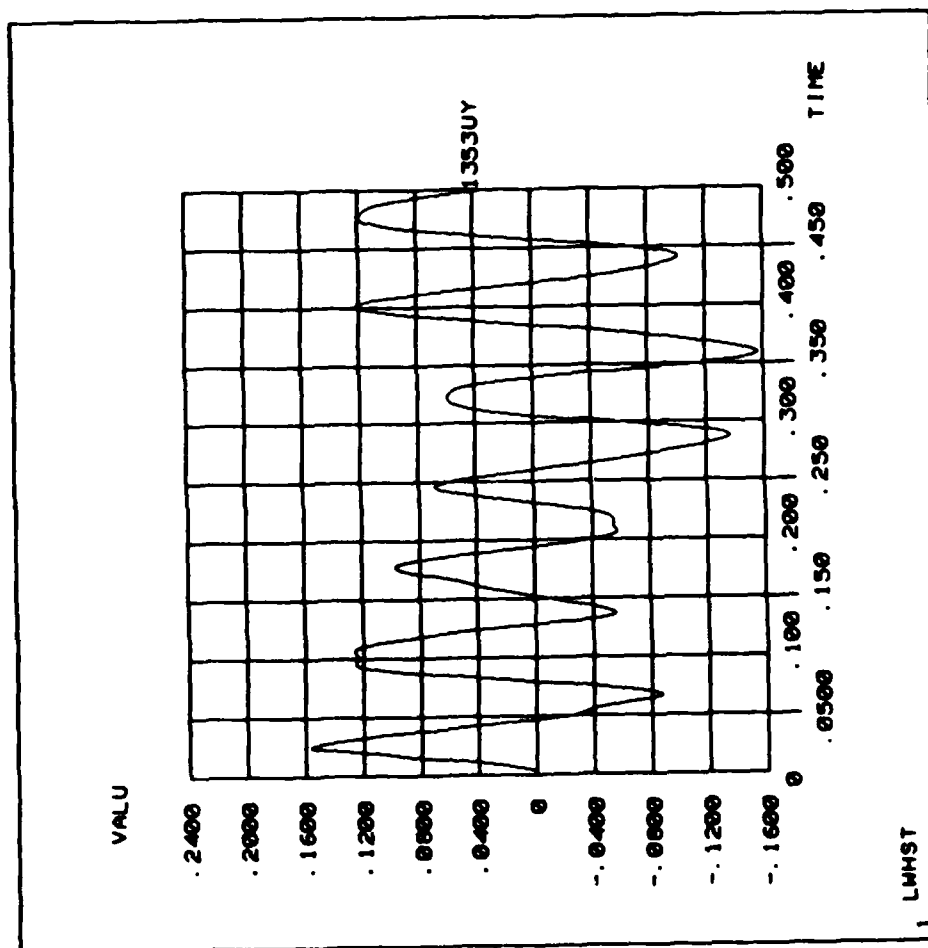


FIGURE 24
TORQUE LOAD

ANSYS 4.2B
FEB 10 1987
12:21:10
PLOT NO. 4
POST26

ZV=1
DIST=1.43

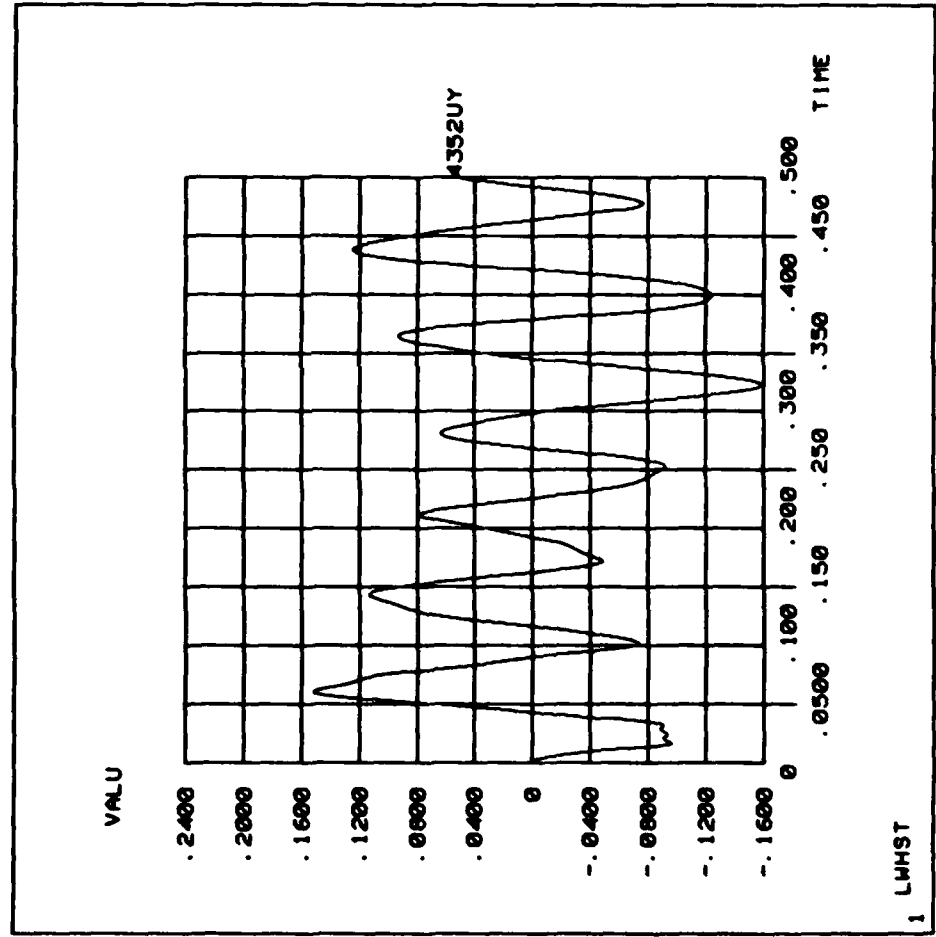


FIGURE 25
TORQUE LOAD

ANSYS 4.2B
FEB 10 1987
12:21:14
PLOT NO. 5
POST26

2V=1
DIST=1.43

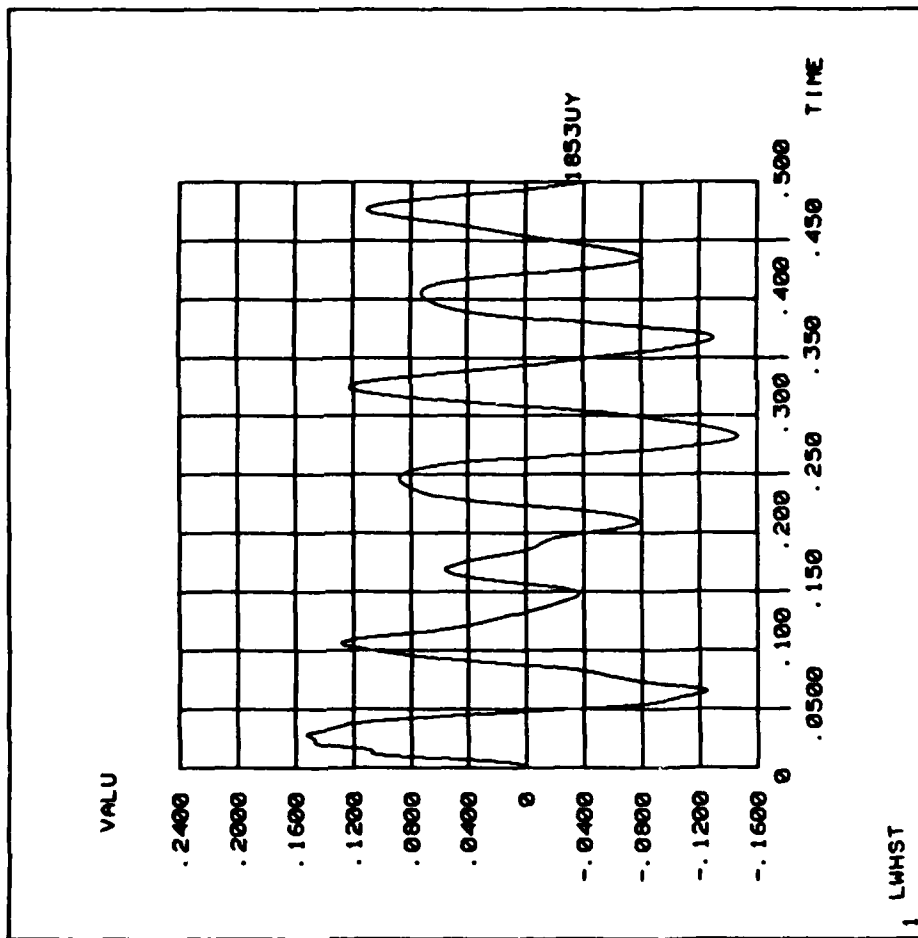


FIGURE 26
TORQUE LOAD

ANSYS 4.2B
FEB 10 1987
12:21:18
PLOT NO. 6
POST26

ZV=1
DIST=1.43

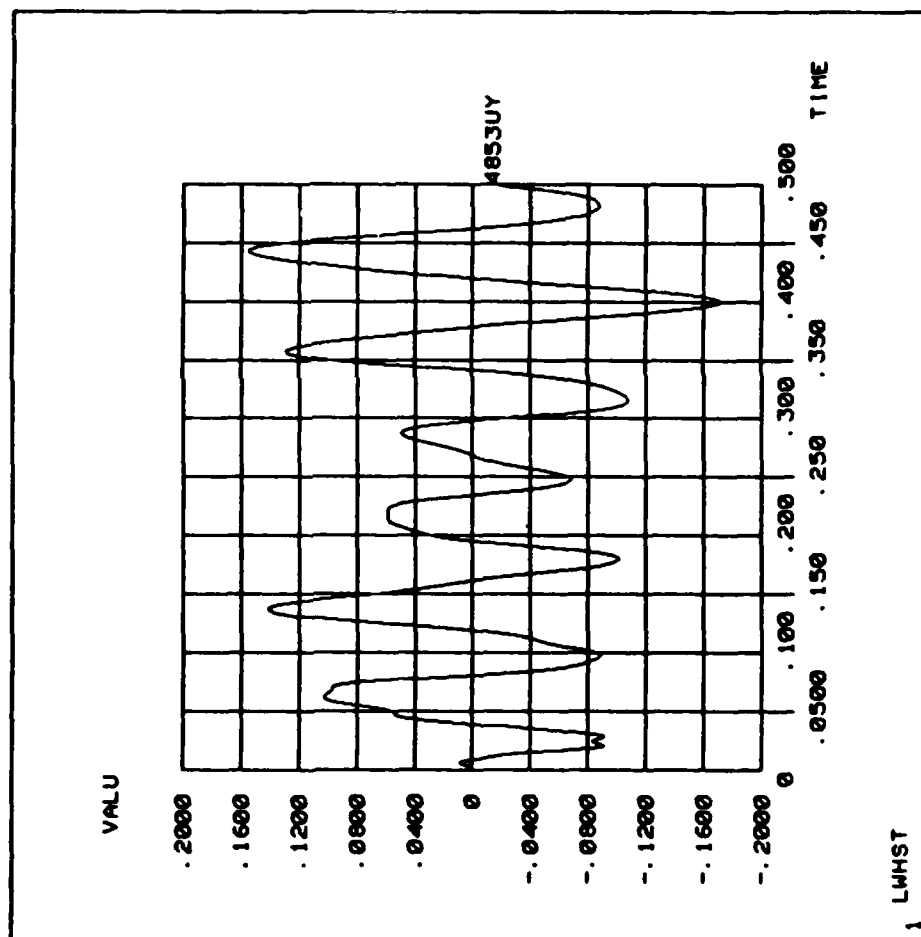
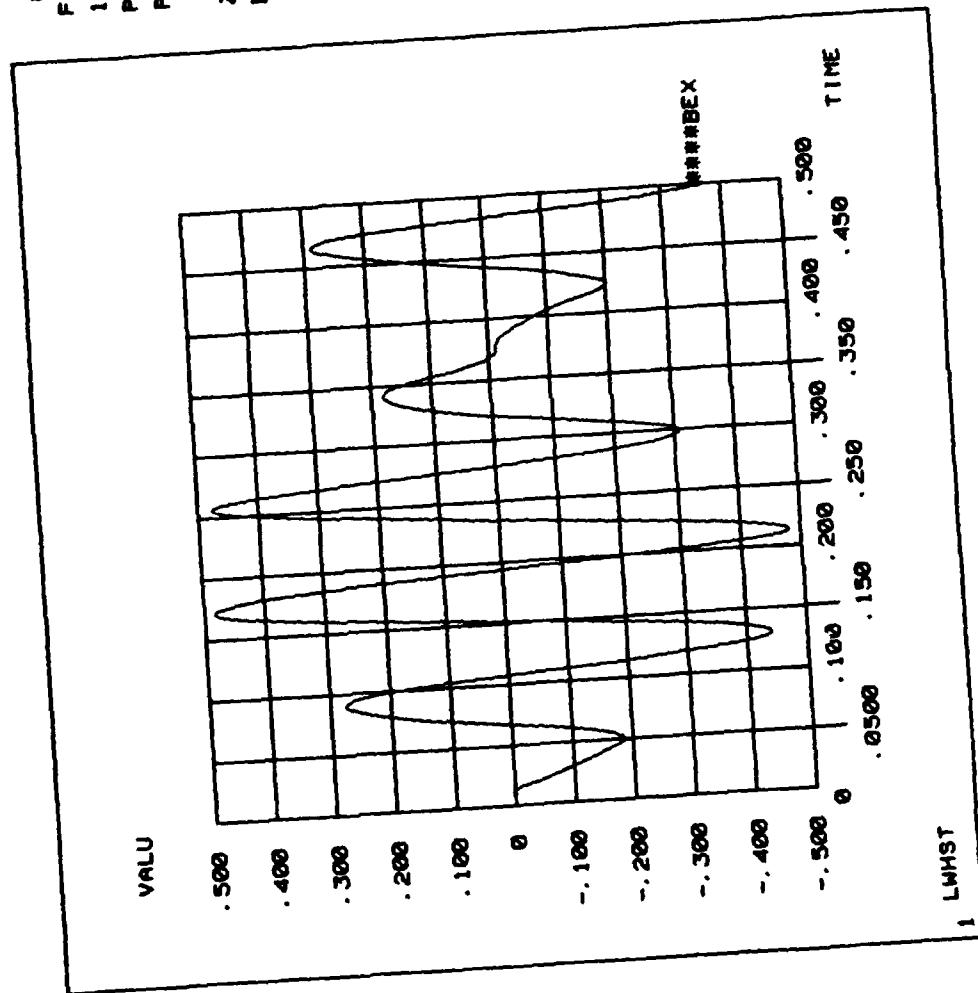


FIGURE 27
TORQUE LOAD

ANSYS 4.2B
FEB 10 1987
12:21:20
PLOT NO. 7
POST26
ZV=1
DIST=1.38



D2/290

COMPUTER RESULTS - MODEL 11

/PROBE,1
/PREP7
/TITLE, LUNST
KAS,5
ET,1,91,C,3,3,3,1
KEYOPT,1,7,1
ET,2,93
ET,3,45
ET,4,94
LCCAL,11,1,14,10,75
12,1,19,0,-232.5,0,-90
13,1,14,-7.5
14,1,0,13.75,-104.0,C,-90
15,1,14,-11
16,1,0,0,-142.5,0,-90,0
17,1,0,C,-196.0,-90,0
CYS,0
K,1,0,-12.5
2,3,75,-12.5
3,7,2,-12.5
CYS,13
K,4,5,0,-90
3,5,0,0
CYS,0
K,6,19,-5.75
K,7,19,-2.4
8,19,0
5,19,2.4
K,10,19,5.75
CYS,11
K,11,5,0,0
K,12,5,0,90
CYS,0
K,13,7,2,13.75
14,3,75,13.75
15,C,15.75
L,1,2,1
2,3,1
1,4,1
CYS,13
L,4,3,2
CYS
L,5,4,-1
6,7,1
7,8,1
8,9,1
5,10,1
10,11,1
CYS,11
L,11,12,2
CYS
L,12,13,1
13,14,1
14,15,1
LGEN,2,1,14,1,0,0,-4.375,20
2,1,14,1,0,C,-96,40
2,1,14,1,0,C,-104,80
2,1,14,1,0,C,-110,80
EP09,73,9
74,6
L,22,73,1
EP3,1,1
LGEN,2,43,56,1,0,0,-6,20
LGEN,2,43,56,1,0,0,-22.5,40

transient input file

LTHD

MODEL 11

RCVD
LJL
2-12-87

transient

f Feb. 11 work

LLEN,2,43,56,1,0,0,-28.5,60
 KPOB,121,-15.75
 RP4,1
 KPOB,125,-1C.75
 CSYS,13
 L,124,125,2
 CSYS
 LLEN,2,85,98,1,0,0,-1C,2C
 LLEN,2,85,98,1,0,0,-57.5,40
 LLEN,2,85,98,1,0,0,-71,6C
 LLEN,2,85,98,1,0,0,-81,062,80
 LLEN,2,85,98,1,0,0,-87,062,100
 /ZLEN,1,1,1
 CSYS,14
 K,9,-90
 K,6,-90
 L,17,74,2
 ,16,75,2
 CSYS
 L,54,16,1
 ,56,72,2
 ,53,72,2
 ,52,72,2
 CSYS,16
 LLEN,103,108
 RP4,14,16
 KPOB,126,10,75,-135
 ,130,10,75,125
 CSYS,0
 KPOB,127,-134.899
 RP3,1
 L,125,126,1
 RP4,1,1
 CSYS,16
 L,7.5,180,15
 KPOB,128,0,19,-5.75,999,16,10,75,999,999
 KPOB,130,0,19,5.75,999,16,1C,75,999,999
 ,127,0,19,-2.4,999,16,8.5,999,999
 ,129,0,19,2.4,999,16,8.5,999,999
 CSYS
 KFIL,127,125,1,128
 L,125,126,1
 RP4,1,1
 CSYS,16
 L,145,126,2
 L,13C,131,2
 KPOB,146,8.5
 RP2,4
 L,146,127,2
 ,129,130,2
 KPOB,147,7.5
 RP2,2
 K,7.5,-163,19
 K,7.5,163,19
 L,147,19,2
 L,19,18,1
 CSCIR,16,1
 L,18,20,1
 CSCIR,16,0
 L,20,149,2
 CSYS,0
 KPOB,166,-8.5
 RP4,20
 KPOB,167,-7.5
 RP4,20
 CSYS,17

E,168,7,5,0,19
CYS
K00,169,,7,5
R4,20
K00,170,,8,5
R4,20
CYS,17
L,167,168,2
168,169,2
CYS
L,166,167,1
169,170,1
L,166,166,2
170,170,2
L,166,206,2
190,210,2
205,206,1
210,211,1
KEL,187,189,2
R2,20,20
L1V,119
120
L,186,188,2
R3,20,20
L,182,190,2
R3,20,20
LEL,160,164
A,1,2,22,21
R14,1,1,1,1
A,21,22,42,41
R14,1,1,1,1
A,41,42,62,61
R11,1,1,1,1
A,32,33,72
33,56,72
36,16,73,72
36,55,16
73,16,17,74
76,17,75
A,61,62,82,81
R14,1,1,1,1
A,81,82,102,101
R14,1,1,1,1
A,101,102,122,121
R14,1,1,1,1
A,121,122,142,141
R4,1,1,1,1
A,123,126,145
A,126,127,146,145
A,127,147,146
A,127,128,18,19
A,128,129,20,18
A,129,130,149,20
A,129,130,131,150
A,130,131,151
A,131,132,132,151
R4,1,1,1,1
A,141,142,162,161
R6,1,1,1,1
A,149,150,170,169
R6,1,1,1,1
A,161,162,182,181
R5,1,1,1,1
A,166,167,36,186
A,36,168,188,186
A,188,37,190,188

A.149,170,190,37
 A.170,171,191,190
 PPS,1,1,1,1
 A.181,182,202,201
 PPS,1,1,1,1
 A.186,188,208,206
 A.188,190,210,208
 A.190,191,211,210
 PPS,1,1,1,1
 A.201,202,222,221
 PPS,1,1,1,1
 A.204,208,228,226
 PPS,1,1,1,1
 A.210,211,231,230
 PPS,1,1,1,1
 ET,1,6,6E6 * CARBON GRAPHITE
 EX,1,6,7E6
 GXY,1,3,4E6
 HXY,1,1,3
 DEMS,1,1,CO0155
 EX,2,13E3 * CORE
 ET,2,4E3
 HXY,2,2,25
 DEMS,2,2,899E-5
 GXY,2,4E3
 RST,2,24
 R,1,1,0E1
 P,2,1,0,0,0405,0405,0405,0405
 PPORE,2,0,2,2,2,2
 PPORE,1,0,0,0405,0405,0405,0405
 R,3,3,324
 R,4,1,0,0,0675,0675,0675,0675
 PPORE,2,0,2,2,2,2
 PPORE,1,0,0,0675,0675,0675,0675
 R,5,1,0,0,162,162,162,162
 PPORE,2,0,2,2,2,2
 PPORE,1,0,0,162,162,162,162
 R,6,1,0,0,162,162,162,162
 PPORE,2,0,1,1,1,1
 PPORE,1,0,0,162,162,162,162
 R,7,1,0,0,135,135,135,135
 PPORE,2,0,1,1,1,1
 PPORE,1,0,0,135,135,135,135
 R,8,1,0,0,135,135,135,135
 PPORE,2,0,2,2,2,2
 PPORE,1,0,0,135,135,135,135
 R,9,1,0,0,0405,0405,0405,0405
 PPORE,2,0,1,1,1,1
 PPORE,1,0,0,0405,0405,0405,0405
 R,11,270
 P,16,81
 EX,3,3,81E6 *ALUMINUMREDUCEDBY.37
 ET,3,3,81E6
 EX,3,3,81E6
 HXY,3,3,33
 DEMS,3,3,CO00546
 C=O REAR TRIANGLE
 GYS,12
 L,3
 L,4,5
 L,38,39
 L,6E,2,334,0,0,0,0
 L,6E,2,334,0,0,0,0
 L,6E,2,334,0,0,0,0
 L,57,38

.38.59
.38.39
.39.00
R.3.180
L.57.76
CS18.12.1
L.59.76
CS18.12.0
L.76.228
CS18
R.19.10.75.-224.562
R.19.-10.75.-224.562
L.231.77
.225.78
.77.58
.78.00
CS18.15
L.224.78
CS18.11
L.232.77
CS18
L.214.343
A.224.225.78
A.225.226.78
.226.228.79.78
.228.230.77.79
.230.231.77
.231.232.77
L.214.341
.342
L.214.346.6
.347.6
A.78.79.98
A.79.77.97
A.79.76.96.98
.79.97.06.76
A.98.96.59.0C
.0.59.38.39
.38.57.58.39
.80.97.58.57
Coco START MESH
EPALL
LSALL
ARALL
PAT.1
TYPE.2
REAL.1
ELSI.15
CS18
APESH.1.14
.15
.21.22
.29
.35.36
REAL.2
TYPE.1
APESH.17.19
.56.28
.21.33
.28.43
REAL.3
TYPE.2
APESH.52.33
.66.67
.80.81
.96.97

.109,110
.121,124
.129
.135,136
.141
.147,148
.153
REAL,4
TYPE,1
APESH,46,50
.55,57
.60,64
.69,71
.74,78
.83,85
.88,92
.99,101
.104,107
.112,113
REAL,5
TYPE,1
APESH,51
.54
.65
.68
.79
.82
.83
.88
.108,
.111
.120
.125
.128
.134
.137
.140
.146
.149
.152
REAL,7
TYPE,1
APESH,44
.58
.72
.86
.102
.114
REAL,8
TYPE,1
APESH,116,119
.126,127
APESH,130,133
.138,139
.142,145
.150,151
REAL,9
TYPE,1
APESH,16
.20
.23
.30
.36
.37
REAL,11
TYPE,2

AREM,45
-39
-71
-87
-103
-115
ELSL,4
REAL,16
TYPE,2
APESH,154,167
Cooo MODIFY TOP ELEMENTS FOR ADDED CCRE
TYPE,1
REAL,4
TYPE,1
REAL,7
Cooo MANIPOLDS
MPS,1,15
KSEM,2,1,4,1,0,-.001
KSEM,2,5,11,1,-.001
KSEM,2,12,13,1,0,-.001
MPS,1,15
KSEM,2,118,138,1,-4.969
KSEM,2,139,-4.999
KSEM,2,139,180,1,-6.8
KSEM,2,187,200,1,-3.43
KSEM,2,207,220,1,-3.75
C175,13
L,117,118,2
C175,11
L,139,140,2
C175
A,99,100,207,234
A,100,116,187,207
A,116,117,135,187
A,234,207,205,237
A,207,187,185,209
A,187,159,160,189
A,159,118,115,160
A,237,205,216,238
A,205,189,196,216
A,189,140,176,196
A,140,119,120,176
A,238,216,217,235
A,216,196,197,217
A,196,176,177,197
A,176,120,136,177
A,239,217,218,240
A,217,197,198,218
A,197,177,178,198
A,177,136,137,178
A,240,218,219,241
A,218,198,199,219
A,199,178,179,199
A,178,137,138,179
A,241,219,220,242
A,219,199,200,220
A,199,179,180,200
A,179,138,139,180
A,242,220,221,243
A,220,200,201,221
Cooo TRIANGULAR AREAS
A,117,118,139
A,139,140,180
L,243,0,0,6
L,239,243

VERAG,149,149,176,171,172,173,437
 VERAG,174,175,176,177,178,179,437
 VERAG,180,181,182,183,184,185,437
 VERAG,186,187,188,189,190,191,437
 VERAG,192,193,194,195,196,197,437
 VERAG,198,.....437

R,22,1

PERGE

PAT,3

TYPE,3

REAL,1

EL,1,1,1

WESH,1,30

WESH,31,32

ERRE,TYPE,3

ALLER

MEM,2,500,ALL,0,0,0,110

MEM,2,500,ALL

BALL

BALL

COO RECOIL CYLINDERS

RT,5,16

TYPE,5

PAT,5

REAL,21

R,21,5,25,436

E,1305,1304

,1304,1305

,1305,1304

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82,5,2986
MLT,3,3
BEM,5,0007331
h,10C01,0,0,125.76
h,10002,0,0,4
h,10003,0,0,C
10005,0,0,-104
FILL
h,10004,0,0,-110
h,10001,10002
BEM,5,1,-1
Cone CABLES
h,10007,19,35,-244
10009,19,-7.5,0
FILL
h,10010,-19,35,-244
h,10012,-19,-7.5
FILL
ST,6,4
TYPE,4
PAT,4
h,6,2086
MLT,6,3
BEM,6,00013
REAL,26
h,26,2,2,4,4,1.5,1.5
h,10007,10008
10008,10009
BEM,2,3,-2
h,10007,6X,0,10C10,3,UV,U2,ROT
Cone NEAR PIVOT
CSYS,2
h,10013,8,0,-C
h,10014,6,0,-38
CSYS
P,23,001,0C1,001
REAL,23
ST,7,21
TYPE,7
h,10C13
h,10C14
CSYS,0
CER1,10013,1227
10013,1231
RP6,0,1
CER1,10013,1249
10013,1253
RP5,C,1
CER1,10013,1267
RP3,C,1
CER1,10013,1283
RP2,C,1
CER1,10013,1291
RP2,0,1
CER1,10013,1302
RP3,0,1
CER1,10014,4227
10014,4231
RP4,C,1
CER1,10014,4249
10014,4533
RP5,C,1
CER1,10014,4267
RP3,0,1
CER1,10014,4283
RP2,0,1

CER1-10014-2191
BP2-0-1
CER1-10014-2302
BP3-0-1
D-10013-UX-0-10014-1-UY-WZ
C-00 EXTRA MASS
TYPE-7
0-24-3-789-3-789-3-789-036-036-036
REAL-24
E-10004
C-00 EXTRA MASSES ON CABLES
TYPE-7
REAL-25
E-23-214-216-214
E-10009
E-10012
BALL
C-00 REORDER WSOBT-2
CIVL-0
WSOBT-2
C-00 COUPLING EQUATIONS
C-00 BARREL TO MANIFOLDS
CP-1-UX-10004-1049
2-UX-10003-1231
3-UX-10003-1349
4-UX-10002-1331
CPL6-1-UY-WOBT
BP4-1
C-00 MANIFOLDS TO SHELL
C-00 FRONT FACE
CP-21-UX-79-1309
22-UX-176-1308
23-UX-09-1392
24-UX-39-1394
25-UX-21-1396
26-UX-24-1384
27-UX-49-1374
28-UX-44-1364
29-UX-39-1354
30-UX-29-1335
31-UX-21-1364
32-UX-14-1322
33-UX-9-1318
34-UX-2-1311
35-UX-1-131C
CP68M-2-300C-22-34
CPL6-21-UX-UY
BP20-1
C-00 ULOTS
CP-2C1-UX-1089-1110
202-UX-1089-1120
203-UX-1014-164
204-UX-1010-028
C-00 VERTICAL PADS
CP-210-UY-1820-381
211-UY-1818-032
212-UY-4020-3381
213-UY-4018-3632
C-00 SHELL TO CABLES
CP-221-UX-19-10009-1334
222-UX-3C19-10012-4334
CPL6-221-UY-WZ
BP21
C-00 MASTER EOP'S
P-1332-UX-1333-1-UY-WZ
P-1053-UX-1033-1-UY-WZ

P-4332-UN-4333-1-UT-02
P-4832-UN-4833-1-UT-02
P-10001-UN-10002-1-UT-02
PEEL-10001-01
TCTAL-100-1
ITER-1-1-1
PAST-1-3-7
REF-2
RUC-1
P-10001-UN-0
Cooo STATIC FIRING FORCE
P-1333-FL-0-4333-3000
P-1332-FV-0-1333-1
P-1832-FV-0-1833-1
P-4332-FV-0-4333-1
P-4832-FV-0-4833-1
DTIME-001
APUR
FINE
PREP6
NTAB-4
NSTEPS-500
FILL-1-1-500-1-501-001
FILL-2-1-12-1-1000-1000
2-12-26-1-12000-4500
2-26-50-1-75000-0
2-50-60-1-75000-44C
2-60-70-1-75000-610
2-70-80-1-44500-520
2-80-90-1-55300-470
2-90-100-1-54600-430
2-100-110-1-50300-380
2-110-120-1-46500-350
2-120-130-1-43000-300
2-130-140-1-40000-280
2-140-150-1-37200-240
2-150-160-1-34800-220
2-160-170-1-32600-180
2-170-180-1-30800-140
2-180-190-1-29200-140
2-190-200-1-27800-110
2-200-210-1-26700-90
2-210-220-1-25800-40
2-220-230-1-25200-2520
CCMB-2-2-0-5
FILL-3-1-2004
3-2-0-4496
3-3-0-18198
3-4-0-35917
3-5-0-42167
3-6-0-33231
3-7-0-22435
3-8-0-16898
3-9-0-10192
3-10-0-7251
3-11-0-5553
CCMB-3-3-0-25 8 MCDS AT 0 IA.
CCMB-4-3-0-1
PLVA-2-3
NITTER-1
MPOST-1
MPRINT-0
TIME-1
F2-1333-2
F2-4333-2
Cooo FT-1332-3

COO PY-4352-4
COO PY-1353-3
COO PY-4353-4
COO PY-1852-3
COO PY-4852-4
COO PY-1853-3
COO PY-4853-4
L90R-1,500
PIMI
/REEC
/IMP-27
/IMP-23
PIMI
/EOP

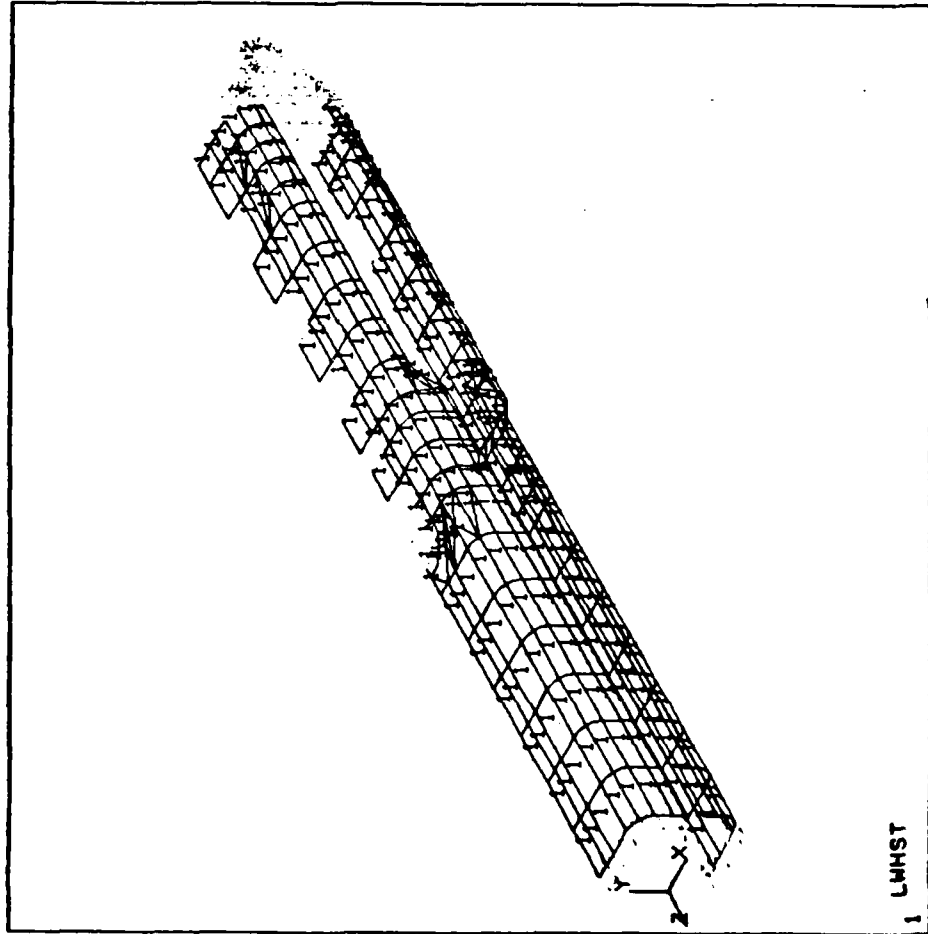
D2/300

GEOMETRY PLOTS - MODEL 12

Model 12

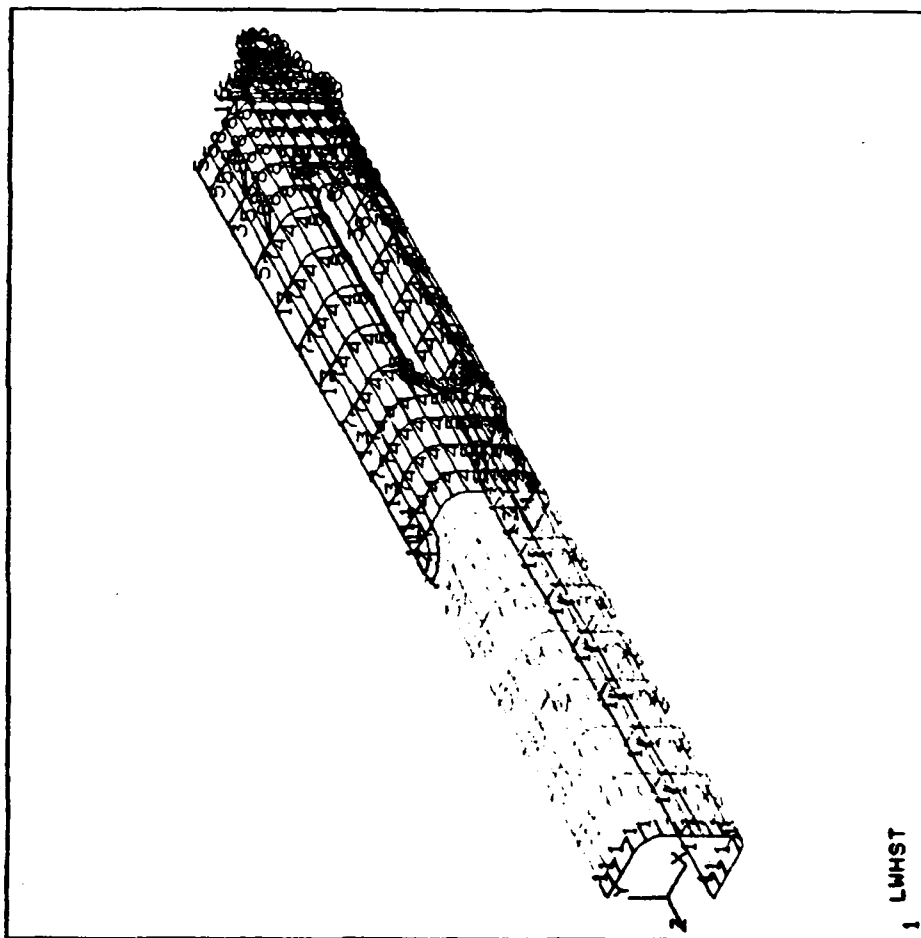
ANSYS 4.2B
FEB 13 1987
7:19:15
PLOT NO. 1
PREP7 ELEMENTS
TNUM=1

XV=1
YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.24
ZF=-115



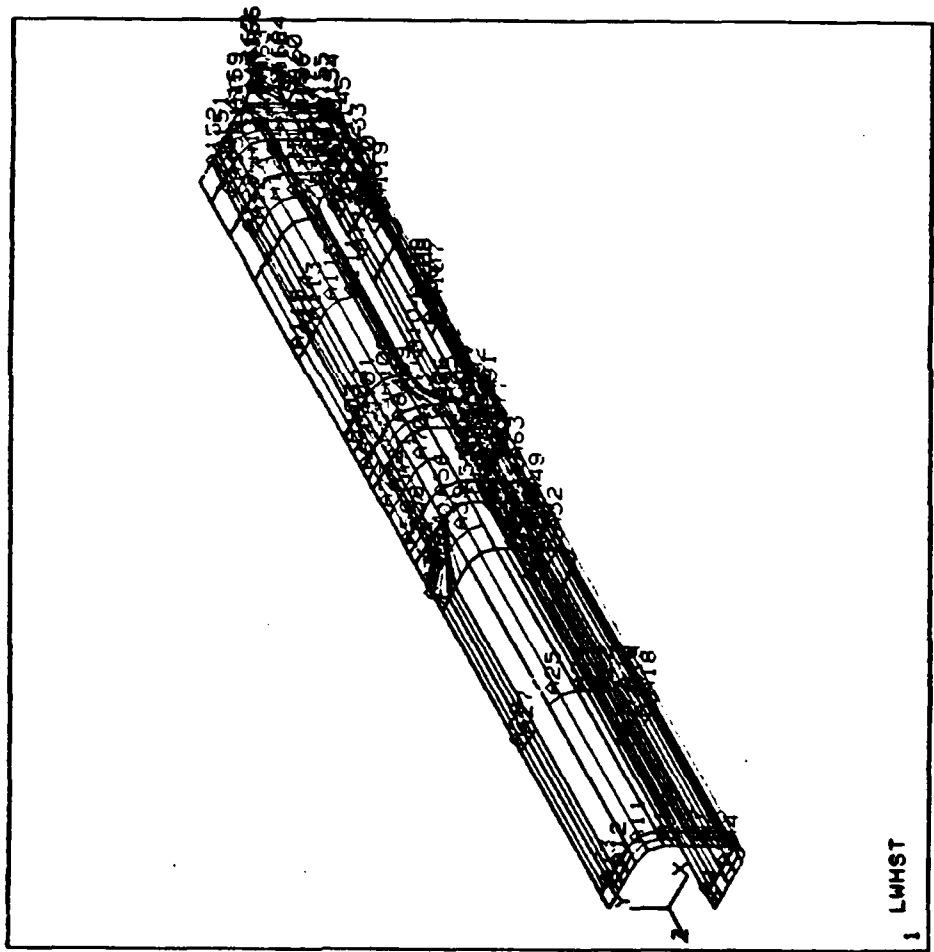
ANSYS 4.2B
 FEB 13 1987
 7:19:33
 PLOT NO. 2
 PREP7 ELEMENTS
 RNUM=1

XV=1
 YV=1
 ZV=1
 DIST=99.6
 XF=12.5
 YF=1.24
 ZF=-115



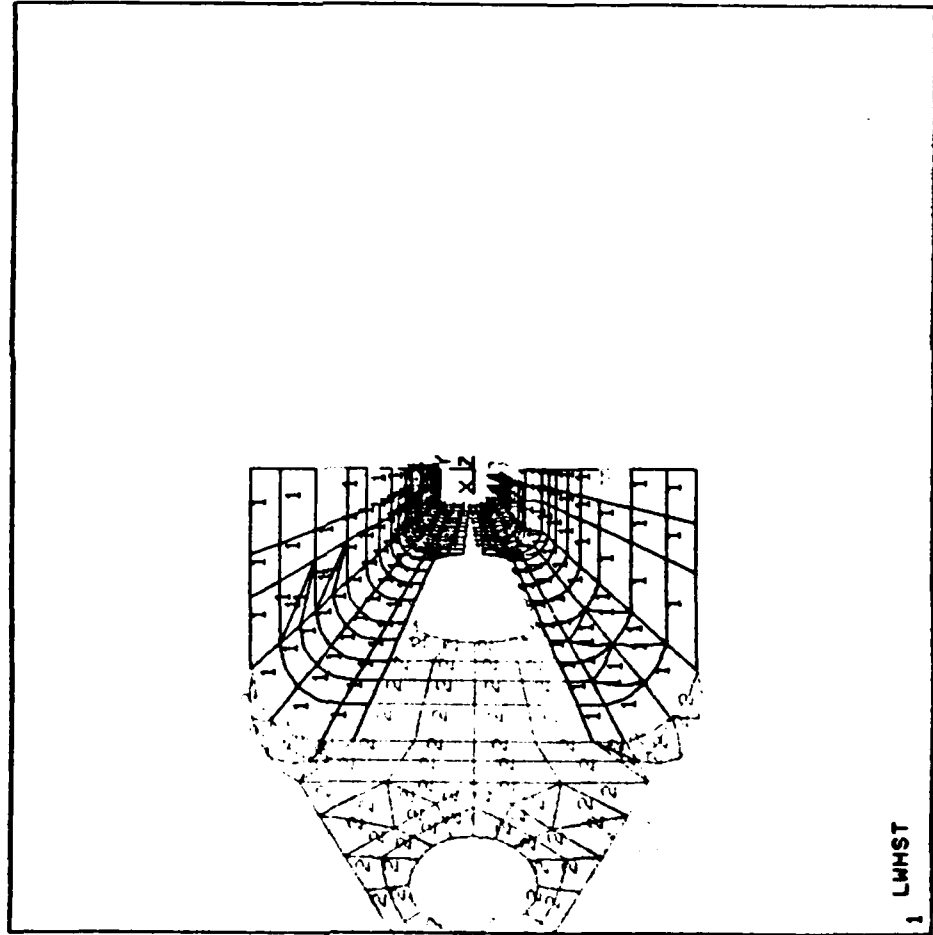
ANSYS 4.2B
FEB 13 1987
7:19:49
PLOT NO. 3
PREP7 AREAS

XV=1
YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.33
ZF=-116



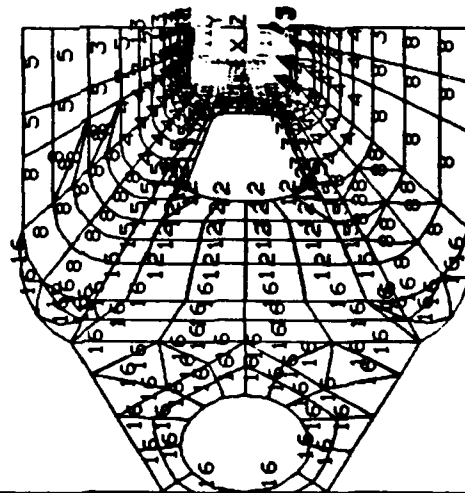
ANSYS 4.2B
FEB 13 1987
7:20:21
PLOT NO. 4
PREP7 ELEMENTS
TNUM=1

ZV=-1
* DIST=139
* ZF=-119
CONE=40



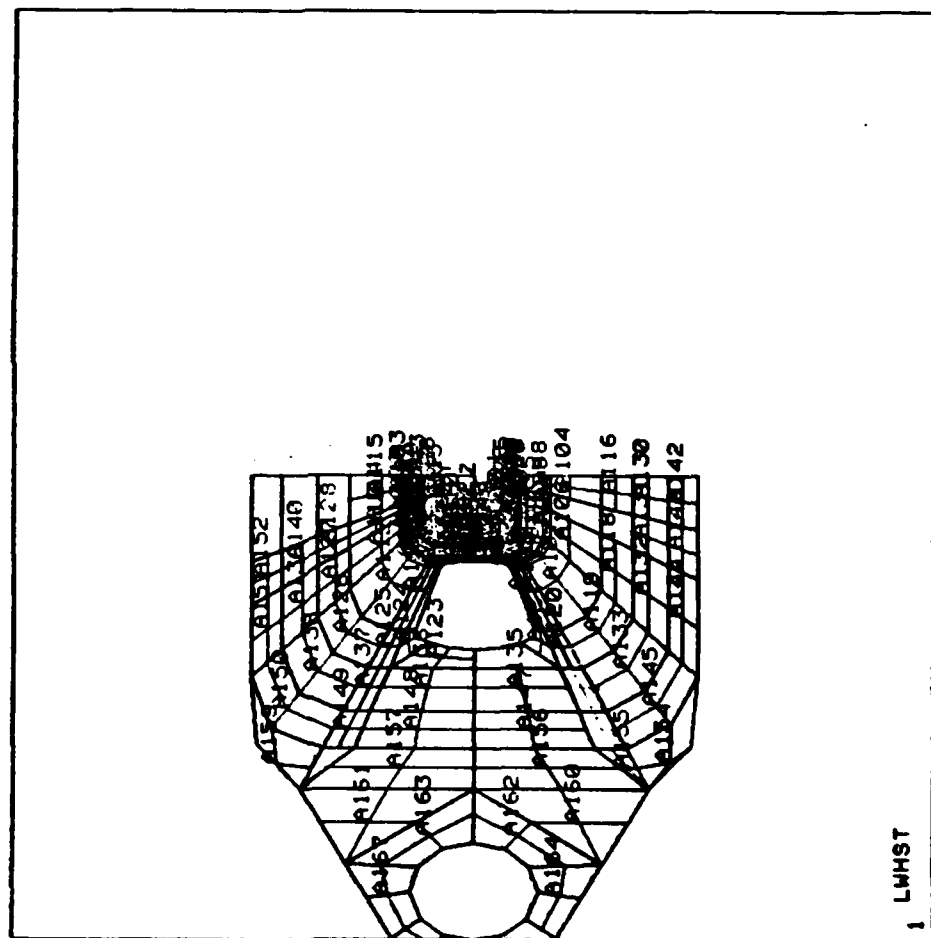
ANSYS 4.2B
FEB 13 1987
7:20:37
PLOT NO. 5
PREP7 ELEMENTS
RNUM=1

ZV=-1
DIST=139
ZF=-119
CONE=40

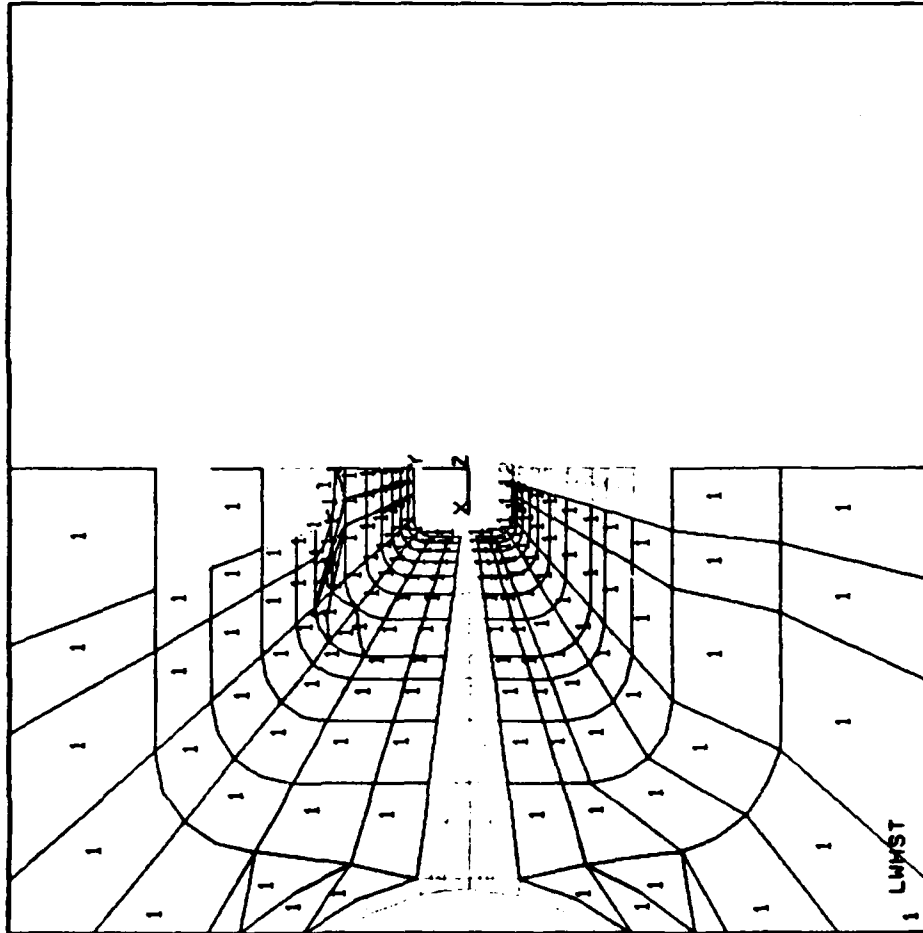


ANSYS 4.2B
 FEB 13 1987
 7:20:53
 PLOT NO. 6
 PREP7 AREAS

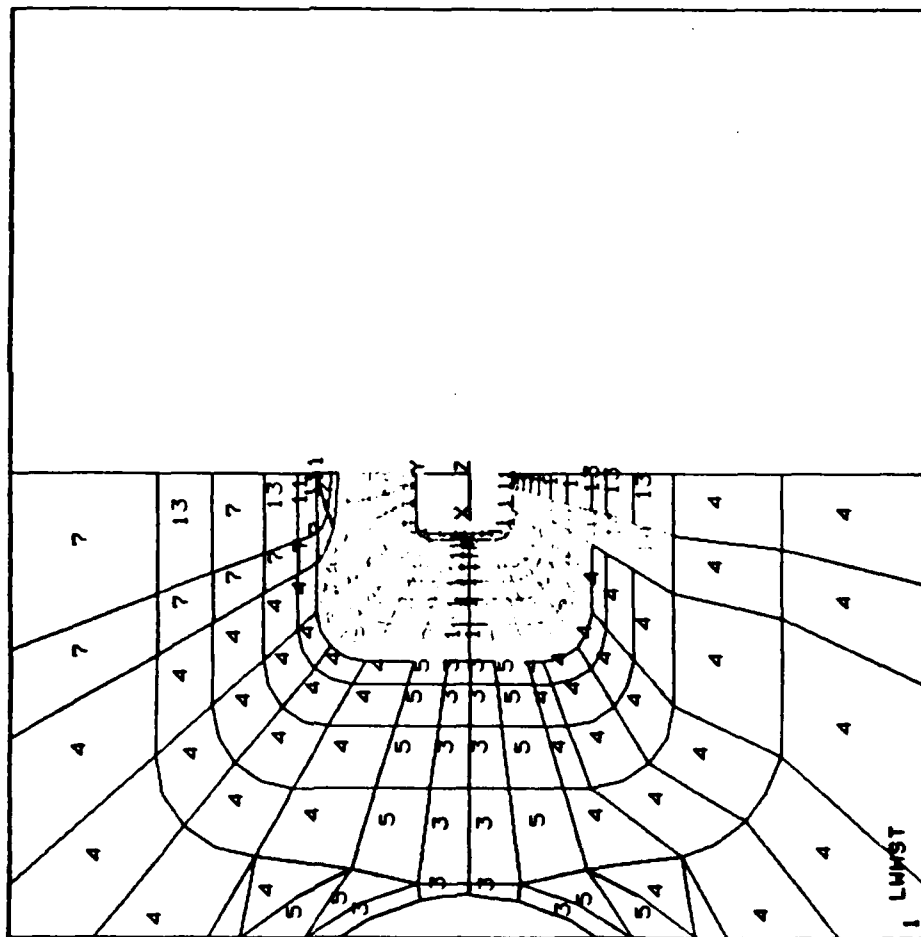
ZV=-1
 # DIST=139
 # ZF=-119
 CONE=40



ANSYS 4.2B
FEB 13 1987
7:21:24
PLOT NO. 7
PREP7 ELEMENTS
TNUM=1
ZV=-1
DIST=160
CONE=40

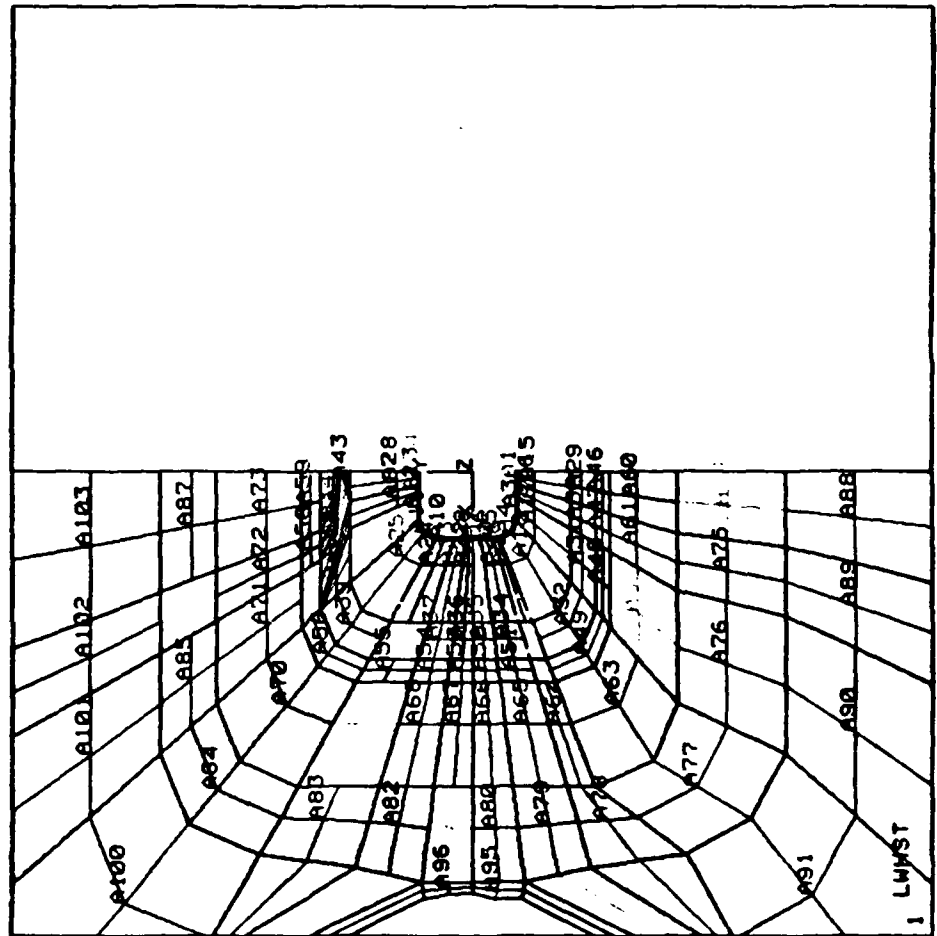


ANSYS 4.2B
FEB 13 1987
7:21:35
PLOT NO. 6
PREP7 ELEMENTS
RNUN=1
ZV=-1
DIST=160
CONE=40

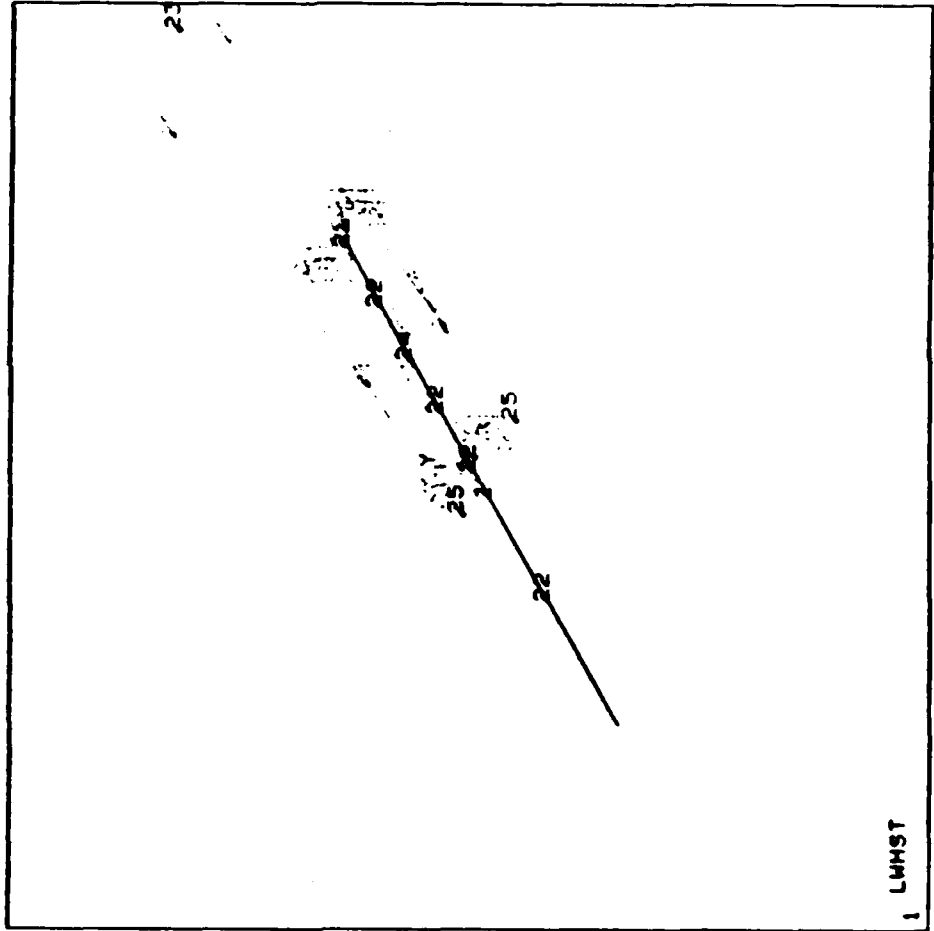


ANSYS 4.2B
FEB 13 1987
7:21:44
PLOT NO. 8
PREP7 AREAS

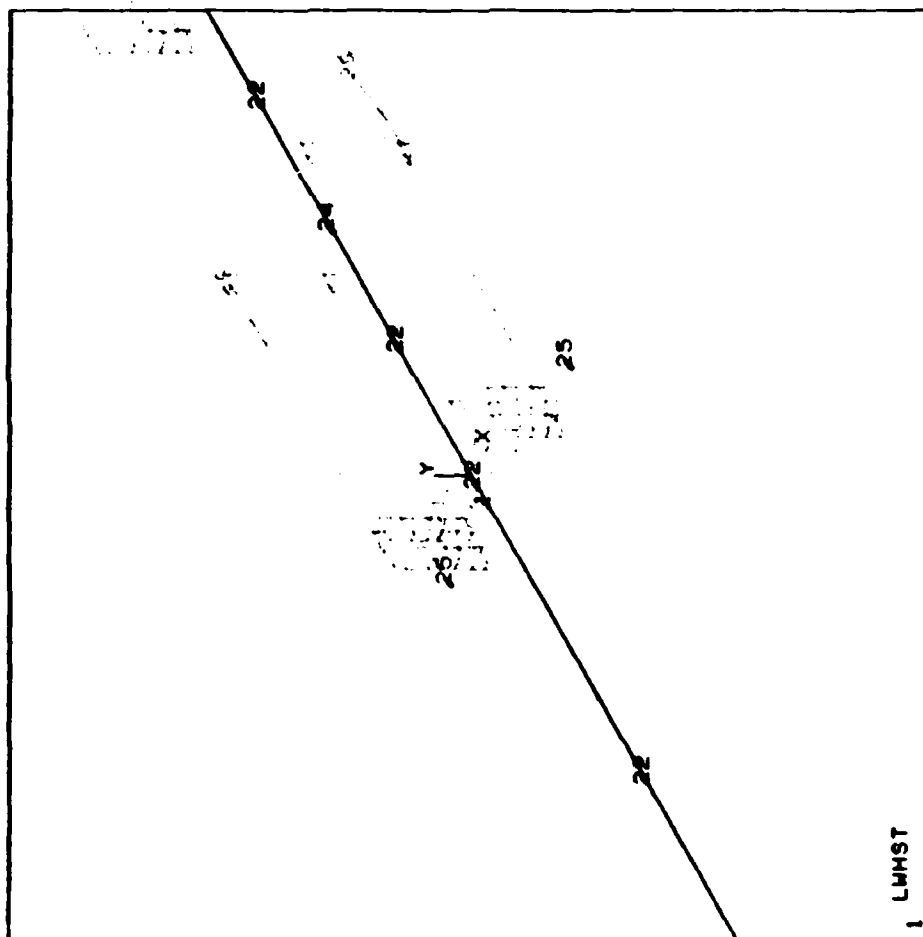
ZV=-1
DIST=160
CONE=40



ANSYS 4.2B
FEB 13 1987
7:22:08
PLOT NO. 10
PREP7 ELEMENTS
RNUM=1
XV=1
YV=1
ZV=1
* DIST=160

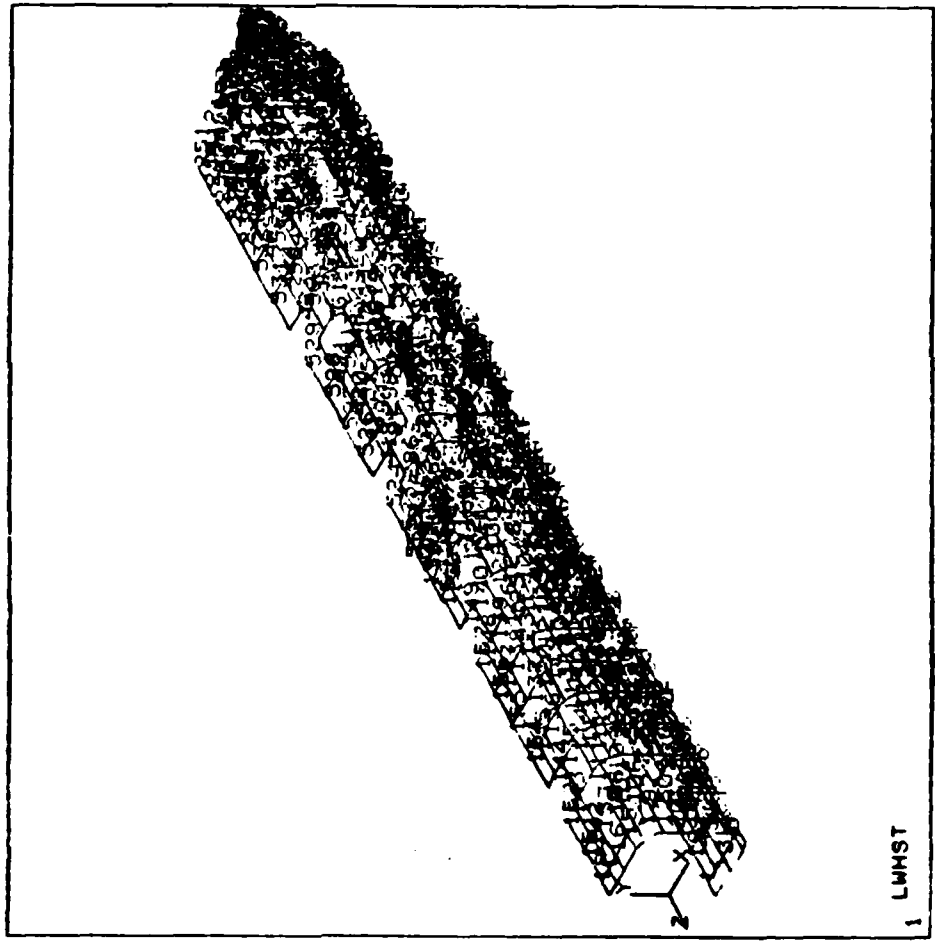


ANSYS 4.2B
 FEB 13 1987
 7:22:08
 PLOT NO. 10
 PREP7 ELEMENTS
 RNUM=1
 XV=1
 YV=1
 ZV=1
 # DIST=70



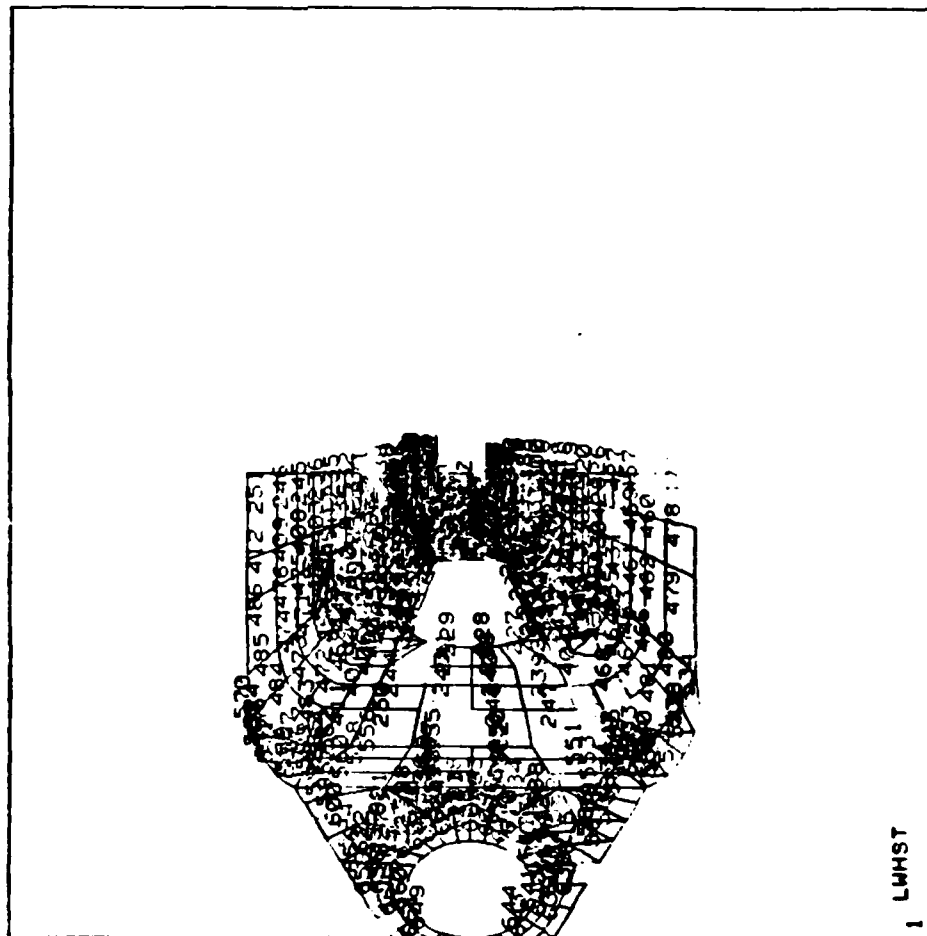
Model 11

ANSYS 4.2B
 FEB 14 1987
 16:12:28
 PLOT NO. 1
 PREP7 ELEMENTS
 ENUM=1
 XV=1
 YV=1
 ZV=1
 DIST=99.6
 XF=12.5
 YF=1.24
 ZF=-115



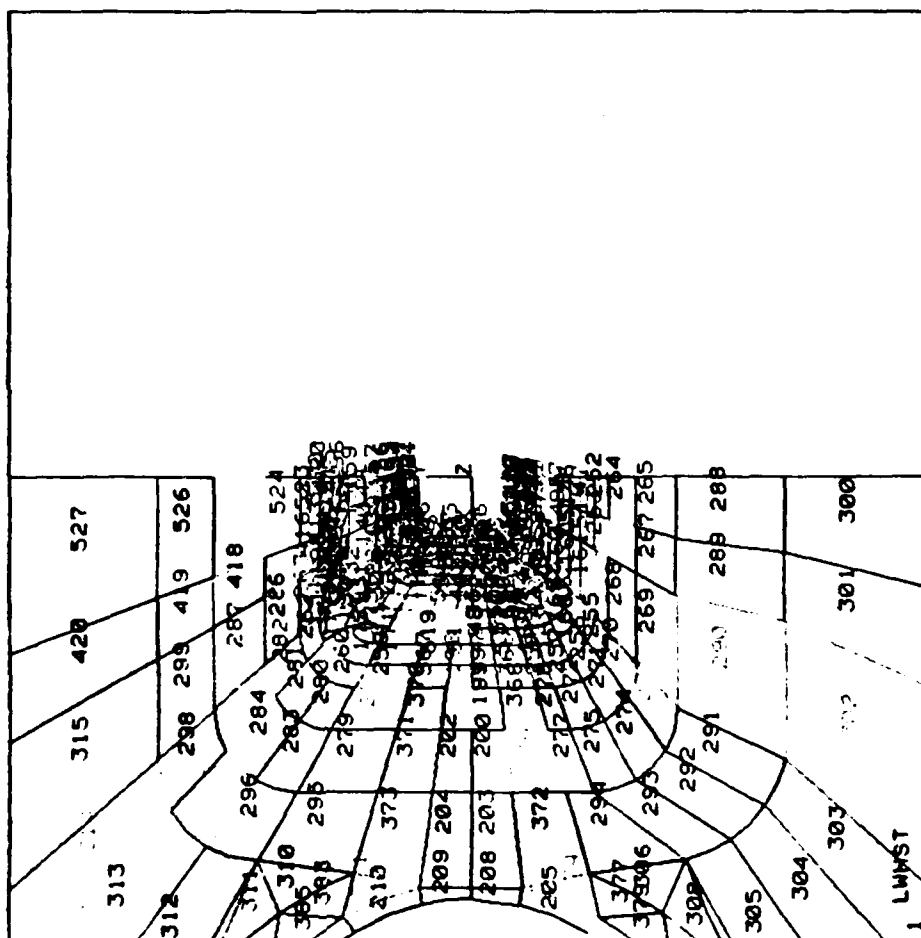
ANSYS 4.2B
FEB 14 1987
16:13:03
PLOT NO. 2
PREP7 ELEMENTS
ENUM=1

ZV=-1
DIST=139
ZF=-119
CONE=40



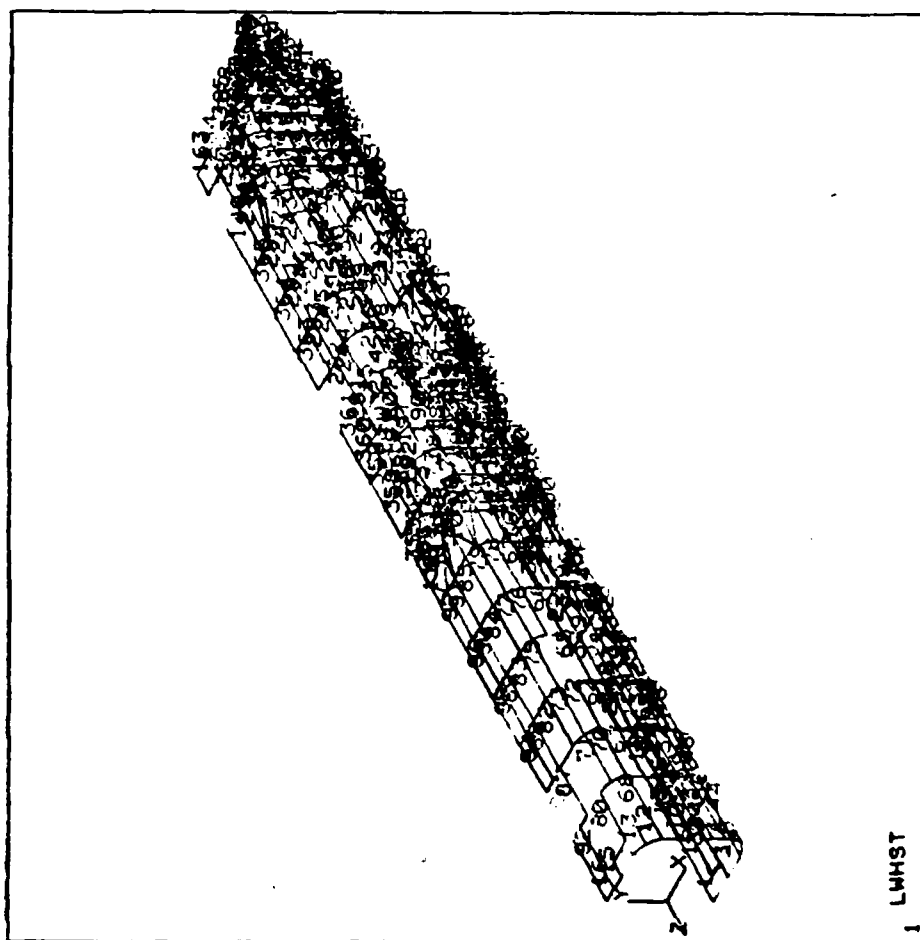
ANSYS 4.2B
FEB 14 1987
16:14:13
PLOT NO. 3
PREP7 ELEMENTS
ENUM=1

ZV=-1
DIST=160
CONE=40



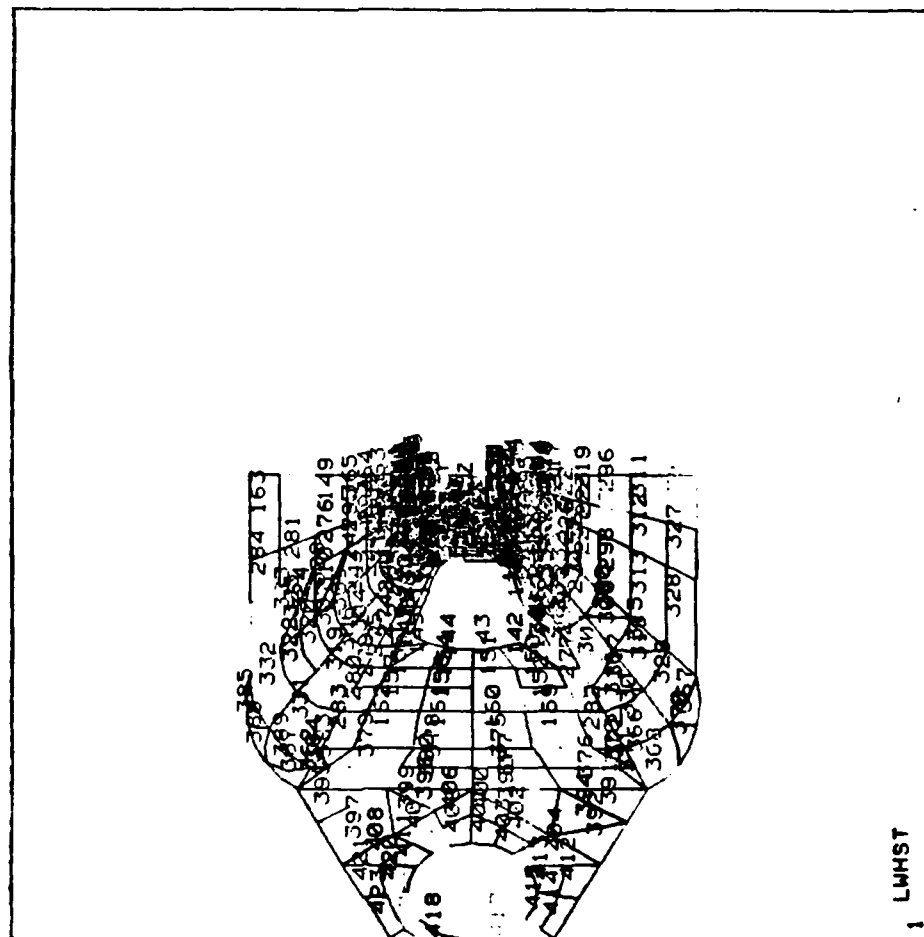
12

ANSYS 4.2B
 FEB 14 1987
 17:02:23
 PLOT NO. 1
 PREP7 ELEMENTS
 ENUM=1
 XV=1
 YV=1
 ZV=1
 DIST=99.6
 XF=12.5
 YF=1.24
 ZF=-115



12

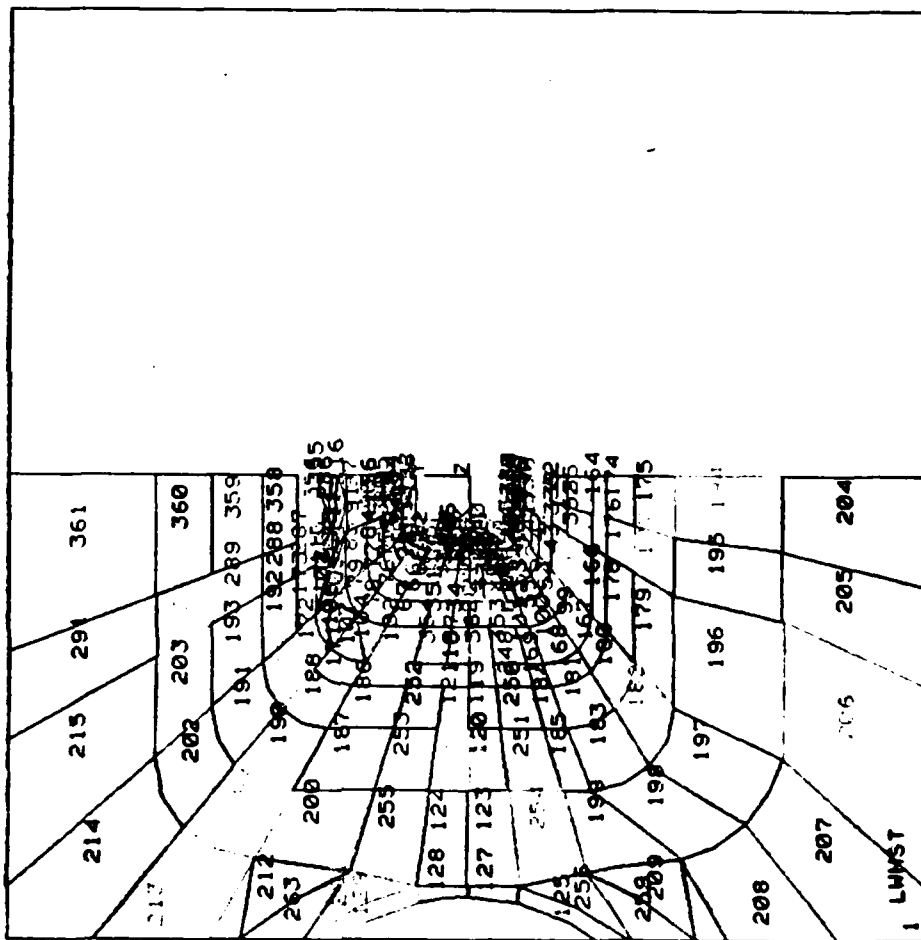
ANSYS 4.2B
FEB 14 1987
17:02:58
PLOT NO. 2
PREP7 ELEMENTS
ENUM=1
2V=-1
* DIST=139
* ZF=-119
CDNE=40



12

ANSYS 4.2B
FEB 14 1987
17:03:30
PLOT NO. 3
PREP7 ELEMENTS
ENUN=1

ZV=-1
DIST=160
CONE=40



D2/310

MCR MEMO: FEBRUARY 14, 1987

2
February 14, 1987

(
Larry Libhardt
FMC Corporation
3989 Central Ave NE
Minneapolis, Mn 55421

Model 12

Static

Dear Larry,

Enclosed are the results for model 12. We made the thickness changes as requested. The buckling analysis is running at this time but will not be finished before I depart. The plots are not labeled but the numbers showing the plot number on the right hand side are virtually the same as before except we added the SXY values. I have also included plots which show the REAL #'s and element numbers for model 12. The model 11 transient model was identical.

Aloha,

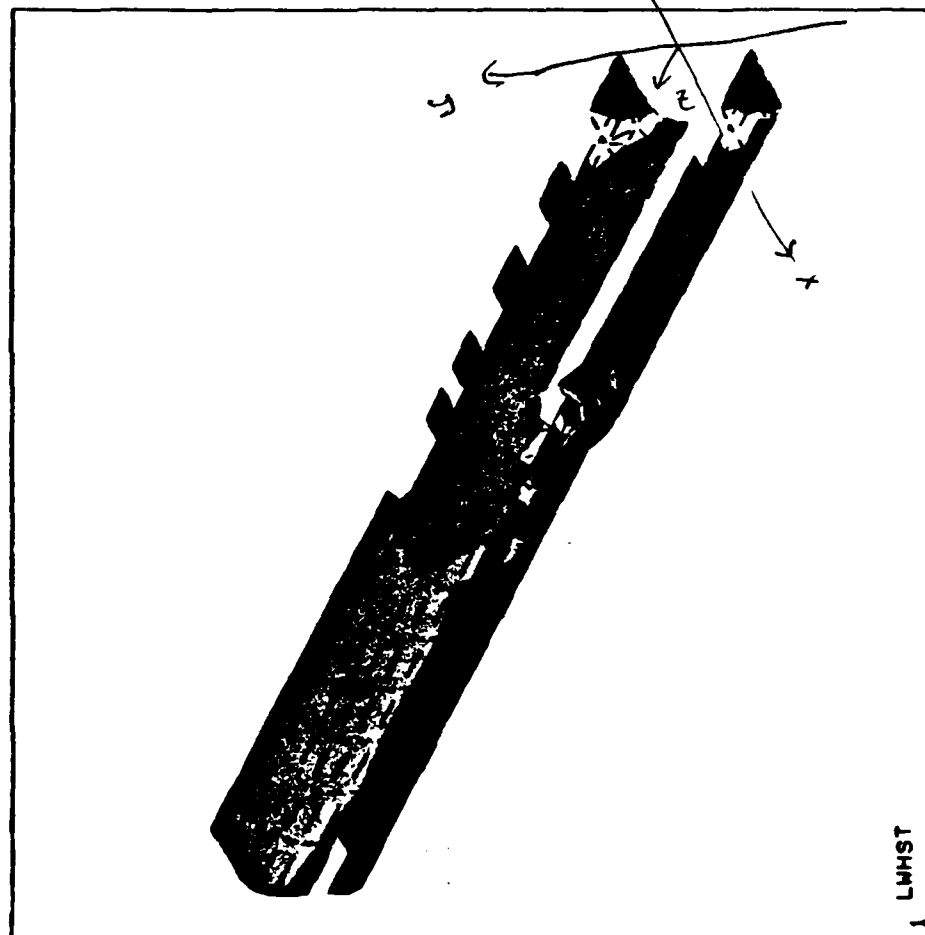
Mark C. Rodamaker

Mark Rodamaker

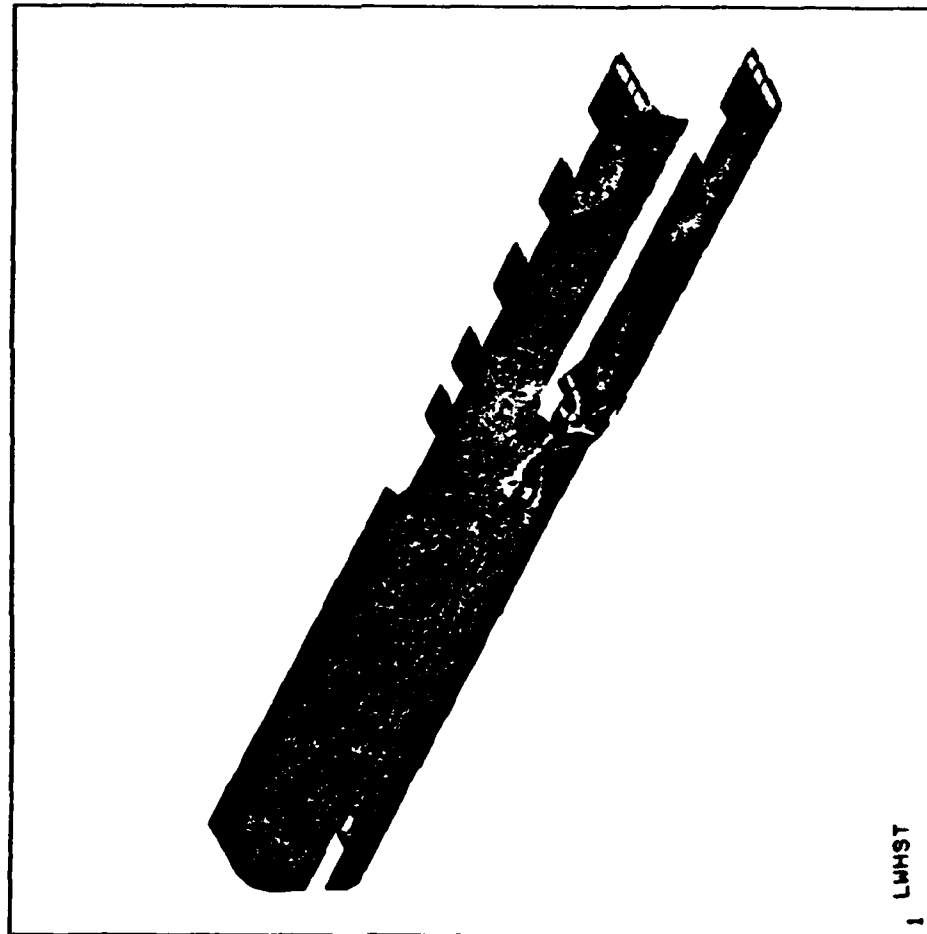
Model

(12)

ANSYS 4.2B
FEB 14 1987
13:54:06
PLOT NO. 1
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=2550
MN=-11340
-9799
-8255
-6711
-5167
-3623

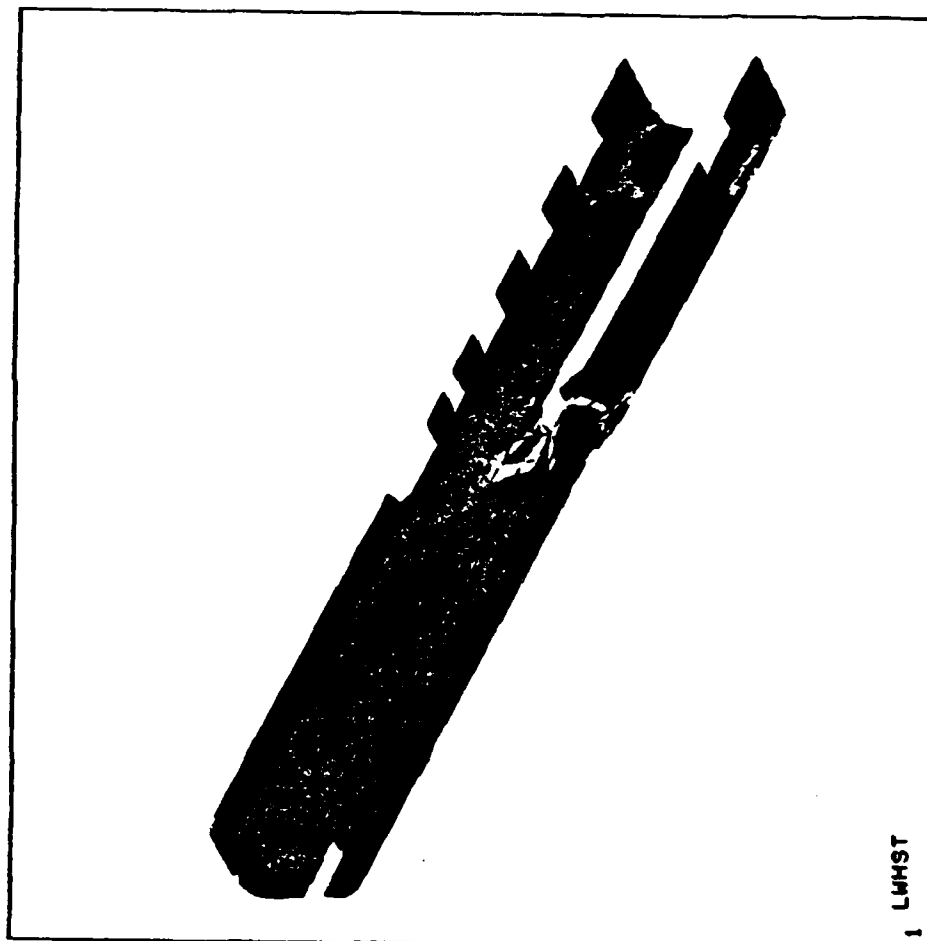


ANSYS 4.2B
 FEB 14 1987
 13:54:42
 PLOT NO. 2
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 TOP
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=5132
 MN=-3362
 -2419
 -1475
 -531
 413
 1357
 1357
 1357



ANSYS 4.2B
FEB 14 1987
13:55:14
PLOT NO. 3
POST1 STRESS
STEP=1
ITER=1
SXY
TOP
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=2301
MN=-2139
-1648
-1154
-660
-166
328



ANSYS 4.2B

FEB 14 1987

13:55:47

PLOT NO. 4

POST1 STRESS

STEP=1

ITER=1

SX

TOP

STRESS ELEM CS

ZV=-1

DIST=120

XF=9.5

ZF=-112

CONE=40

HIDDEN

MX=2550

MN=-11340

-9798

-8255

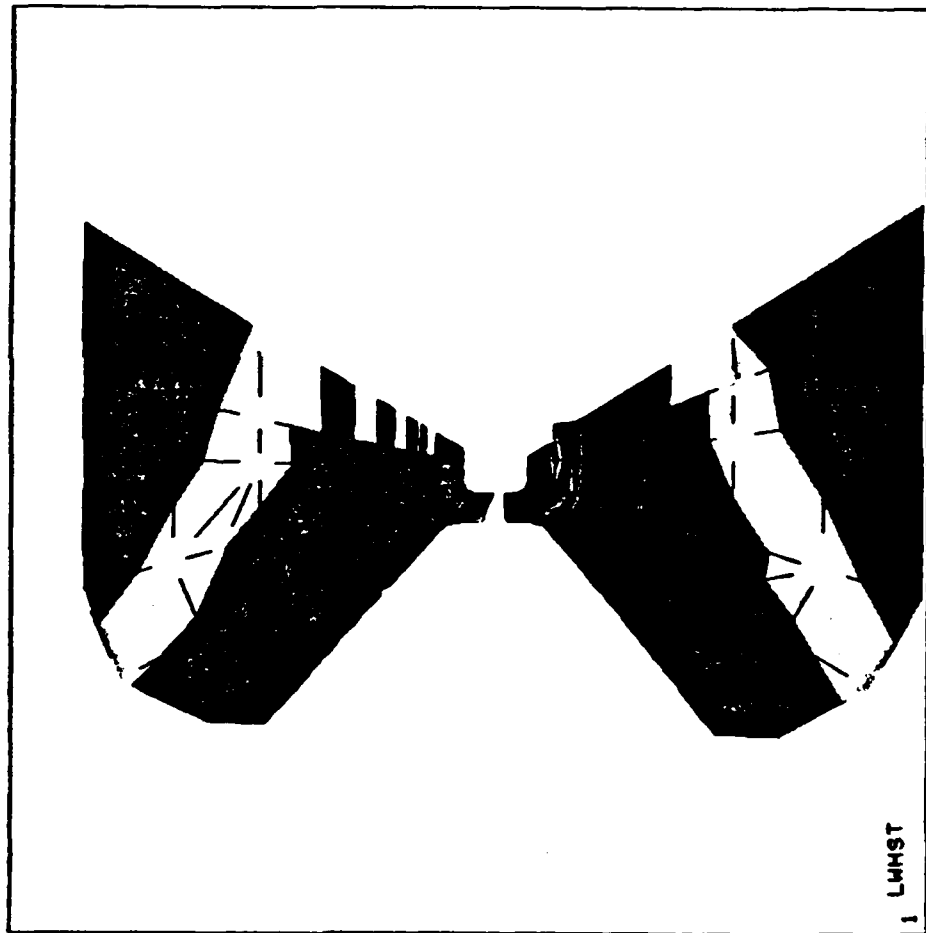
-6711

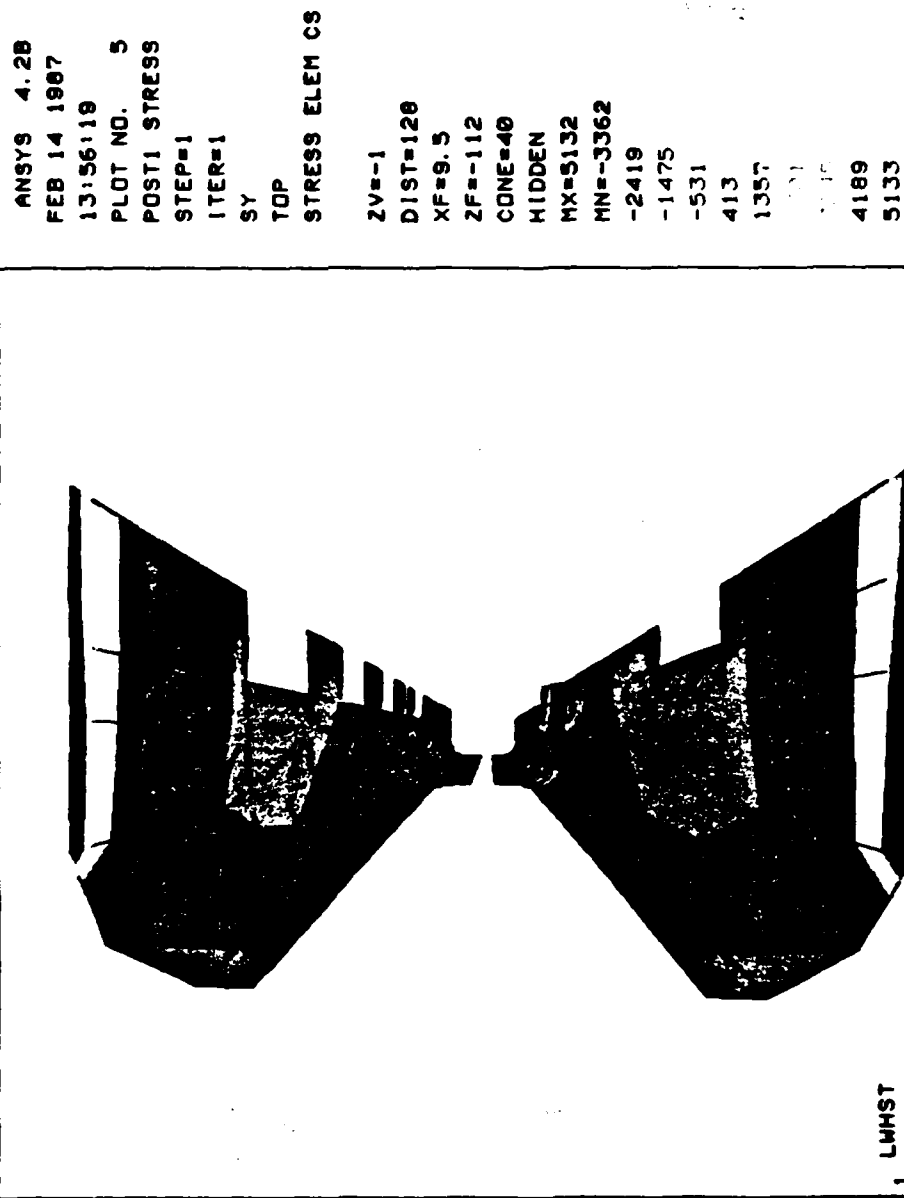
-5167

-3623

1009

2553

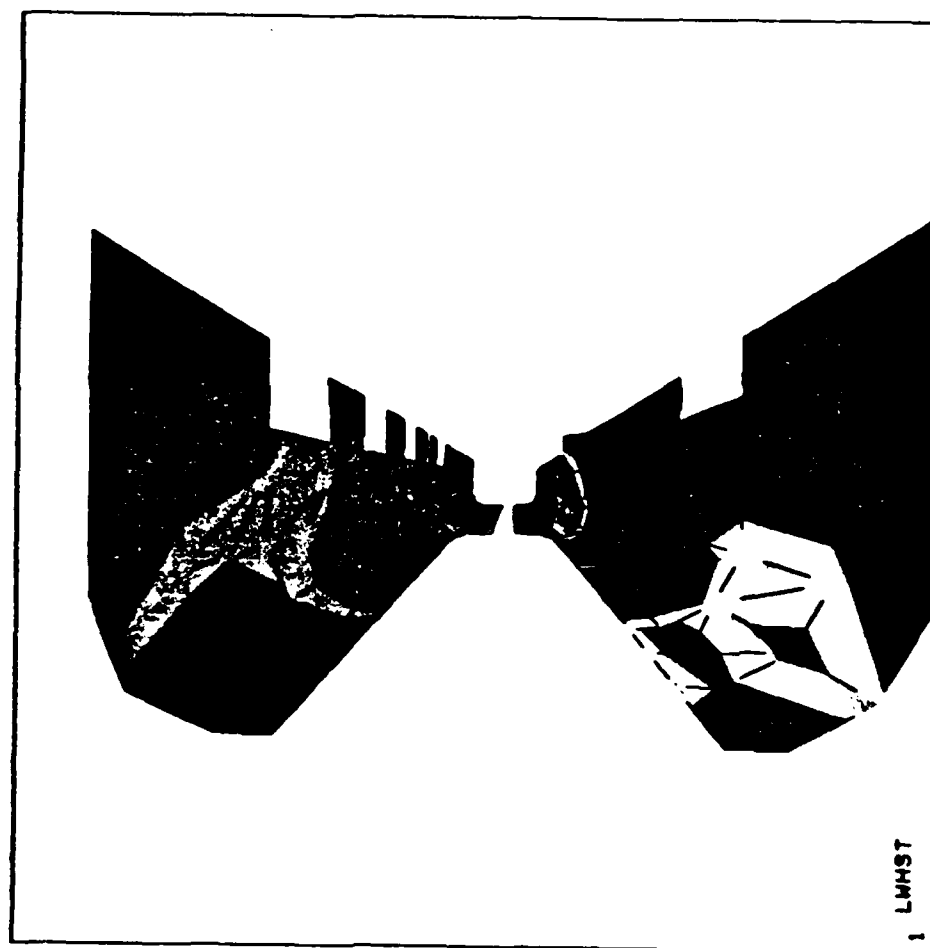




ANSYS 4.2B
FEB 14 1987
13:56:52
PLOT NO. 6
POST1 STRESS
STEP=1
ITER=1
SXY
TOP
STRESS ELEM CS

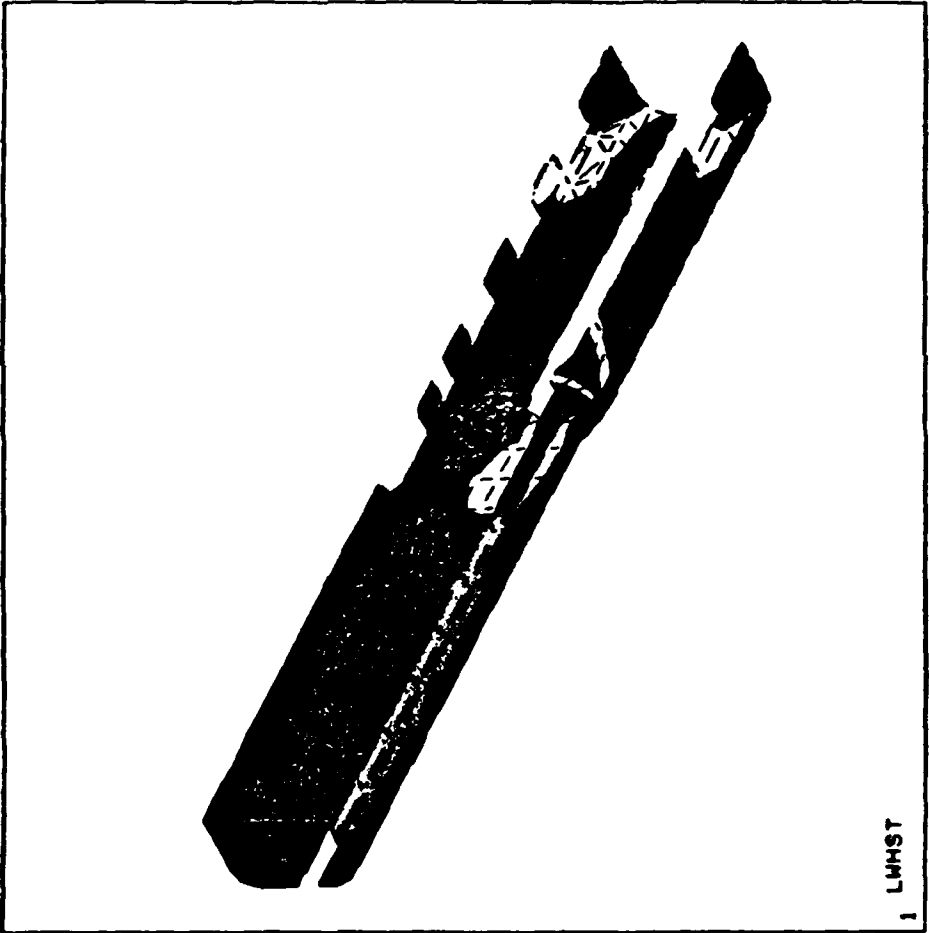
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=2301
MN=-2139
-1648
-1154
-660
-166
328

1810
2304



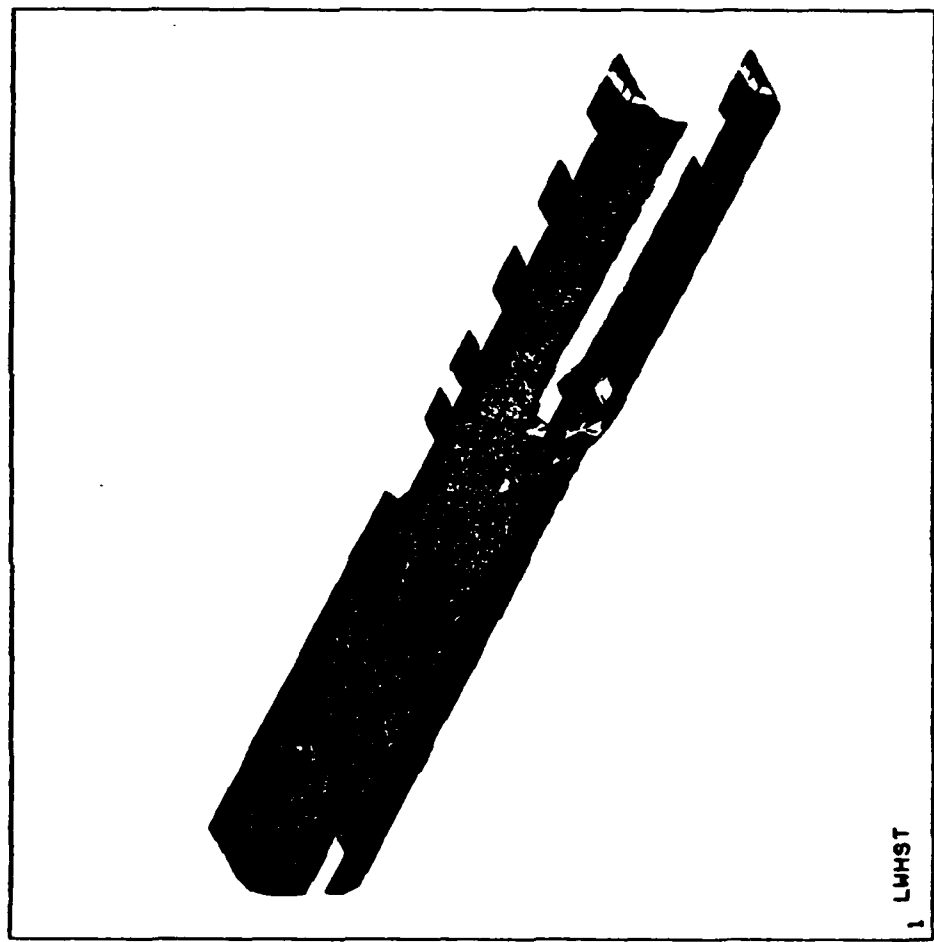
ANSYS 4.2B
FEB 14 1987
13:57:48
PLOT NO. 7
POST1 STRESS
STEP=1
ITER=1
SX
BOTTOM
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=2573
MN=-14456
-12567
-10674
-8781
-6888
-4995
-3110
-1110



ANSYS 4.2B
FEB 14 1987
13:58:21
PLOT NO. 0
POST1 STRESS
STEP=1
ITER=1
SY
BOTTOM
STRESS ELEM CS

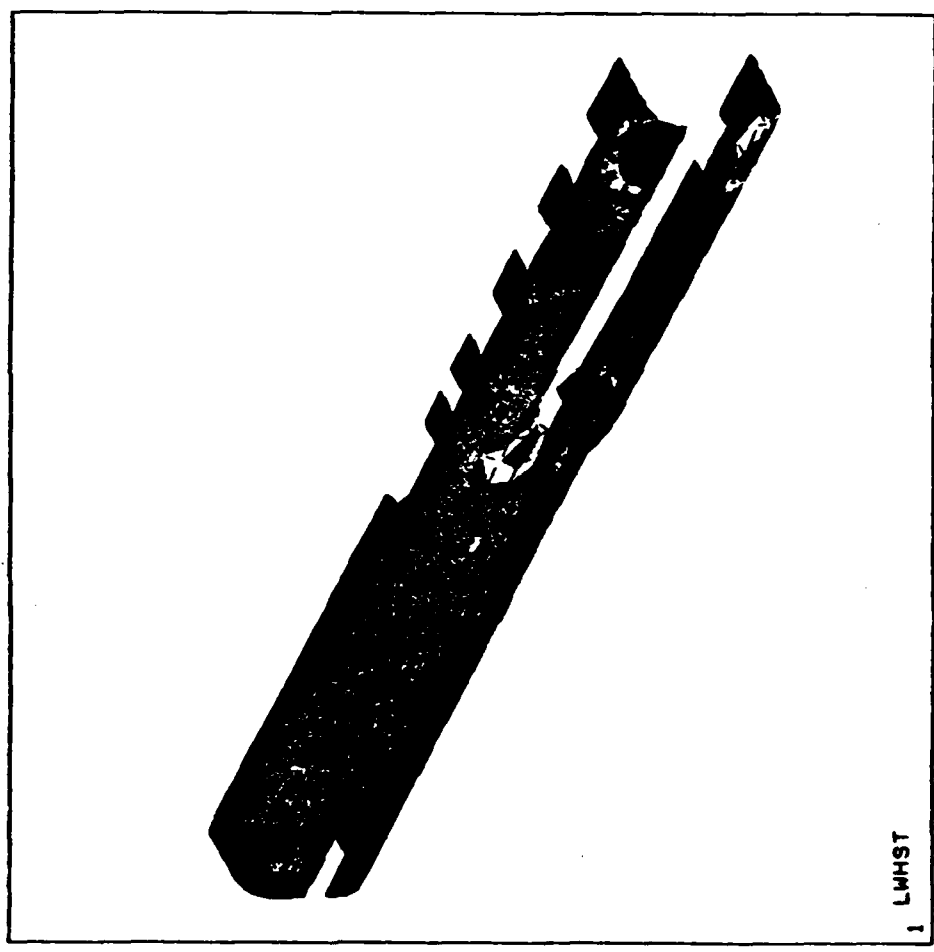
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=3700
MN=-3267
-2496
-1721
-946
-171
604
1700
3100



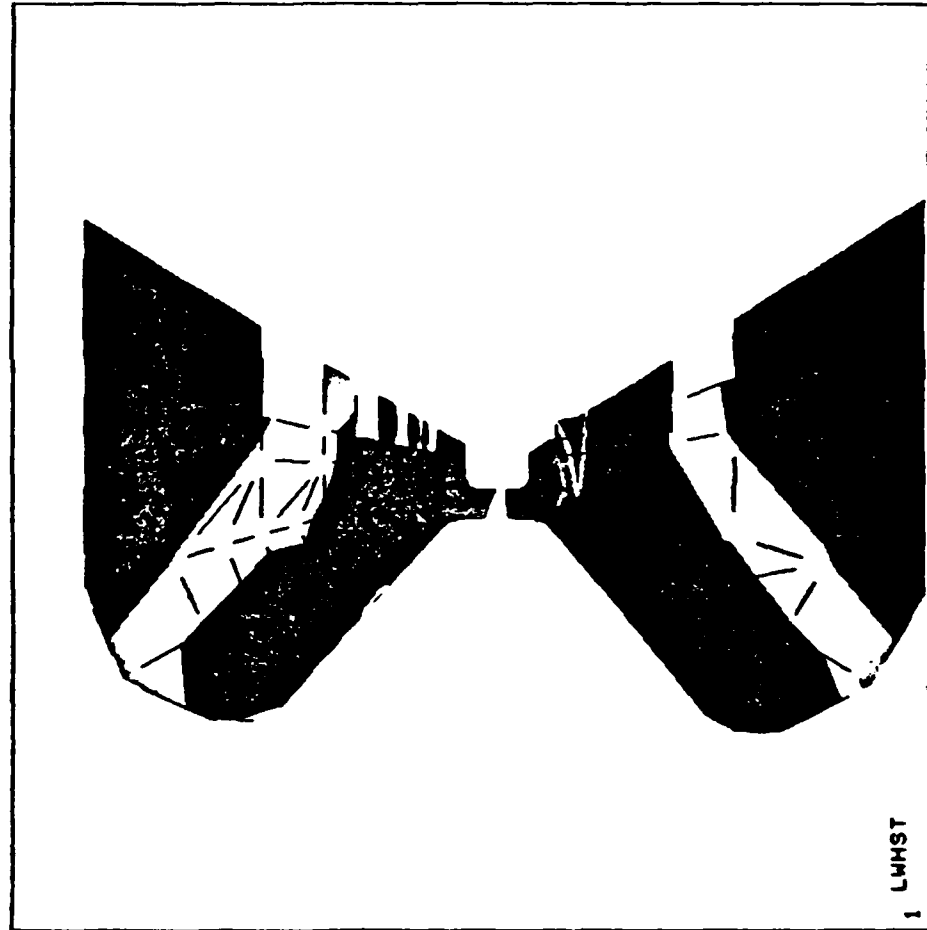
1, LMHST

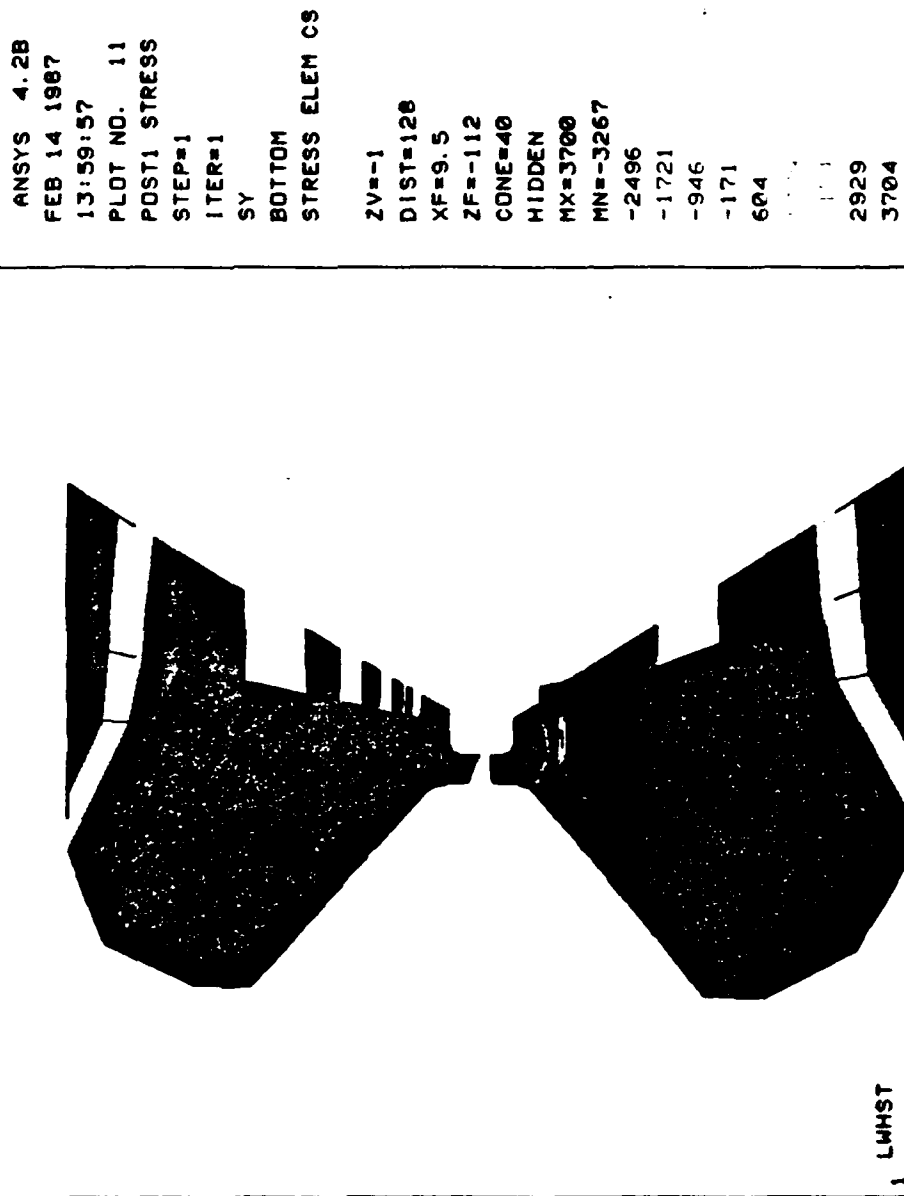
ANSYS 4.2B
 FEB 14 1987
 13:58:52
 PLOT NO. 9
 POST1 STRESS
 STEP=1
 ITER=1
 SKY
 BOTTOM
 STRESS ELEM CS

XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=3351
 MN=-3014
 -2310
 -1602
 -894
 -186
 522

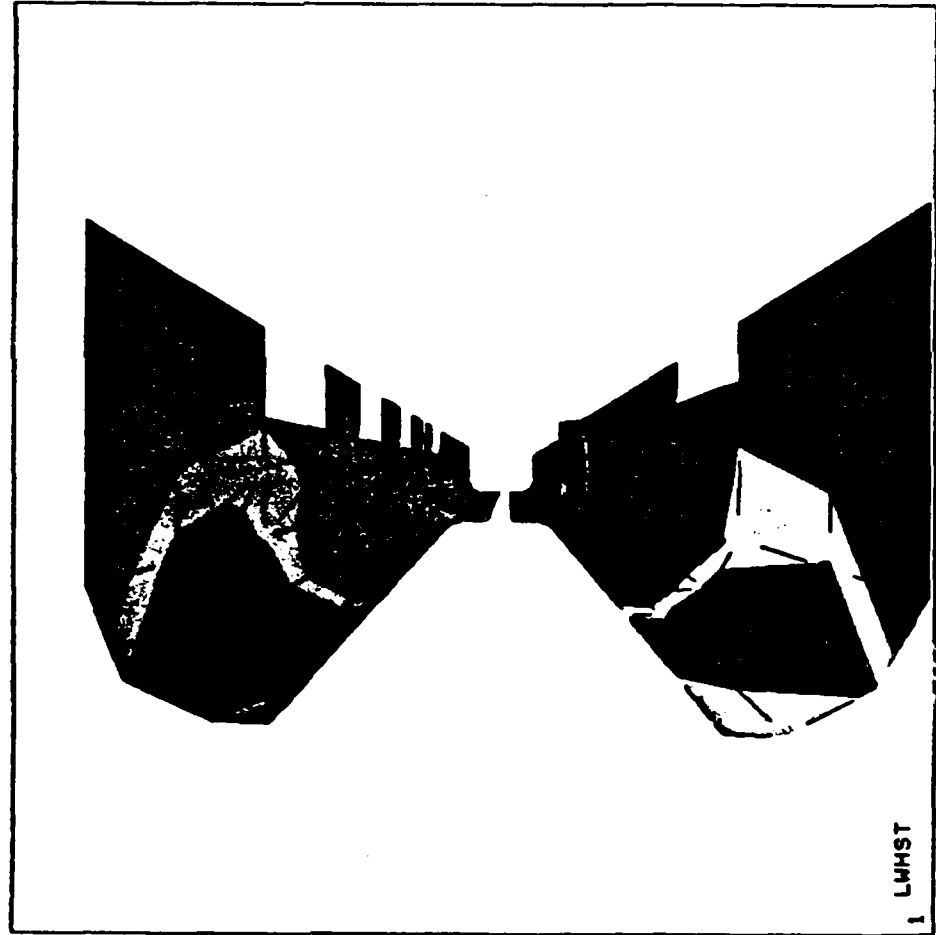


ANSYS 4.2B
 FEB 14 1987
 13:59:24
 PLOT NO. 10
 POST1 STRESS
 STEP=1
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=2573
 MN=-14456
 -12567
 -10674
 -8781
 -6888
 -4995
 684
 2577



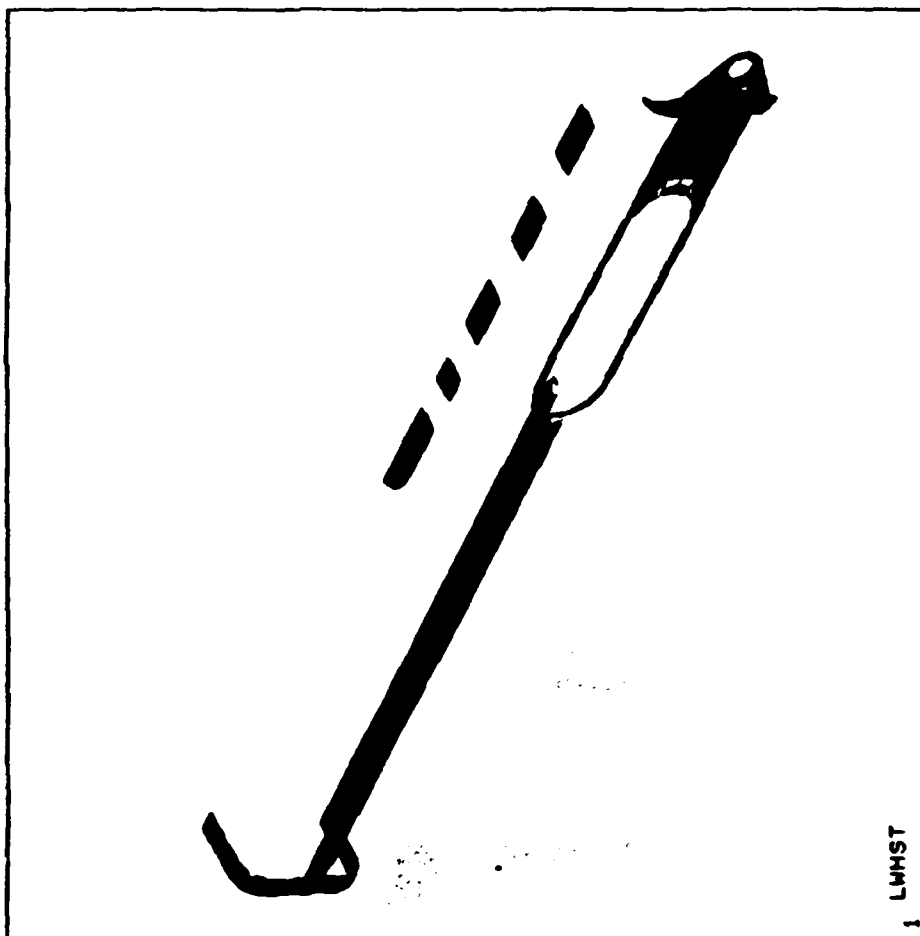


ANSYS 4.2B
 FEB 14 1987
 14:00:29
 PLOT NO. 12
 POST1 STRESS
 STEP=1
 ITER=1
 SXY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=120
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=3351
 MN=-3014
 -2310
 -1602
 -894
 -186
 522
 2646
 3354

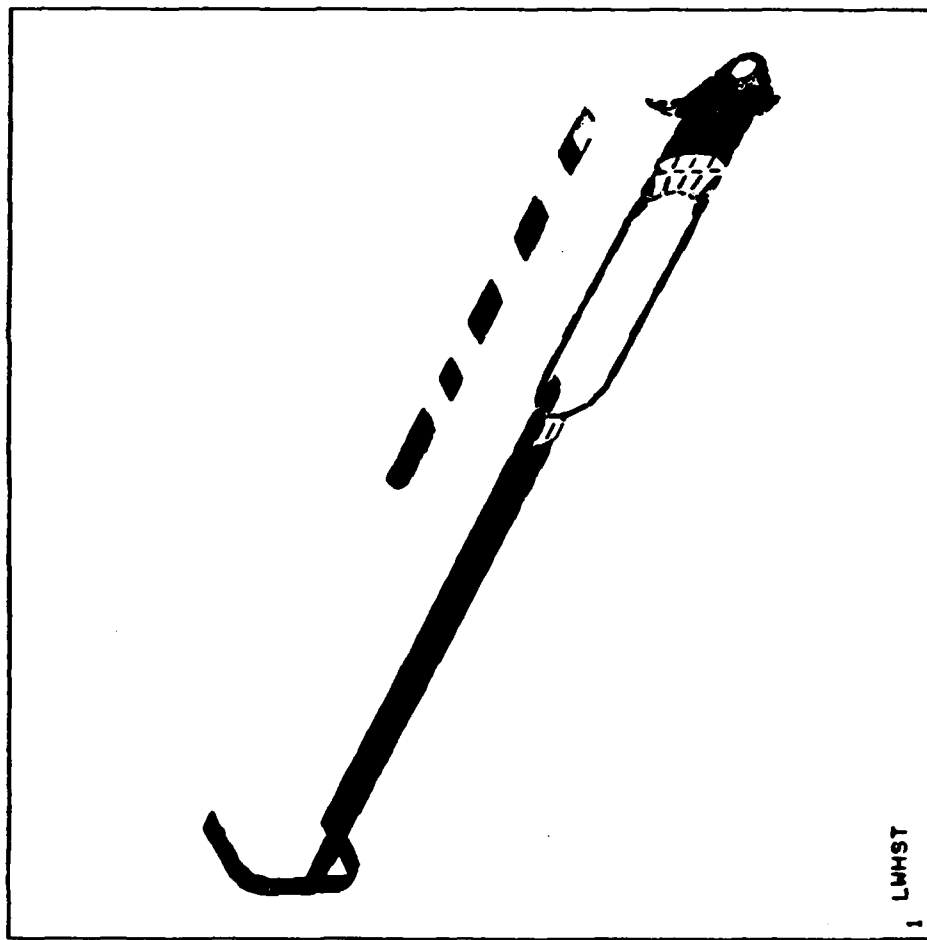


ANSYS 4.2B
FEB 14 1987
14:01:34
PLOT NO. 13
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM CS

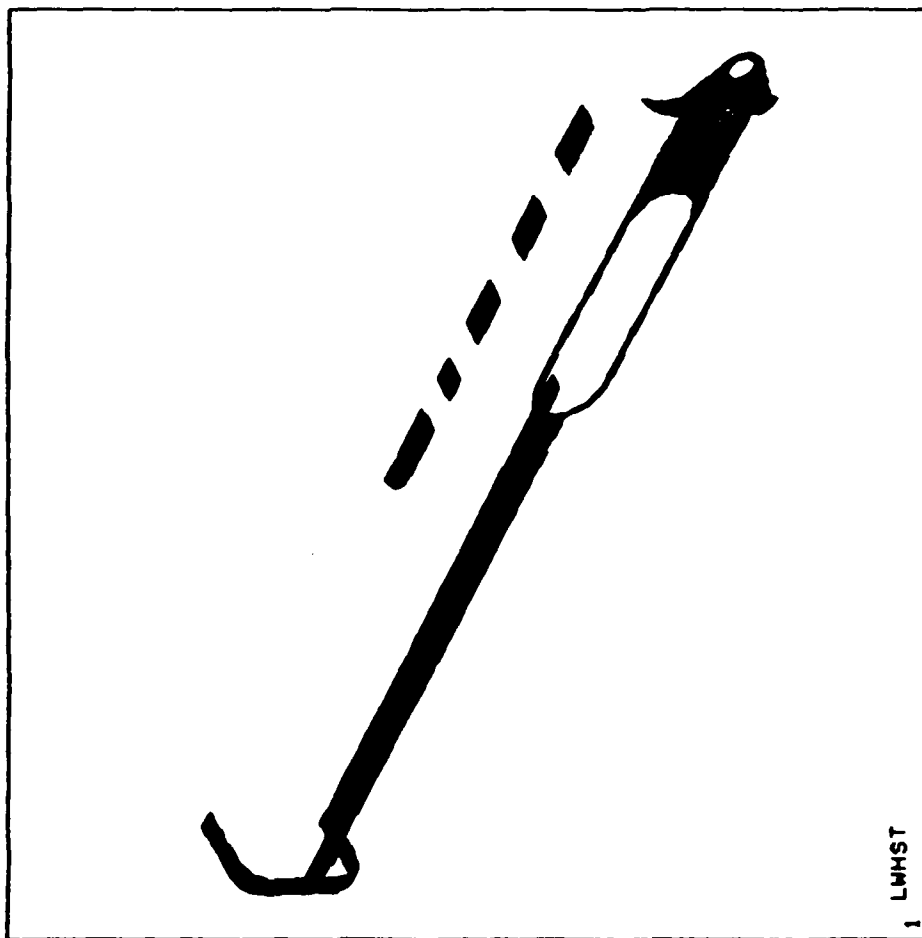
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=6754
MN=-6004
-4588
-3170
-1752
-334
10R4
2000
3000



ANSYS 4.2B
 FEB 14 1987
 14:01:53
 PLOT NO. 14
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 TOP
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=6593
 MN=-18544
 -15751
 -12958
 -10165
 -7372
 -4579



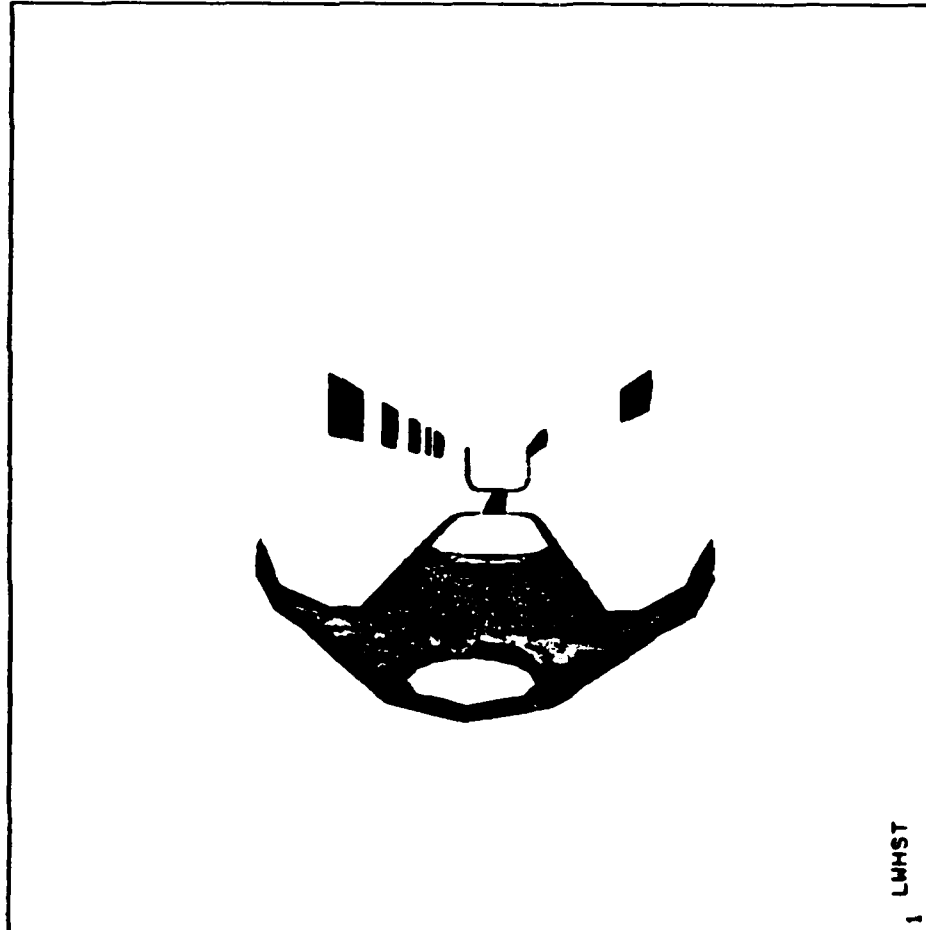
ANSYS 4.2B
 FEB 14 1987
 14:02:10
 PLOT NO. 15
 POST1 STRESS
 STEP=1
 ITER=1
 SXY
 TOP
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=11738
 MN=-13946
 -11093
 -8239
 -5385
 -2531
 323



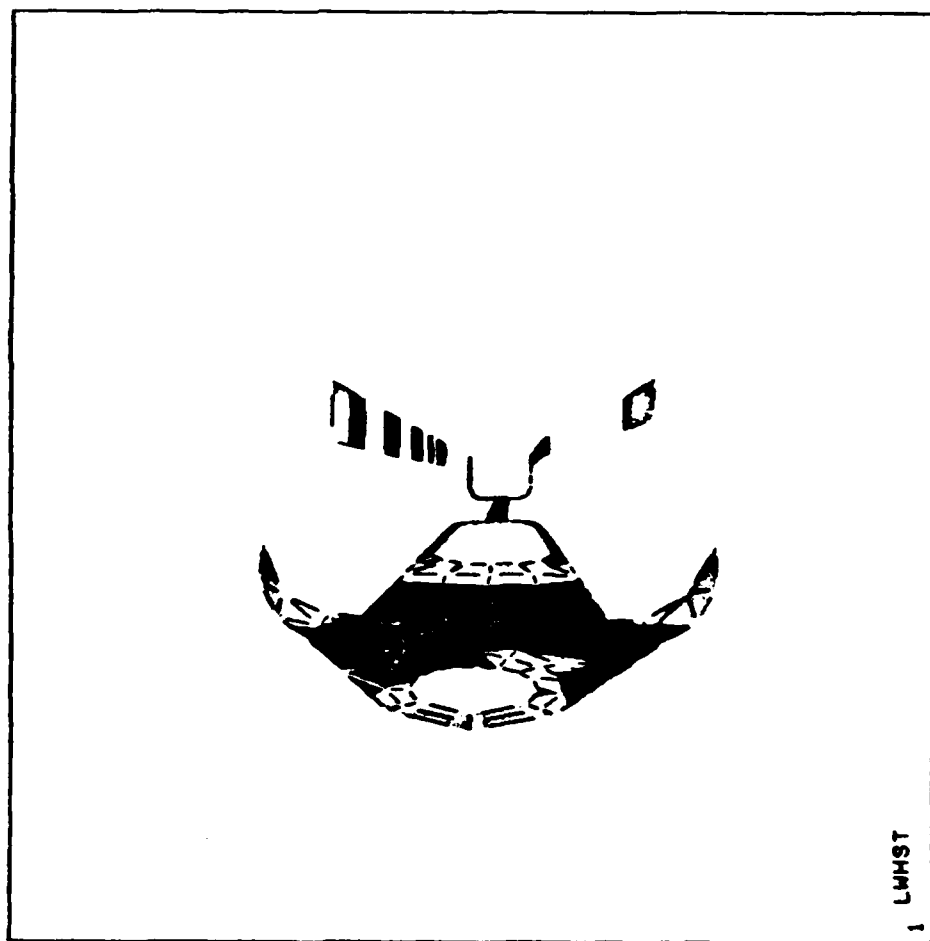
ANSYS 4.2B
FEB 14 1987
14:02:27
PLOT NO. 16
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM C9

ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=6754
MN=-6004
-4588
-3170
-1752
-334
1004

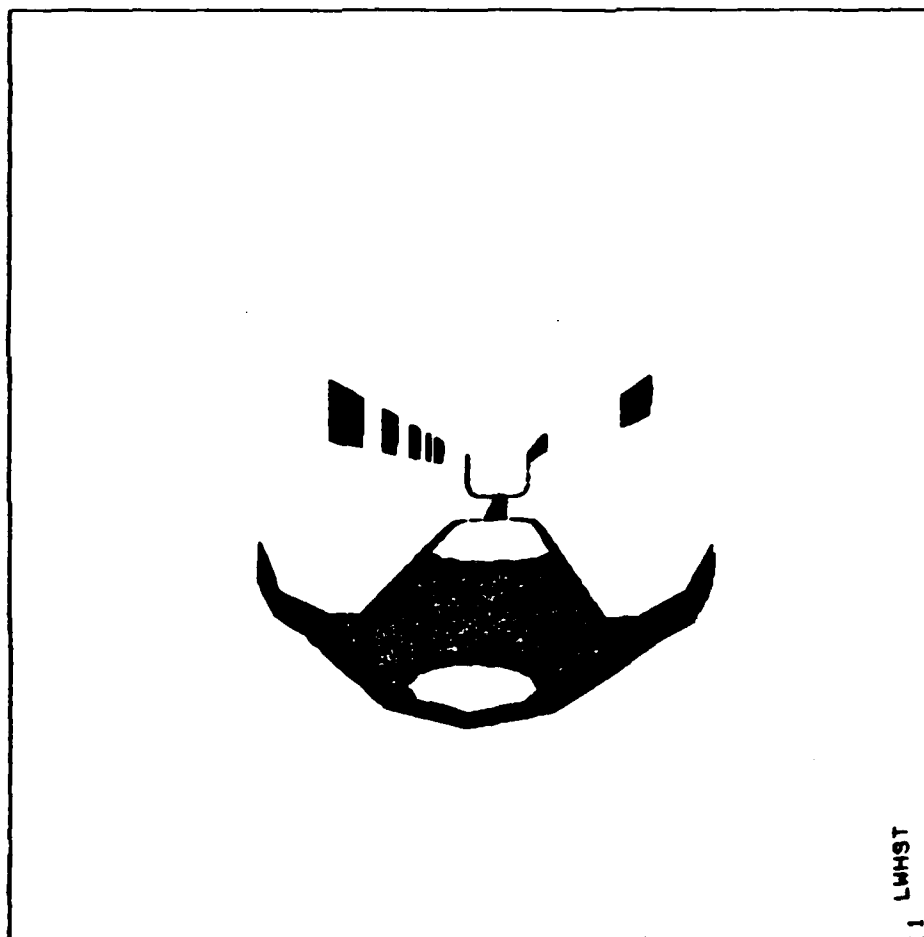
5338
6756



ANSYS 4.2B
FEB 14 1987
14:02:46
PLOT NO. 17
POST1 STRESS
STEP=1
ITER=1
SY
TOP
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-118
CONE=40
HIDDEN
MX=6593
MN=-18544
-15751
-12958
-10165
-7372
-4579
3800
6593

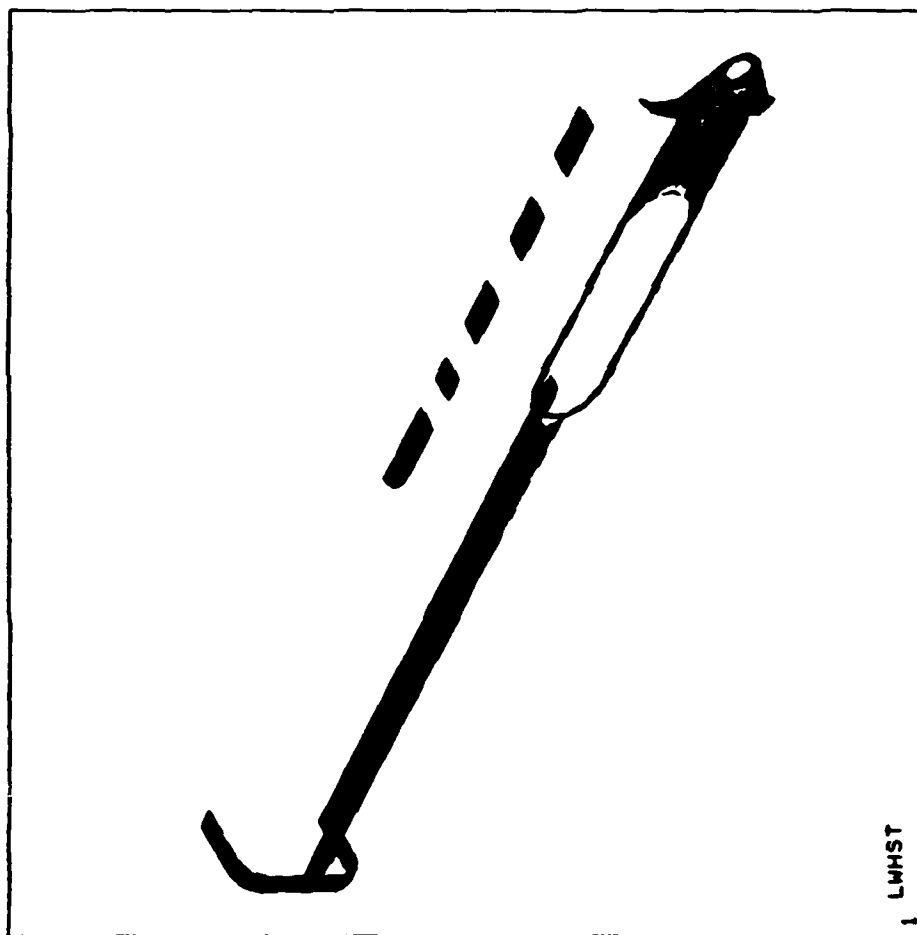


ANSYS 4.2B
 FEB 14 1987
 14:03:04
 PLOT NO. 18
 POST1 STRESS
 STEP=1
 ITER=1
 SXY
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=11730
 MN=-13946
 -11093
 -8239
 -5385
 -2531
 323
 8885
 11739



ANSYS 4.28
 FEB 14 1987
 14:03:38
 PLOT NO. 19
 POST1 STRESS
 STEP=1
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS

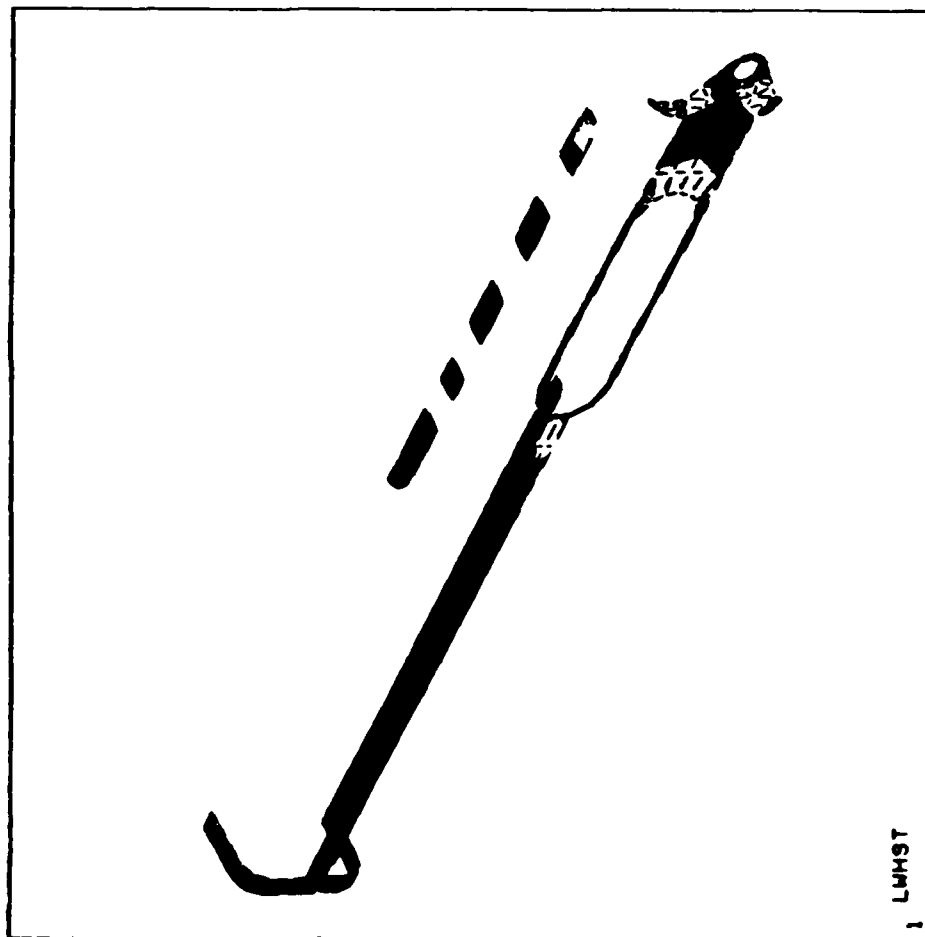
XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=8196
 MN=-5630
 -4097
 -2560
 -1023
 514
 2051



1 LWHST

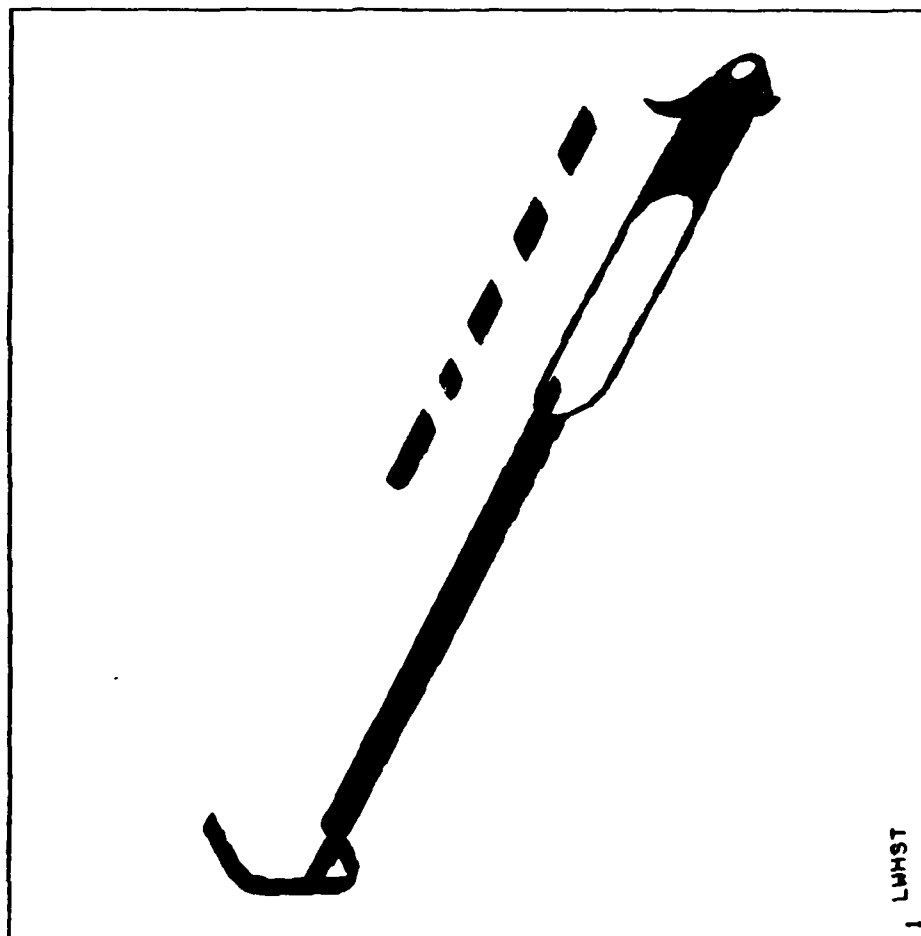
ANSYS 4.2B
 FEB 14 1987
 14:03:57
 PLOT NO. 20
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS

XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 MIDDEN
 MX=6154
 MN=-17203
 -14611
 -12015
 -9419
 -6823
 -4227
 1 11

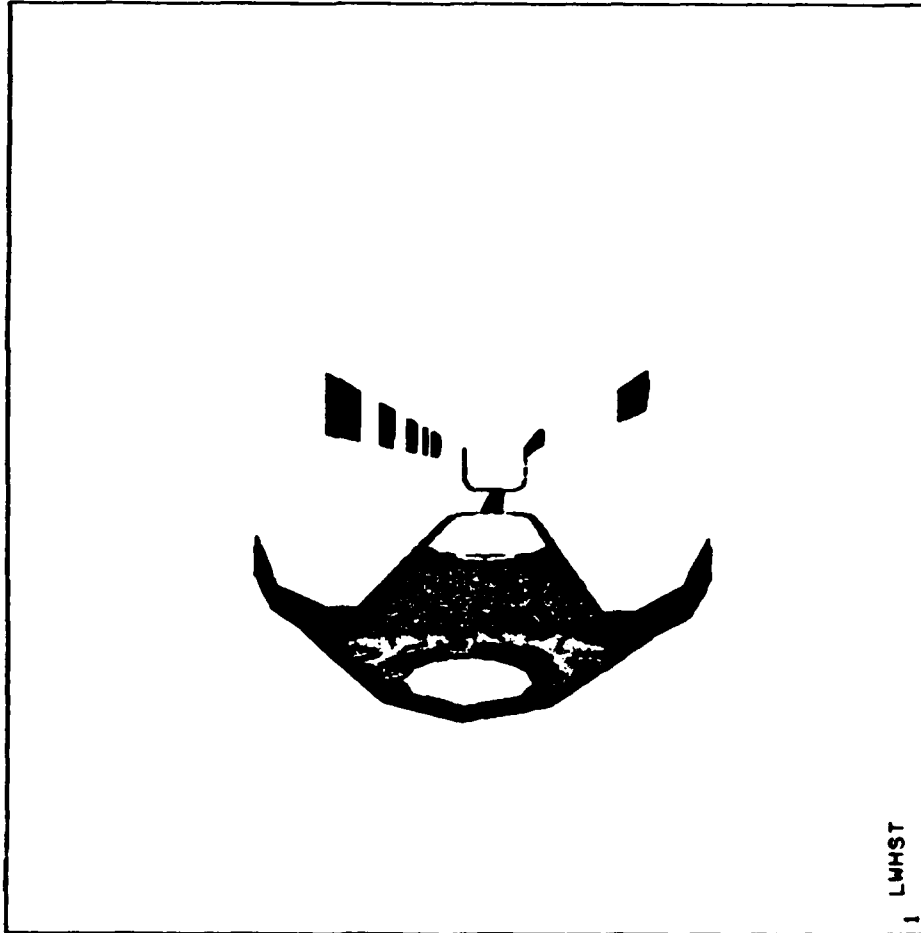


ANSYS 4.2B
FEB 14 1987
14:04:14
PLOT NO. 21
POST1 STRESS
STEP=1
ITER=1
SXY
BOTTOM
STRESS ELEM C3

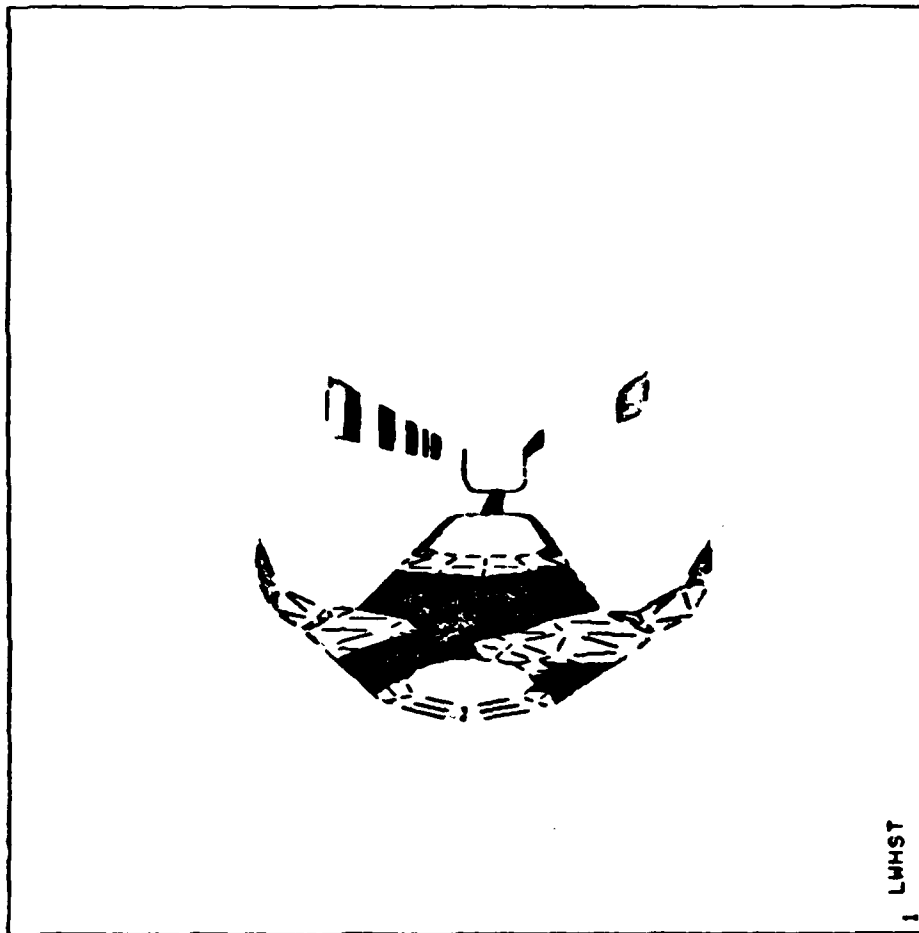
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=11982
MN=-15332
-12297
-9262
-6227
-3192
-157



ANSYS 4.2B
FEB 14 1987
14:04:33
PLOT NO. 22
POST1 STRESS
STEP=1
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=8196
MN=-5630
-4097
-2560
-1023
514
2051
6662
8199



ANSYS 4.2D
 FEB 14 1987
 14:04:50
 PLOT NO. 23
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=6154
 MN=-17203
 -14611
 -12015
 -9419
 -6823
 -4227
 3561
 6157



ANSYS 4.2B

FEB 14 1987

14:05:07

PLOT NO. 24

POST1 STRESS

STEP=1

ITER=1

SXY

BOTTOM

STRESS ELEM CS

ZV=-1

DIST=139

XF=9.5

ZF=-119

CONE=40

HIDDEN

MX=11982

MN=-15332

-12297

-9262

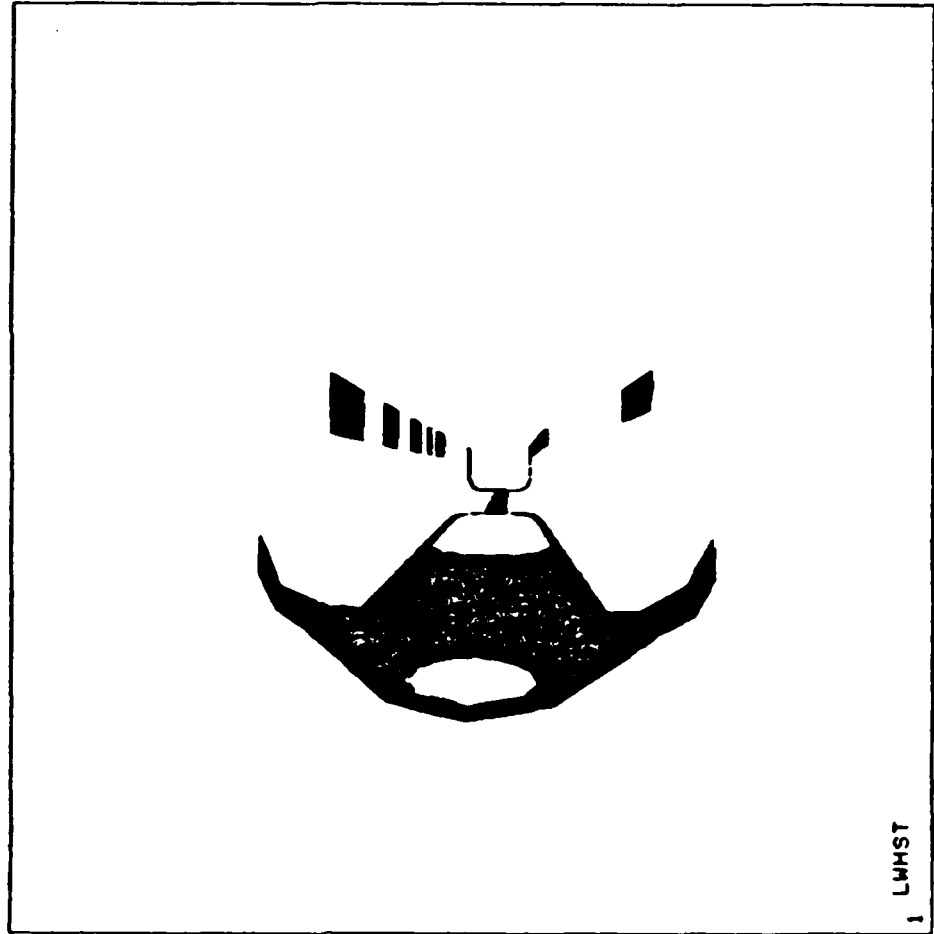
-6227

-3192

-157

8948

11983



ANSYS 4.2B

FEB 14 1987

14:05:55

PLOT NO. 25

POST1 STRESS

STEP=1

ITER=1

SIGE

BOTTOM

XV=1

YV=1

ZV=-1

DIST=59.9

YF=1.63

ZF=-52

HIDDEN

MX=2422

MN=6.11

273

542

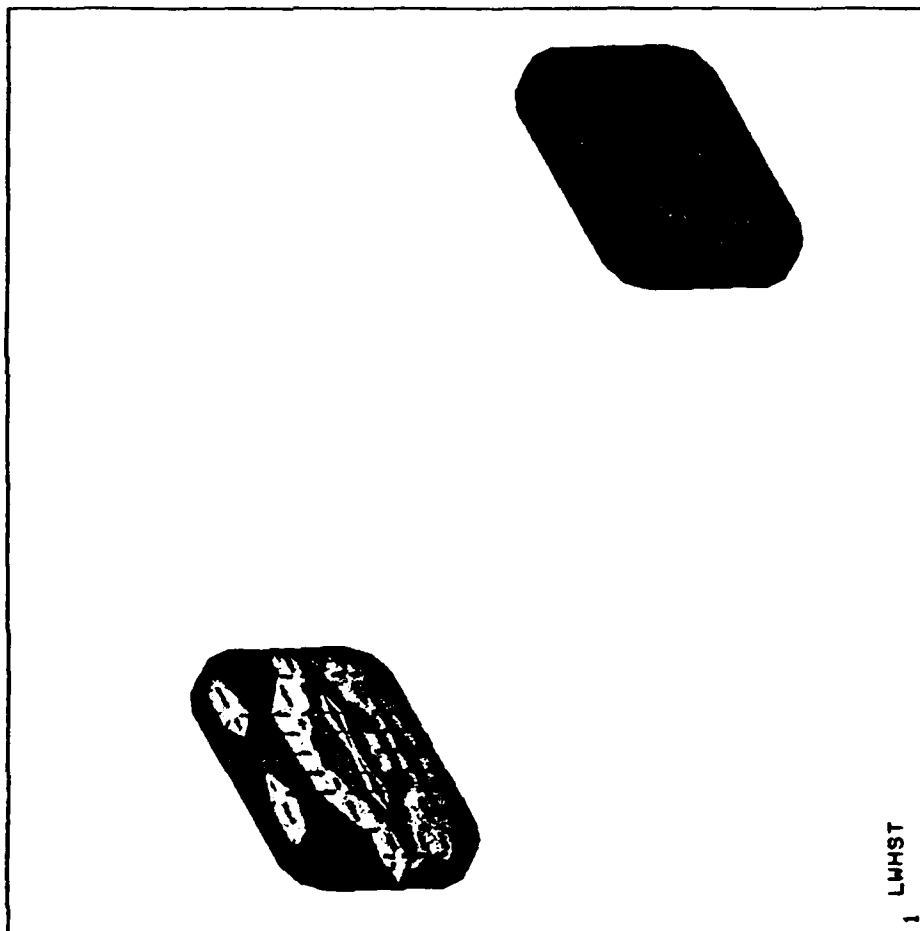
811

1080

1349

2156

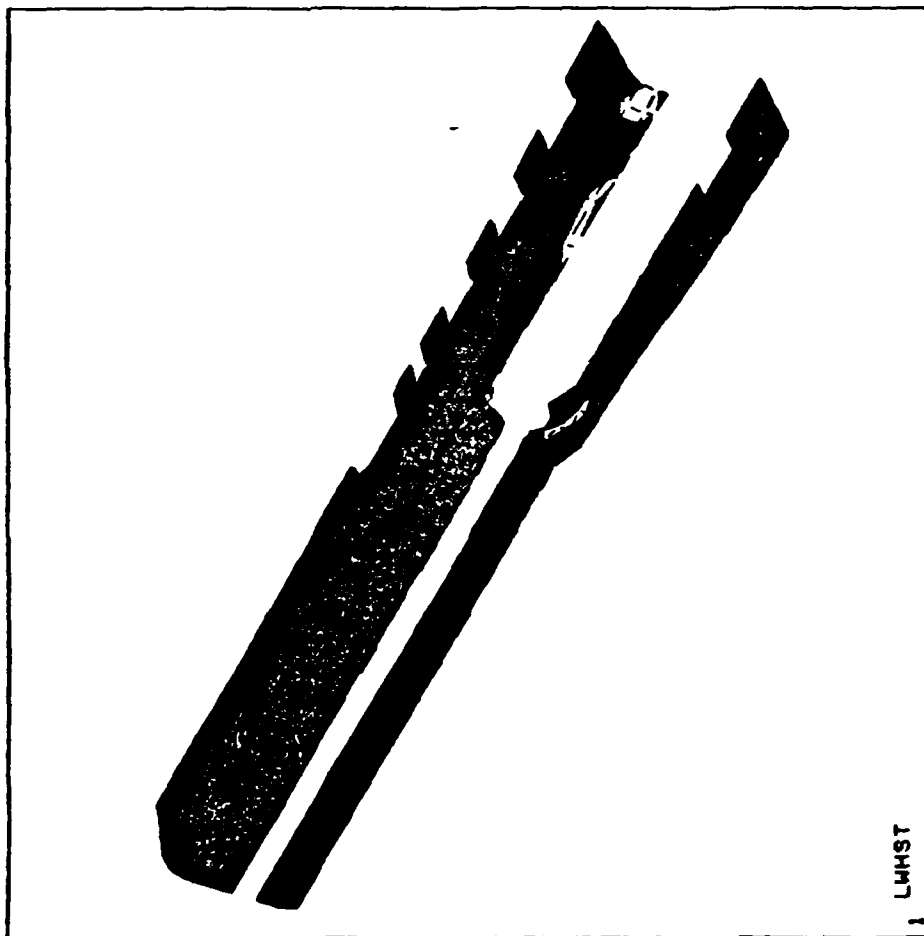
2425



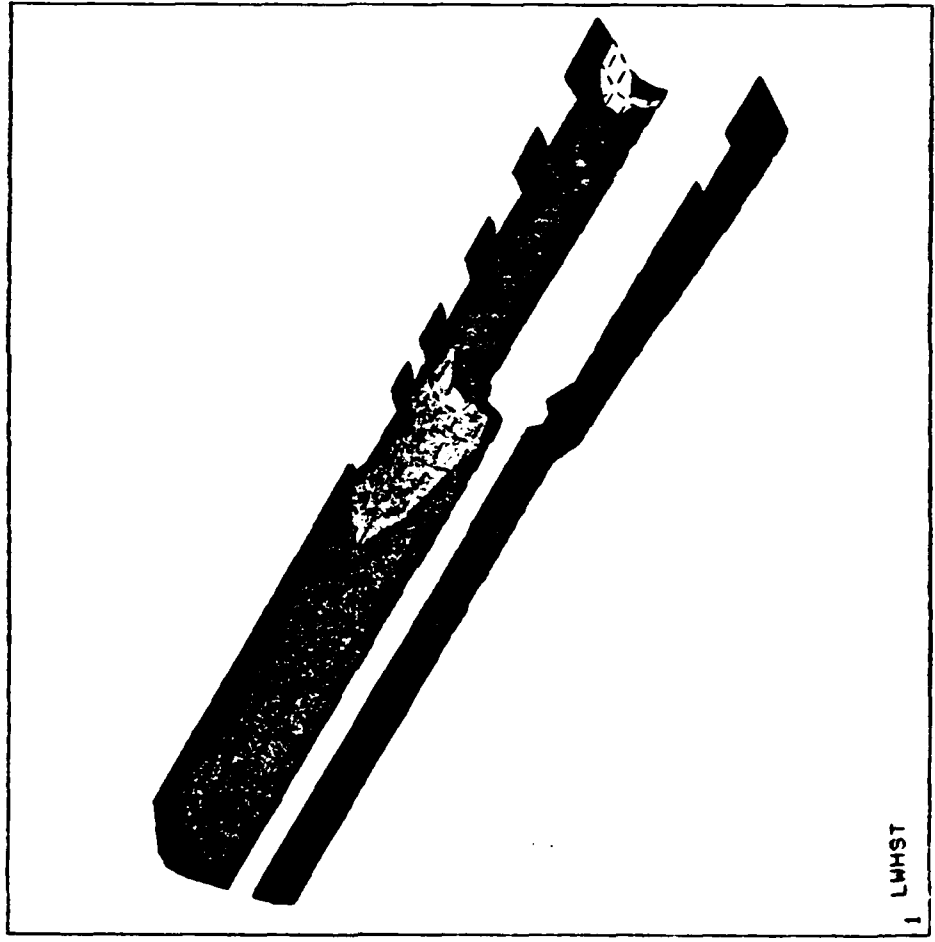
Model 12

ANSYS 4.2B
 FEB 14 1987
 14:09:00
 PLOT NO. 26
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 TOP
 STRESS ELEM CS

XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=11508
 MN=-11549
 -8988
 -6426
 -3864
 -1302
 1260

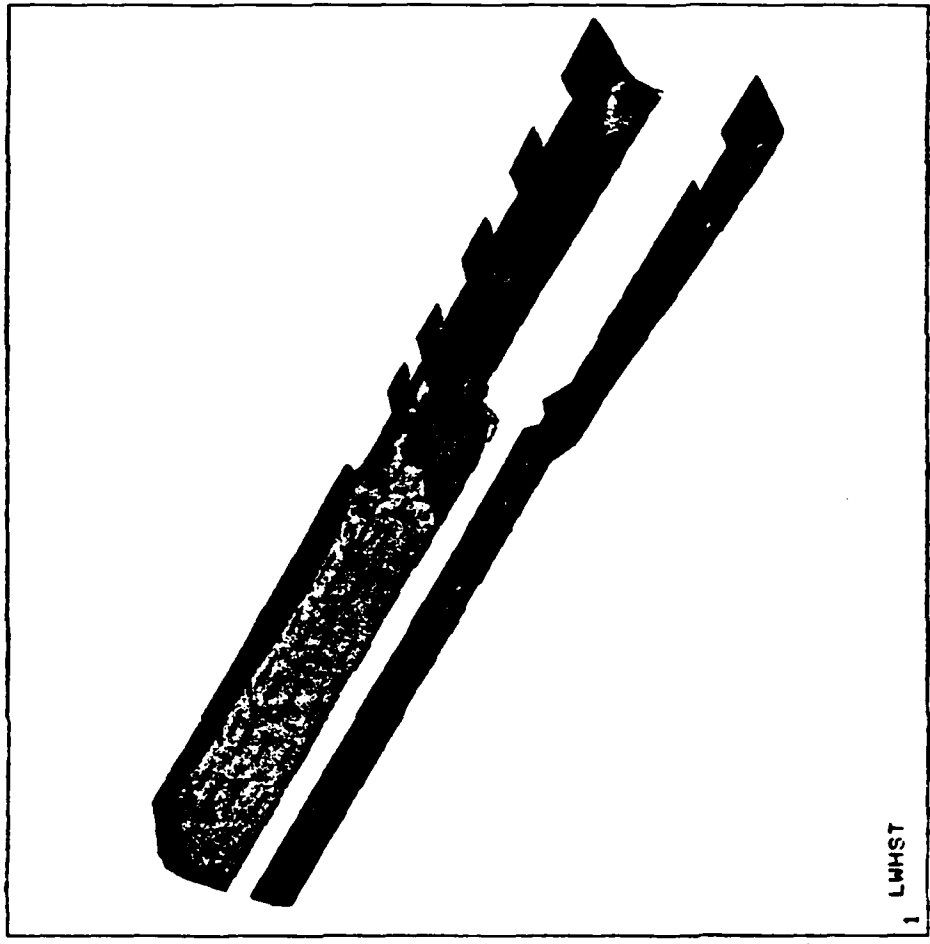


ANSYS 4.2B
FEB 14 1987
14:09:34
PLOT NO. 27
POST1 STRESS
STEP=2
ITER=1
SY
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=18920
MN=-19948
-15630
-11311
-6992
-2673
1646



ANSYS 4.2B
FEB 14 1987
14:10:05
PLOT NO. 28
POST1 STRESS
STEP=2
ITER=1
SXY
TDP
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=12516
MN=-2425
-768
893
2554
4215
5876



1 LWHST

ANSYS 4.2B

FEB 14 1987

14:10:37

PLOT NO. 29

POST1 STRESS

STEP=2

ITER=1

SX

TOP

STRESS ELEM CS

ZV=-1

DIST=128

XF=9.5

ZF=-112

CONE=40

HIDDEN

MX=11508

MN=-11549

-8988

-6426

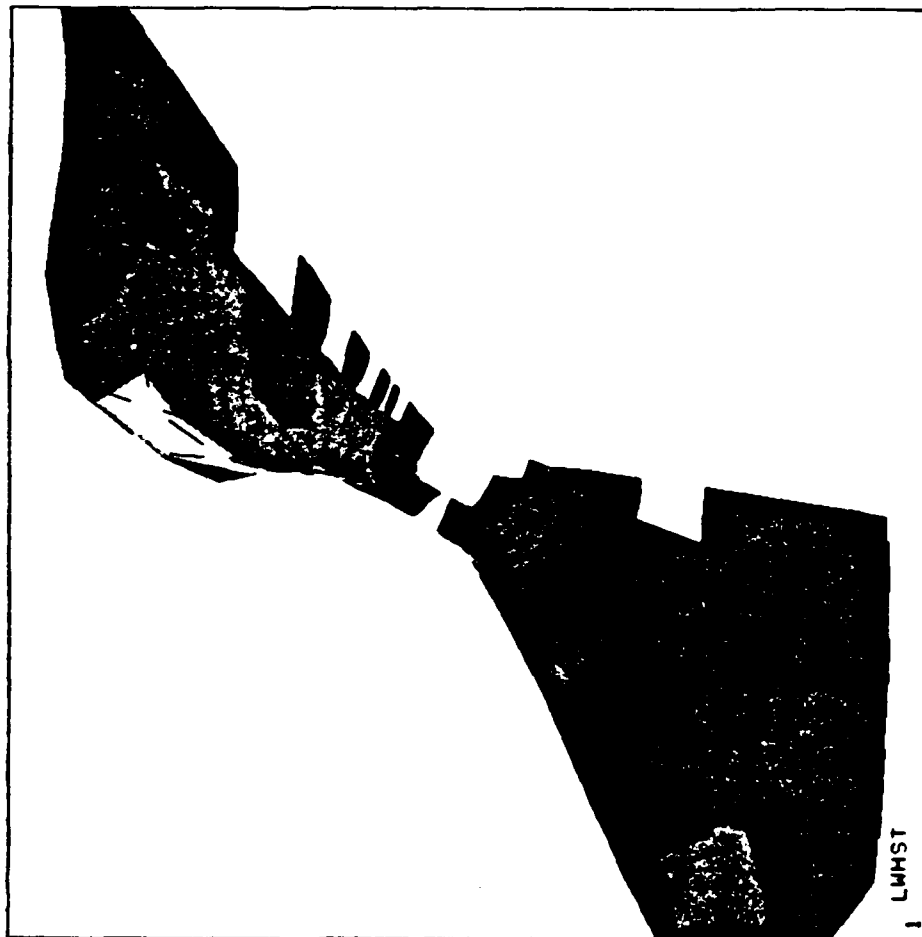
-3864

-1302

1260

8946

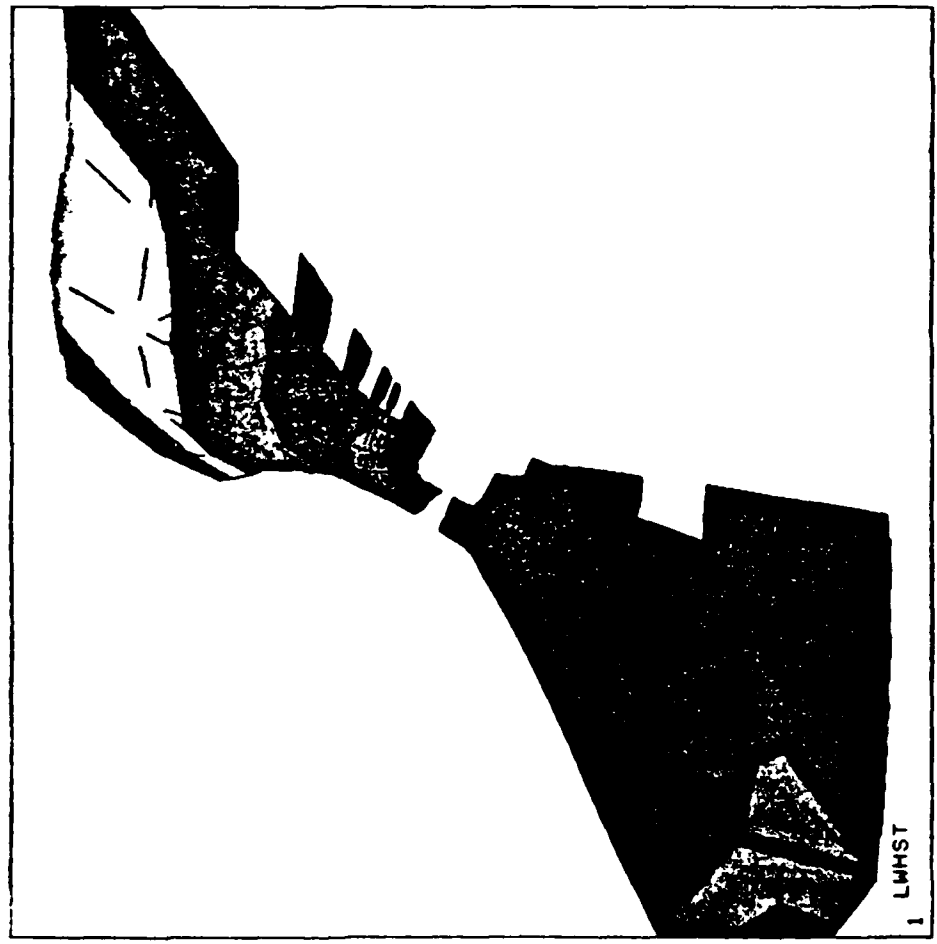
11508

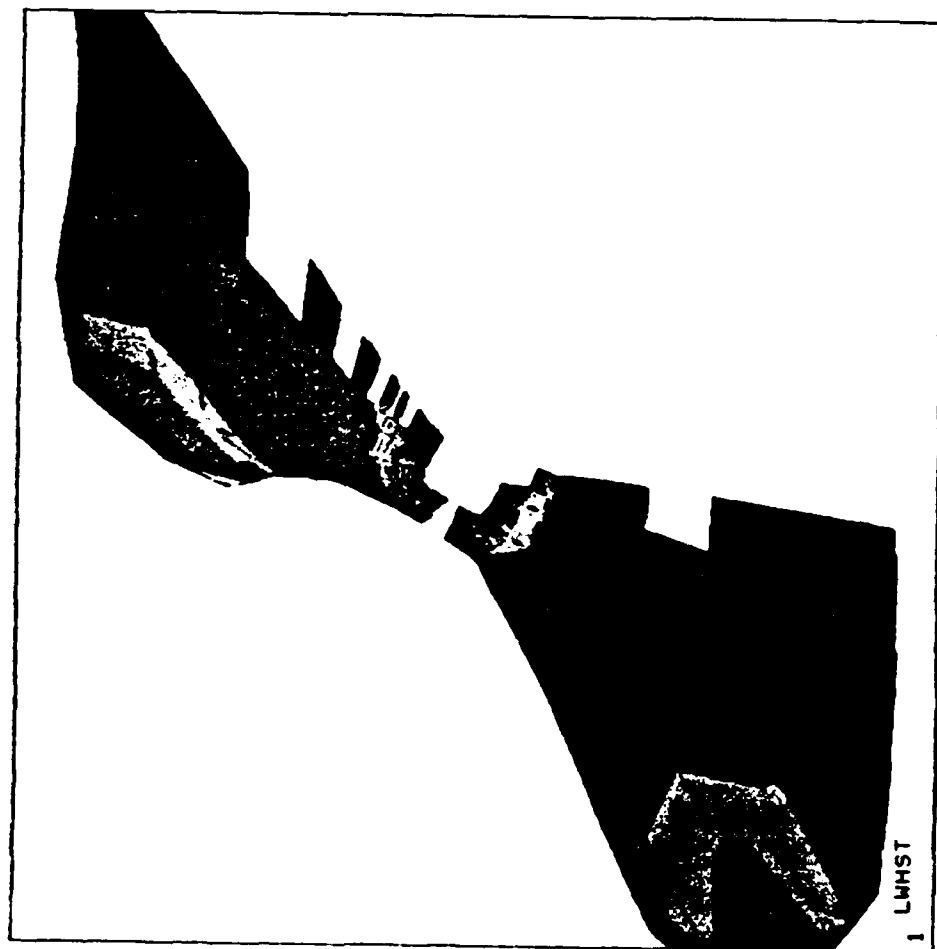


ANSYS 4.2B
FEB 14 1987
14:11:08
PLOT NO. 30
POST1 STRESS
STEP=2
ITER=1
SY
TOP
STRESS ELEM CS

ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=18920
MN=-19948
-15630
-11311
-6992
-2673
1646

14603
18922



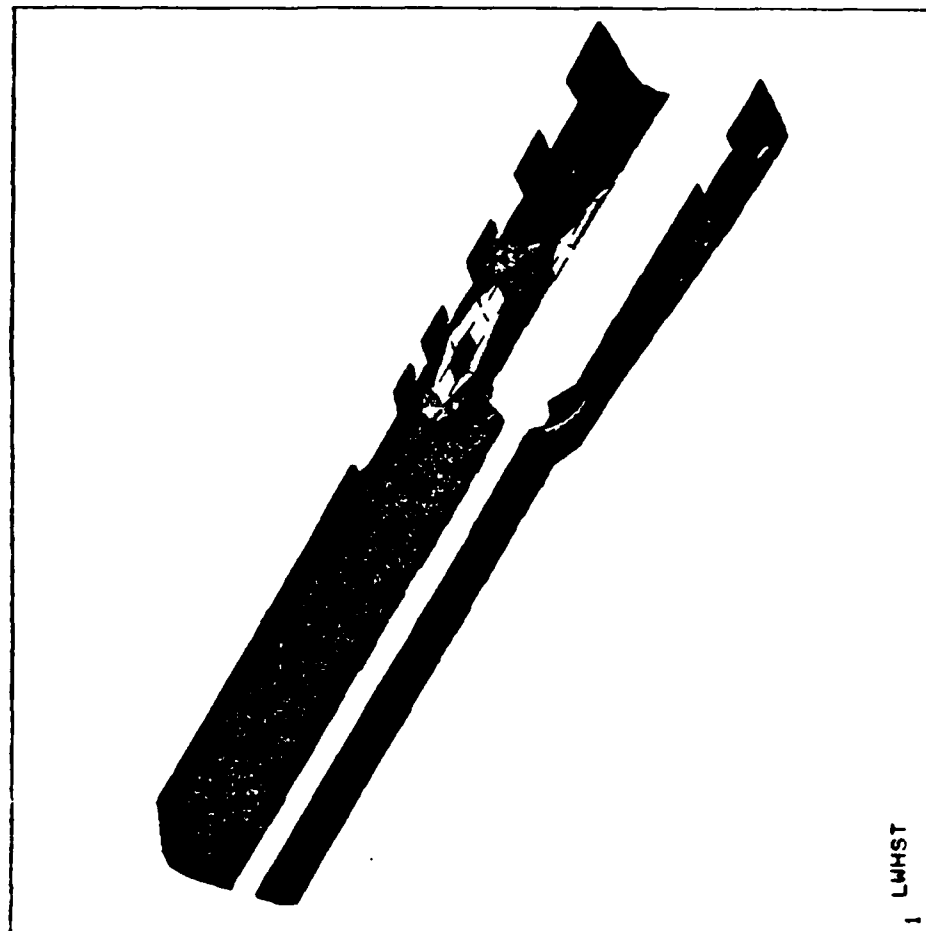


ANSYS 4.2B
 FEB 14 1987
 14:11:40
 PLOT NO. 31
 POST1 STRESS
 STEP=2
 ITER=1
 SXY
 TOP
 STRESS ELEM CS

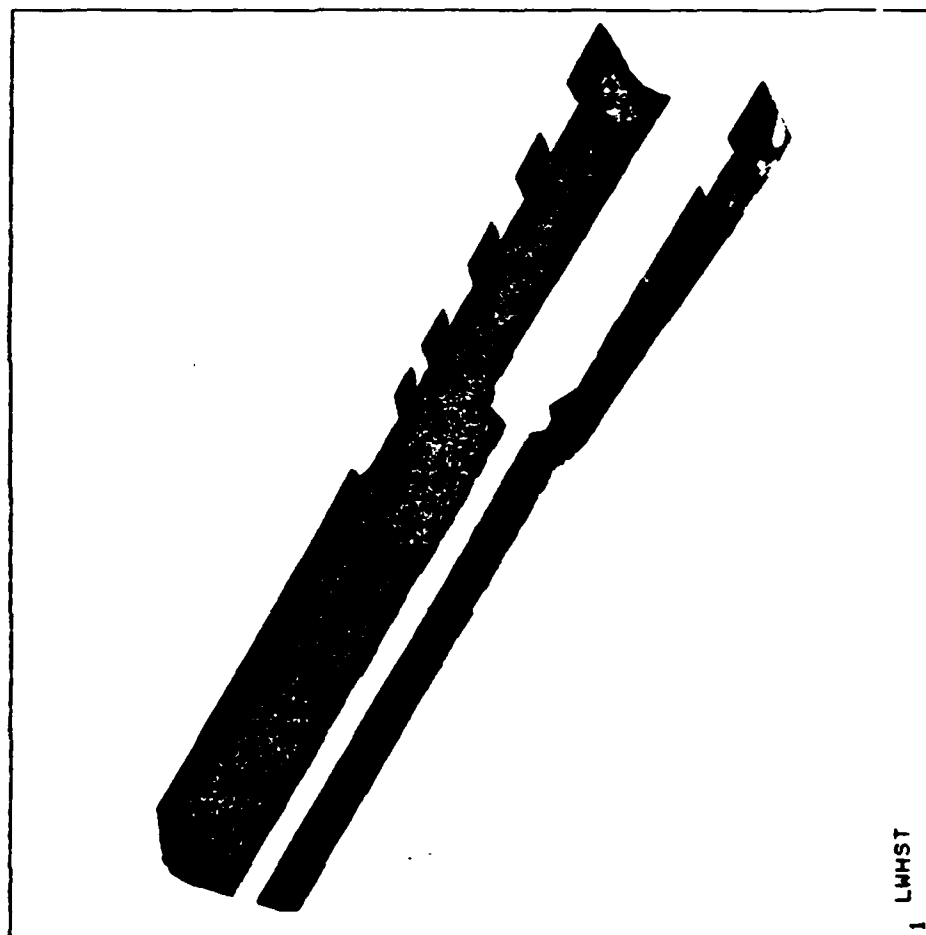
ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=12516
 MN=-2425
 -768
 893
 2554
 4215
 5876

10859
 12520

ANSYS 4.2B
 FEB 14 1987
 14:13:02
 PLOT NO. 32
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=8742
 MN=-8432
 -6527
 -4618
 -2709
 -800
 1109

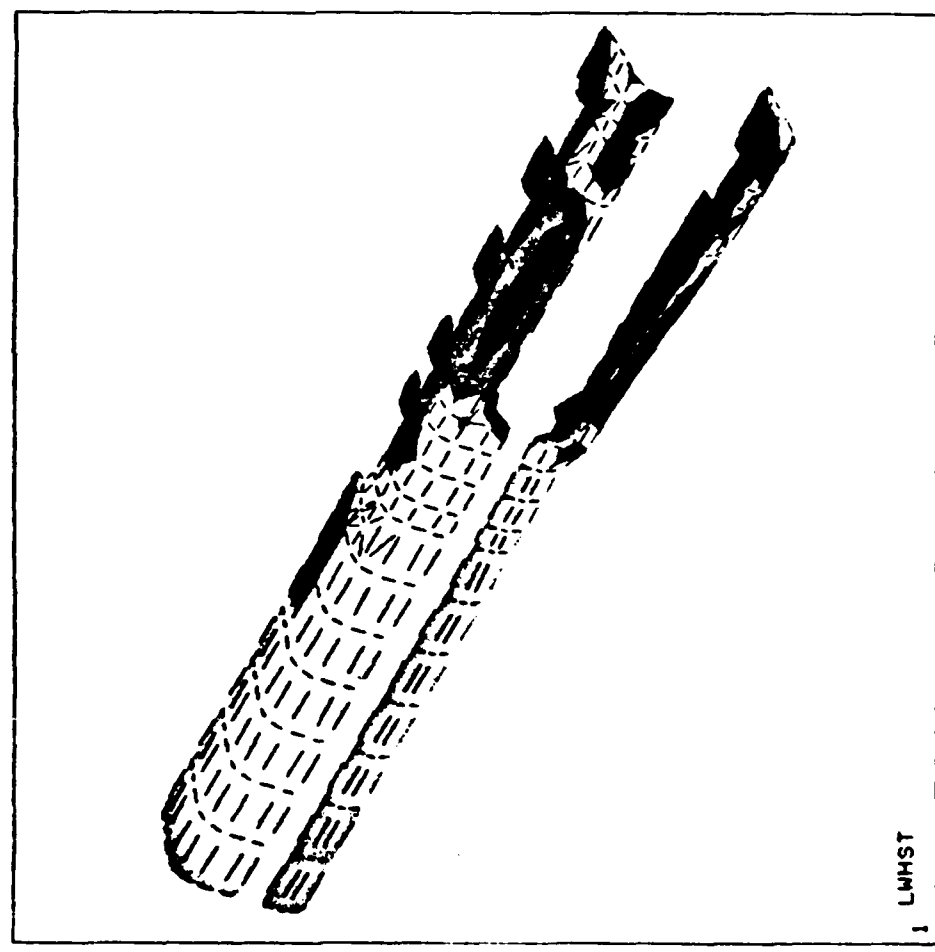


ANSYS 4.2B
FEB 14 1987
14:14:41
PLOT NO. 33
POST1 STRESS
STEP=2
ITER=1
SY
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=12296
MN=-12308
-9575
-6841
-4107
-1373
1361

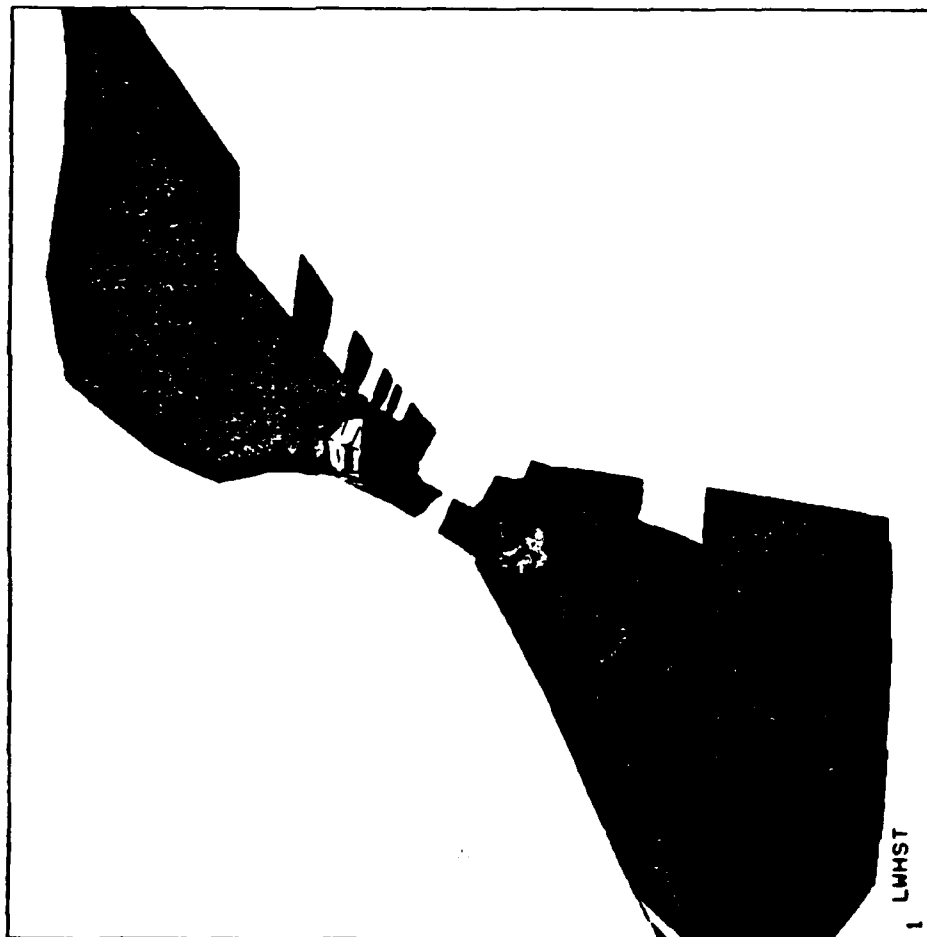


ANSYS 4.2B
FEB 14 1987
14:15:14
PLOT NO. 34
POST1 STRESS
STEP=2
ITER=1
SXY
BOTTOM
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=4882
MN=-10648
-8924
-7198
-5472
-3746
-2020



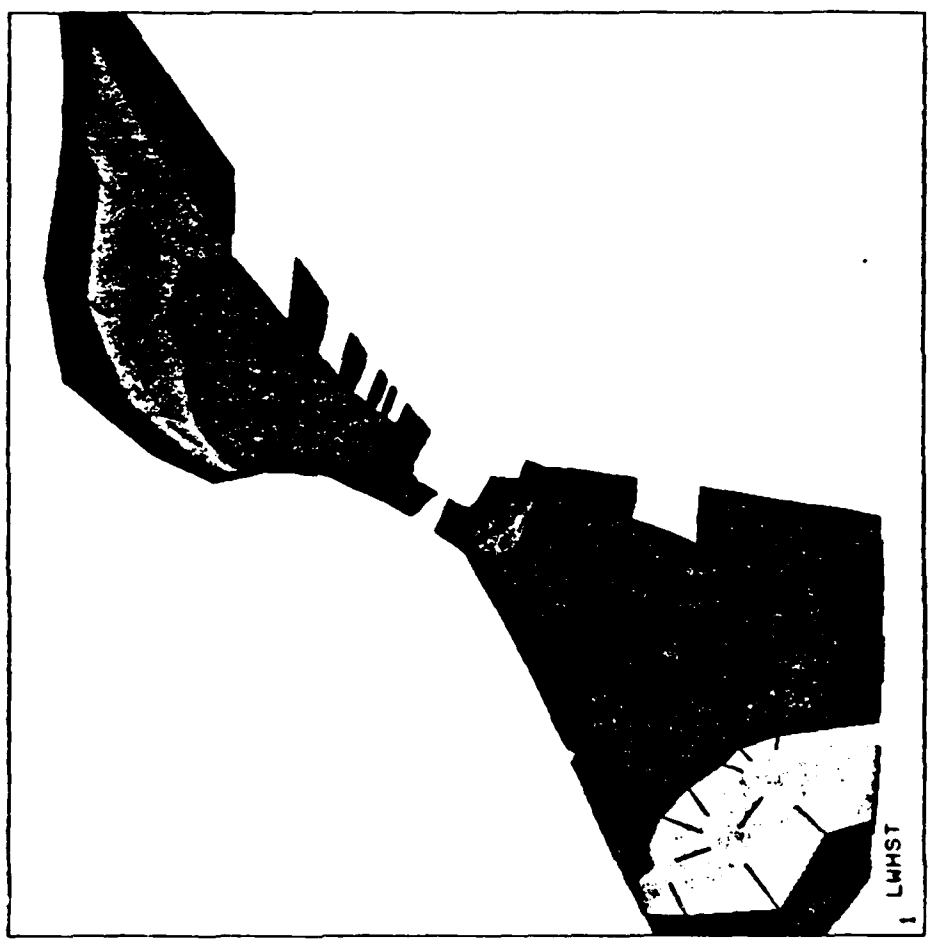
ANSYS 4.2B
 FEB 14 1987
 14:15:46
 PLOT NO. 35
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=8742
 MN=-8432
 -6527
 -4618
 -2709
 -800
 1100
 6836
 8745



ANSYS 4.2B
FEB 14 1987
14:16:17
PLOT NO. 36
POST1 STRESS
STEP=2
ITER=1
SY
BOTTOM
STRESS ELEM CS

ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=12296
MN=-12308
-9575
-6841
-4107
-1373
1361

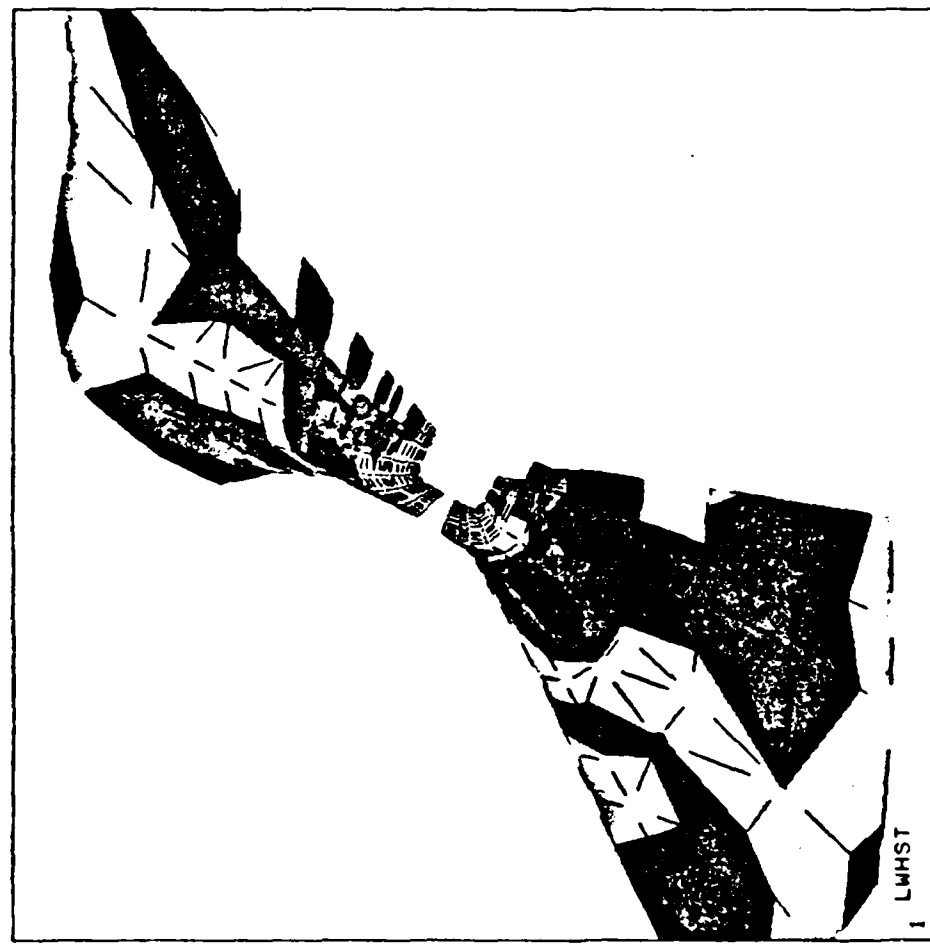
9563
12297



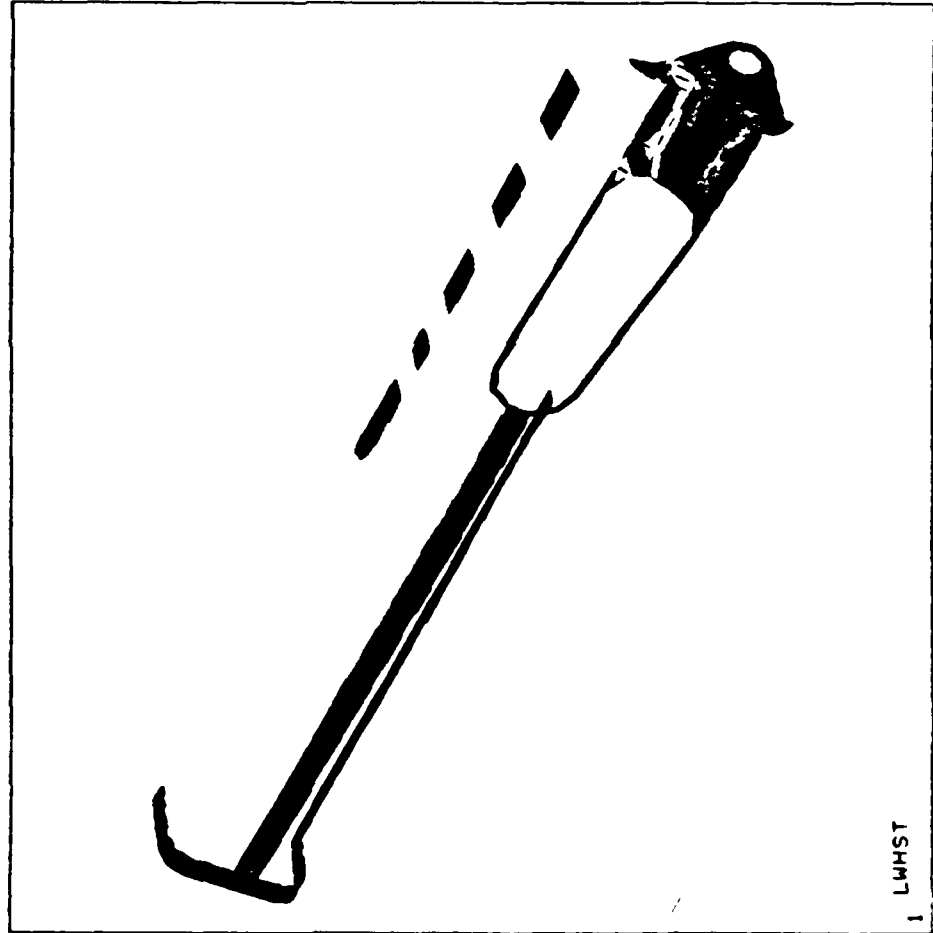
ANSYS 4.2B
 FEB 14 1987
 14:16:51
 PLOT NO. 37
 POST1 STRESS
 STEP=2
 ITER=1
 SXY
 BOTTOM
 STRESS ELEM CS

ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=4882
 MN=-10648
 -8924
 -7198
 -5472
 -3746
 -2020

3158
 4884



ANSYS 4.2B
 FEB 14 1987
 14:17:56
 PLOT NO. 38
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 TOP
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=24413
 MN=-25097
 -19599
 -14097
 -8595
 -3093
 2409



AD-A183 991

LIGHTWEIGHT TOWED HOWITZER DEMONSTRATOR PHASE 1 AND
 PARTIAL PHASE 2 VOLUM (U) FMC CORP MINNEAPOLIS MINN
 NORTHERN ORDNANCE DIV R RATHE ET AL APR 87

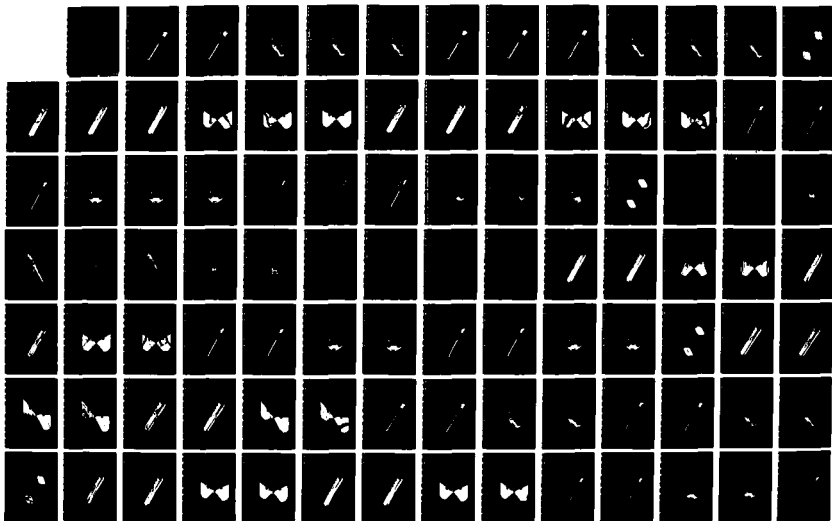
3/5

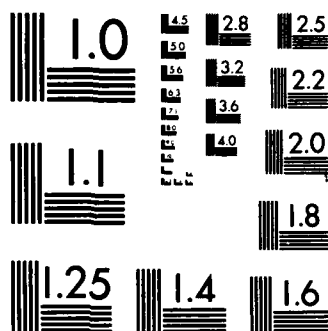
UNCLASSIFIED

FMC-E-3841-VOL-D2-PT-3 DAAA21-86-C-0047

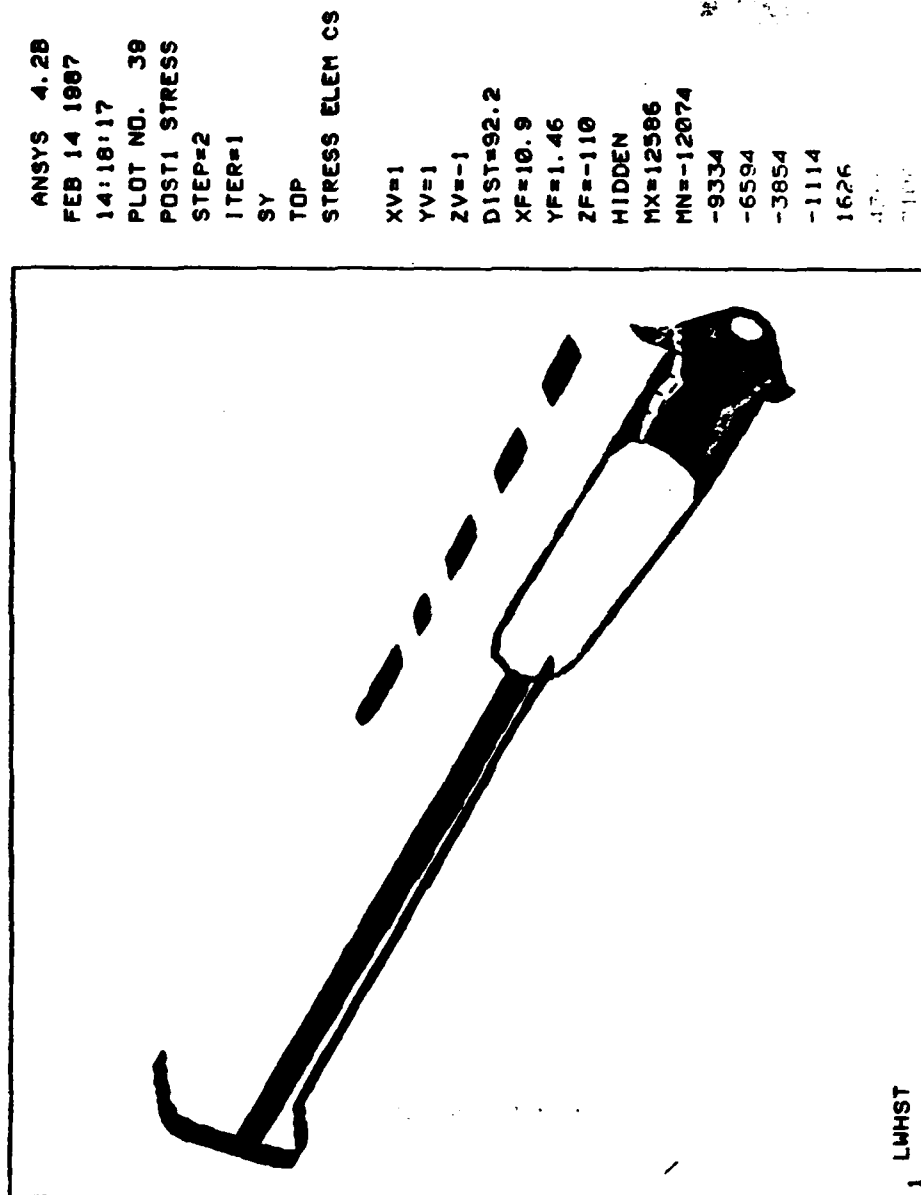
F/G 19/6

NL





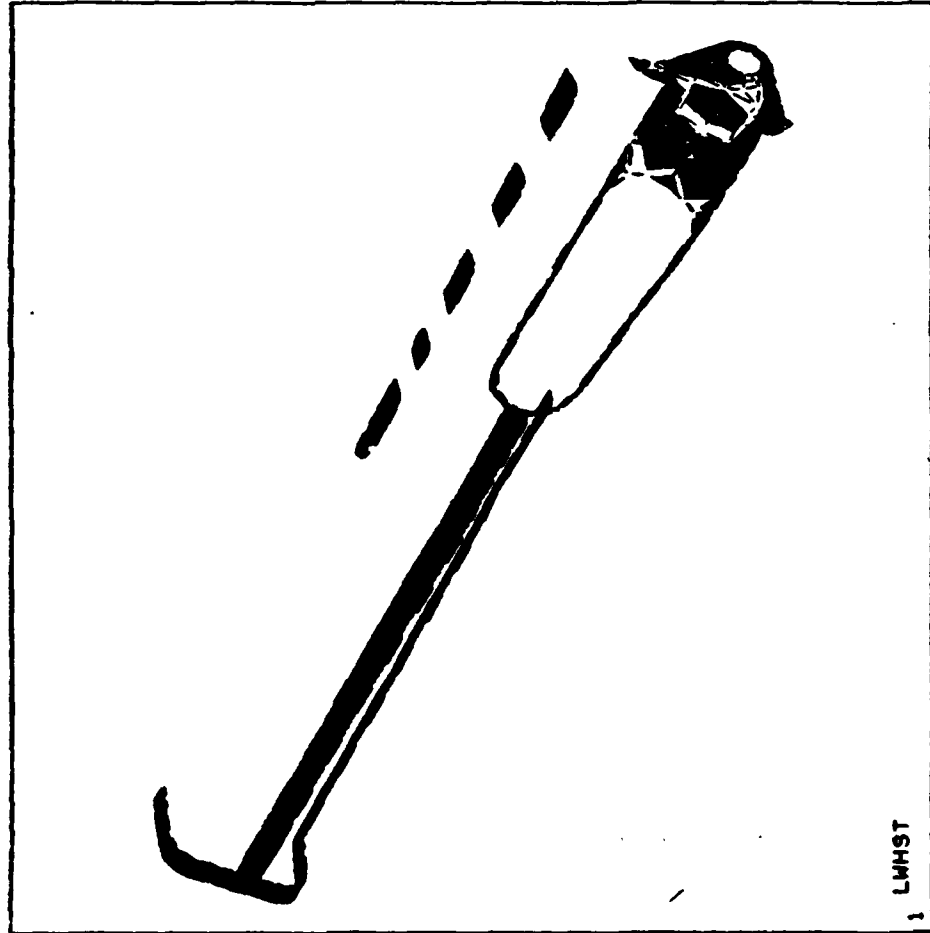
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



ANSYS 4.2B
FEB 14 1987
14:18:17
PLOT NO. 39
POST1 STRESS
STEP=2
ITER=1
SY
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=12586
MN=-12074
-9334
-6594
-3854
-1114
1626
17.1
17.1

ANSYS 4.2B
FEB 14 1987
14:18:34
PLOT NO. 40
POST1 STRESS
STEP=2
ITER=1
SXY
TOP
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=5156
MN=-9077
-7497
-5915
-4333
-2751
-1169
-11
1000



ANSYS 4.2B

FEB 14 1987

14:18:55

PLOT NO. 41

POST1 STRESS

STEP=2

ITER=1

SX

TOP

STRESS ELEM CS

ZV=-1

DIST=139

XF=9.5

ZF=-119

CONE=40

HIDDEN

MX=24413

MN=-25097

-19599

-14097

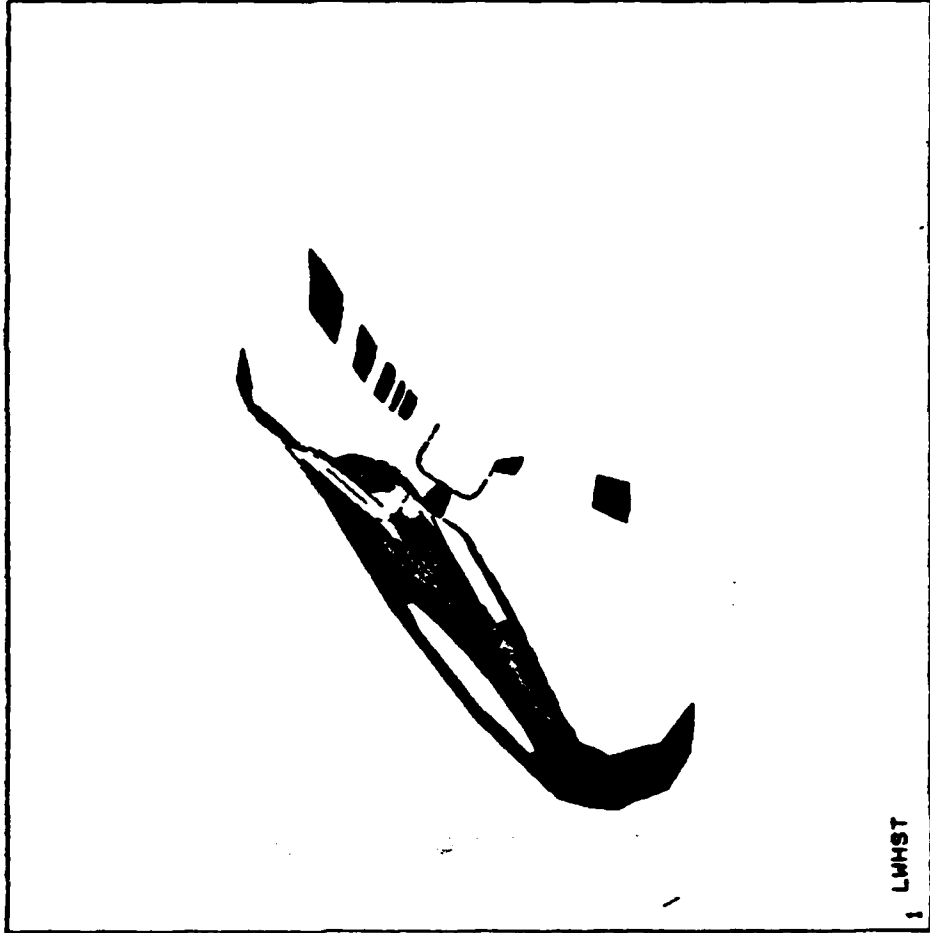
-8595

-3093

2409

18915

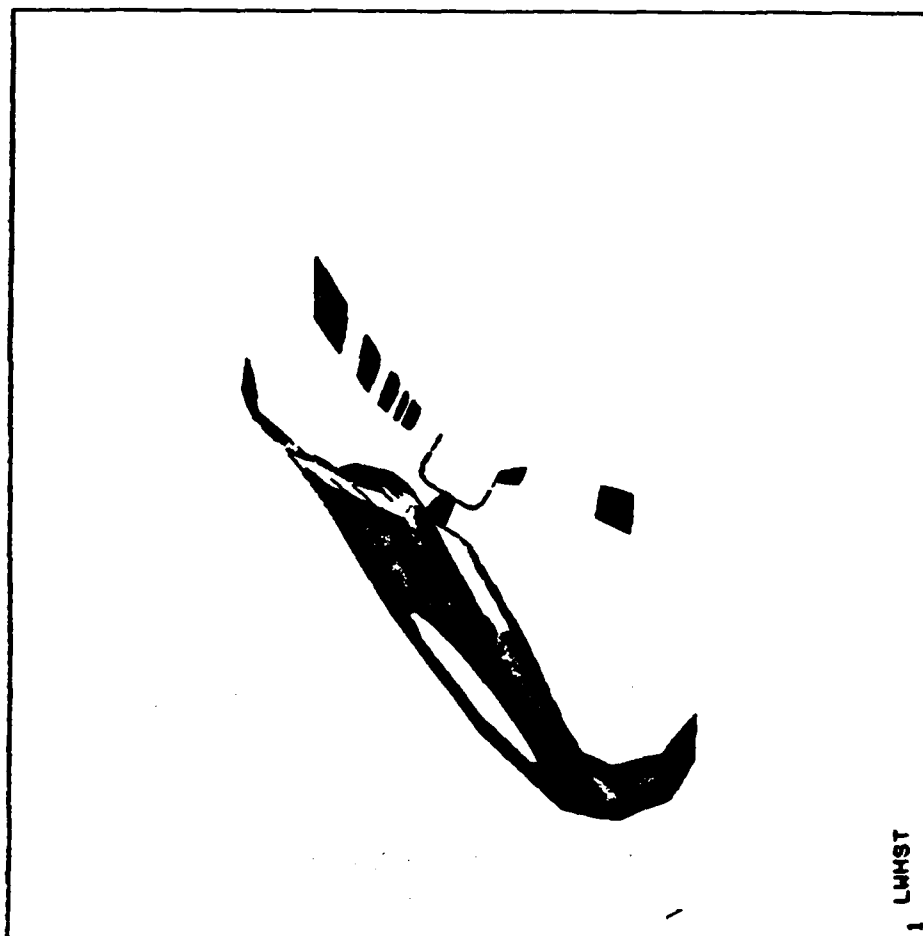
24417



LWHS1

ANSYS 4.2B
 FEB 14 1987
 14:19:12
 PLOT NO. 42
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 TOP
 STRESS ELEM CS

ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=12586
 MN=-12074
 -9334
 -6594
 -3854
 -1114
 1626
 9846
 12586



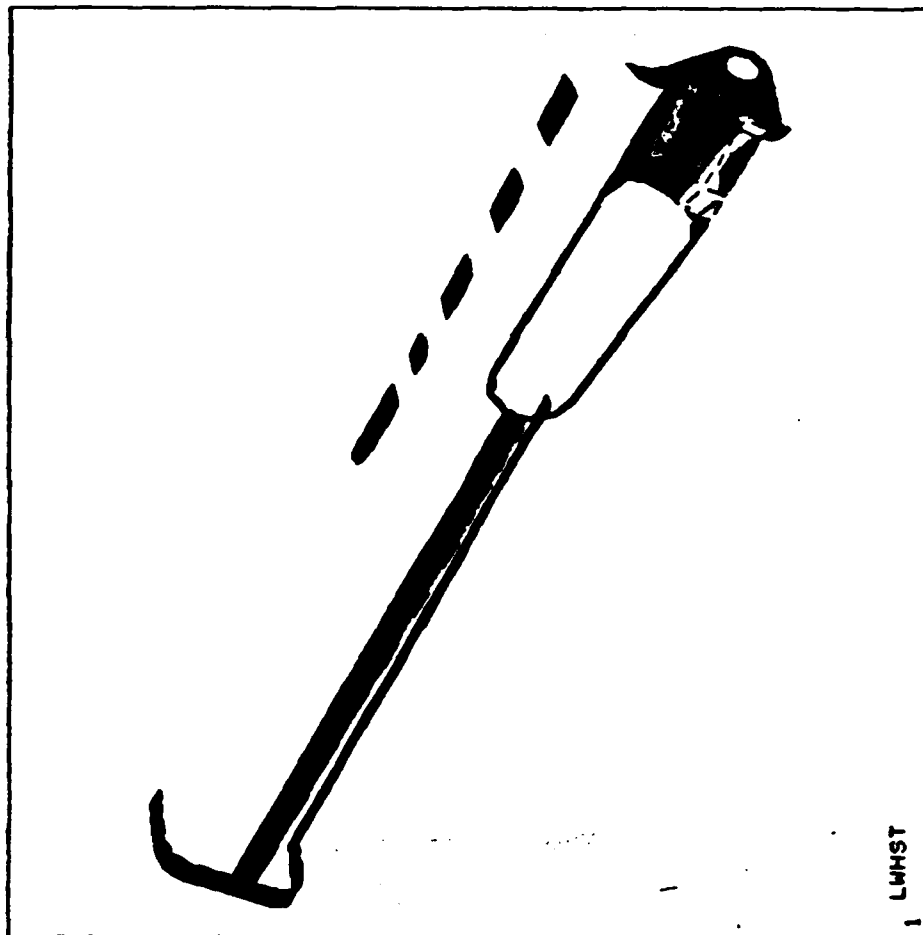
ANSYS 4.2B
FEB 14 1987
14:19:29
PLOT NO. 43
POST1 STRESS
STEP=2
ITER=1
SXY
TOP
STRESS ELEM CS

ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=5156
MN=-9077
-7497
-5915
-4333
-2751
-1169

3577
5159

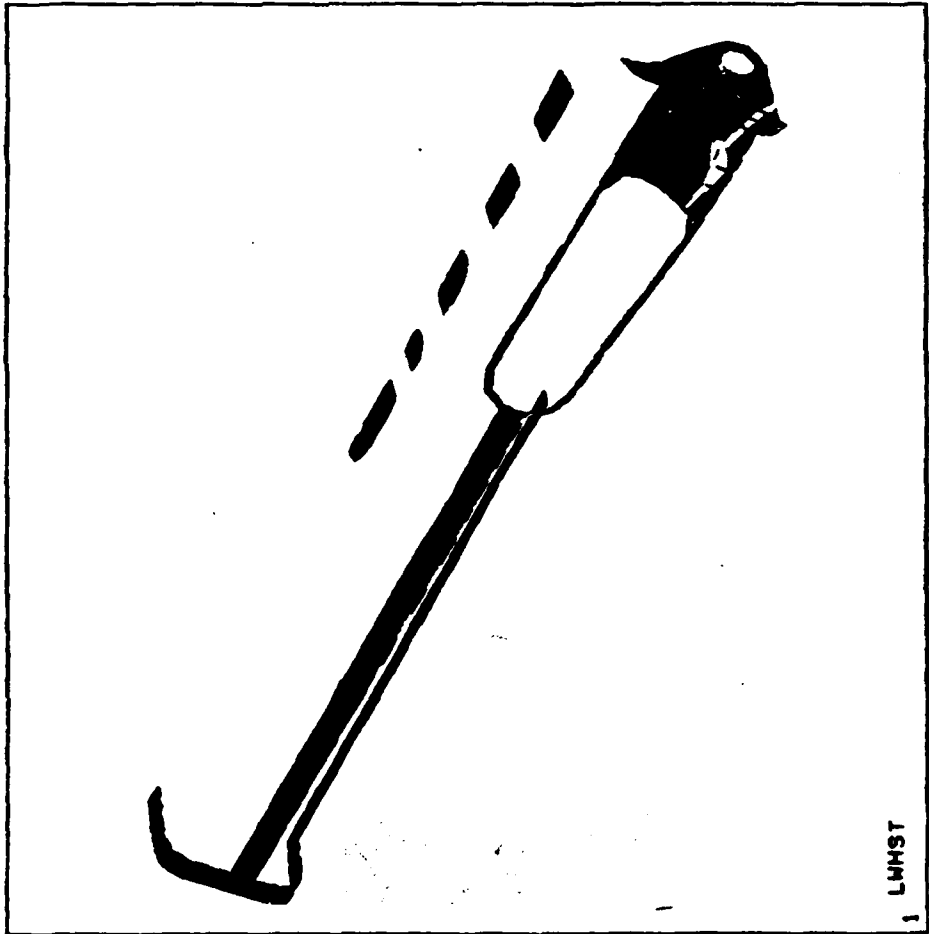


ANSYS 4.2B
FEB 14 1987
14:20:06
PLOT NO. 44
POST1 STRESS
STEP=2
ITER=1
SX
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=25061
MN=-24260
-18783
-13302
-7821
-2340
3141
14107

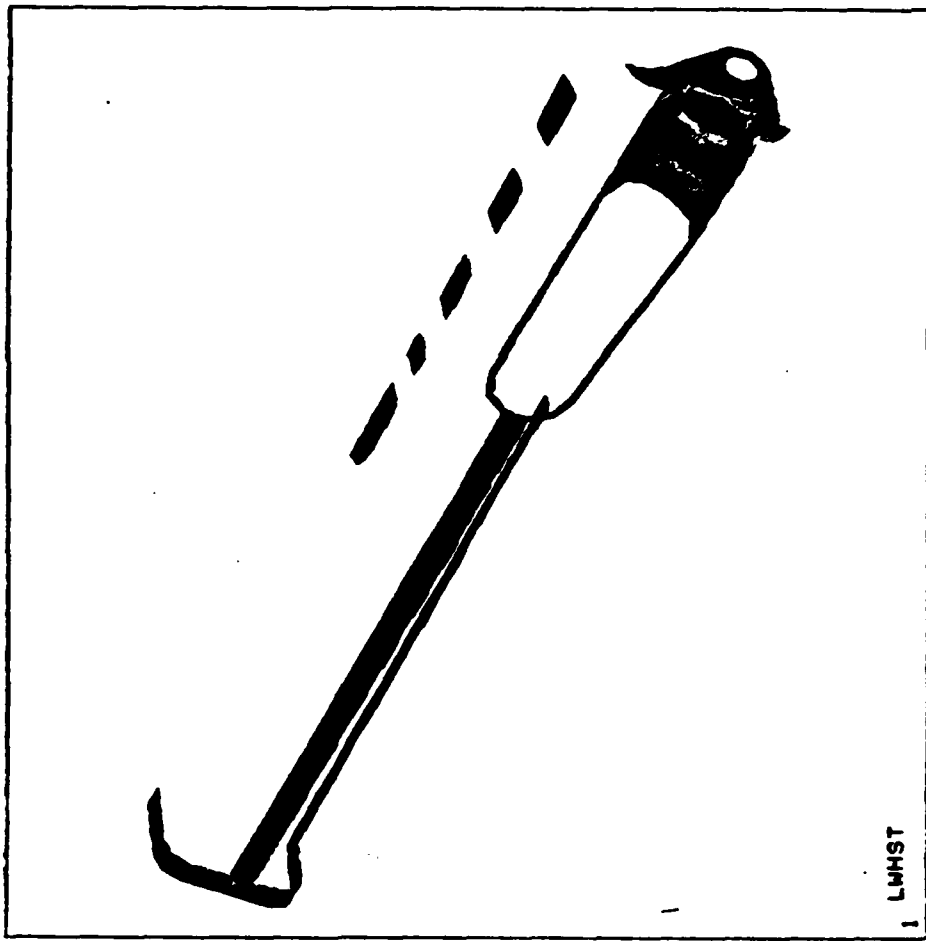


ANSYS 4.2B
FEB 14 1987
14:20:23
PLOT NO. 45
POST1 STRESS
STEP=2
ITER=1
SY
BOTTOM
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=9397
MN=-9903
-7762
-5617
-3472
-1327
818



ANSYS 4.2B
 FEB 14 1987
 14:20:42
 PLOT NO. 46
 POST1 STRESS
 STEP=2
 ITER=1
 SXY
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=7645
 MN=-5585
 -4119
 -2648
 -1177
 294
 1765



ANSYS 4.2B

FEB 14 1987

14:21:01

PLOT NO. 47

POST1 STRESS

STEP=2

ITER=1

SX

BOTTOM

STRESS ELEM CS

ZV=-1

DIST=139

XF=9.5

ZF=-119

CONE=40

HIDDEN

MX=25061

MN=-24260

-18783

-13302

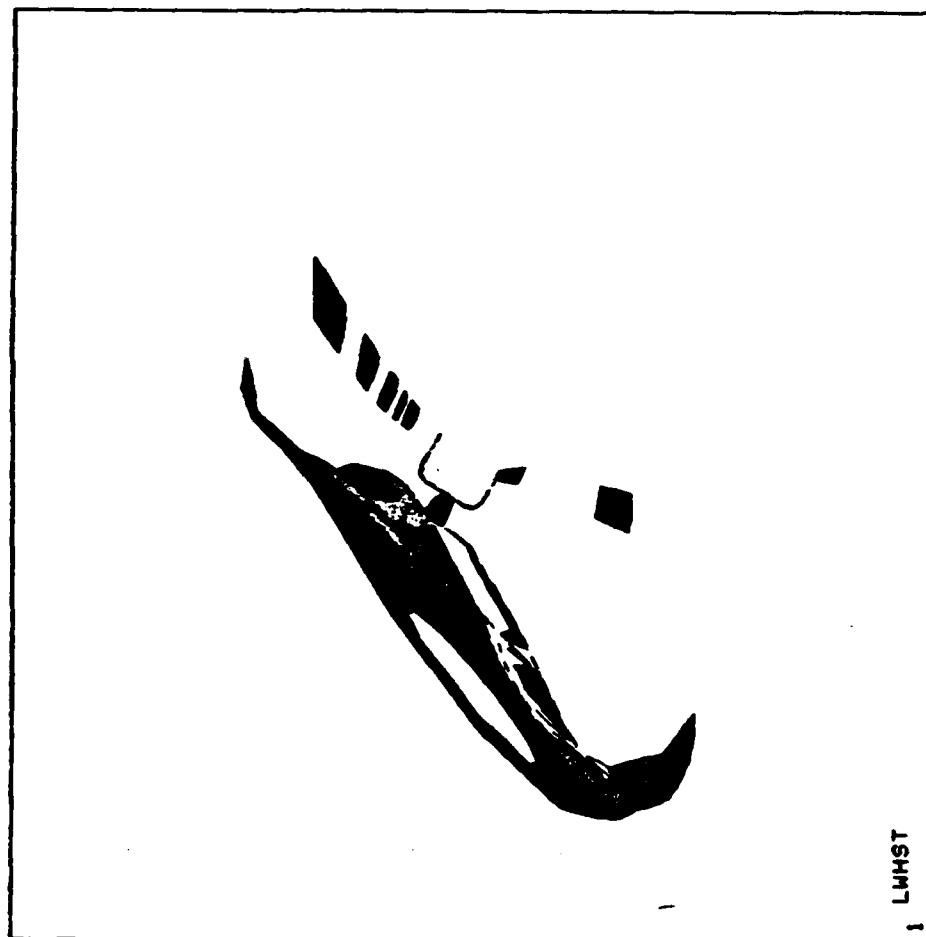
-7821

-2340

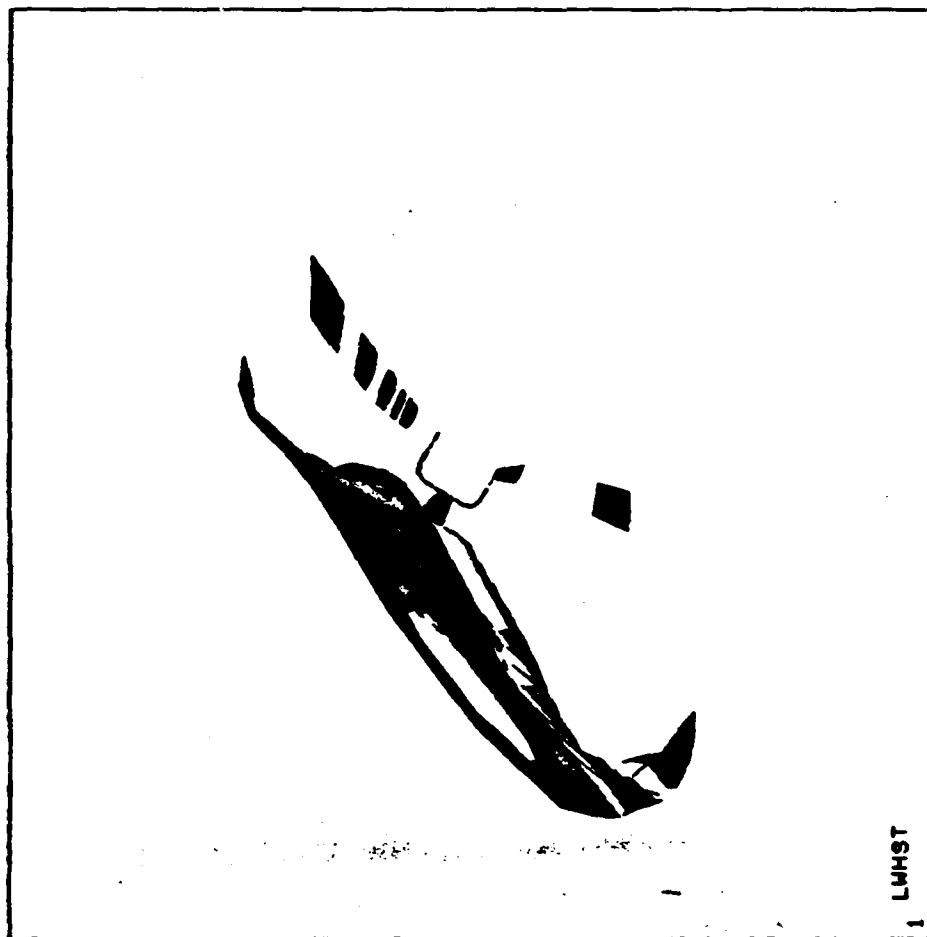
3141

19584

25065



ANSYS 4.2B
 FEB 14 1987
 14:21:18
 PLOT NO. 48
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=9397
 MN=-9905
 -7762
 -5617
 -3472
 -1327
 816
 7253
 9398

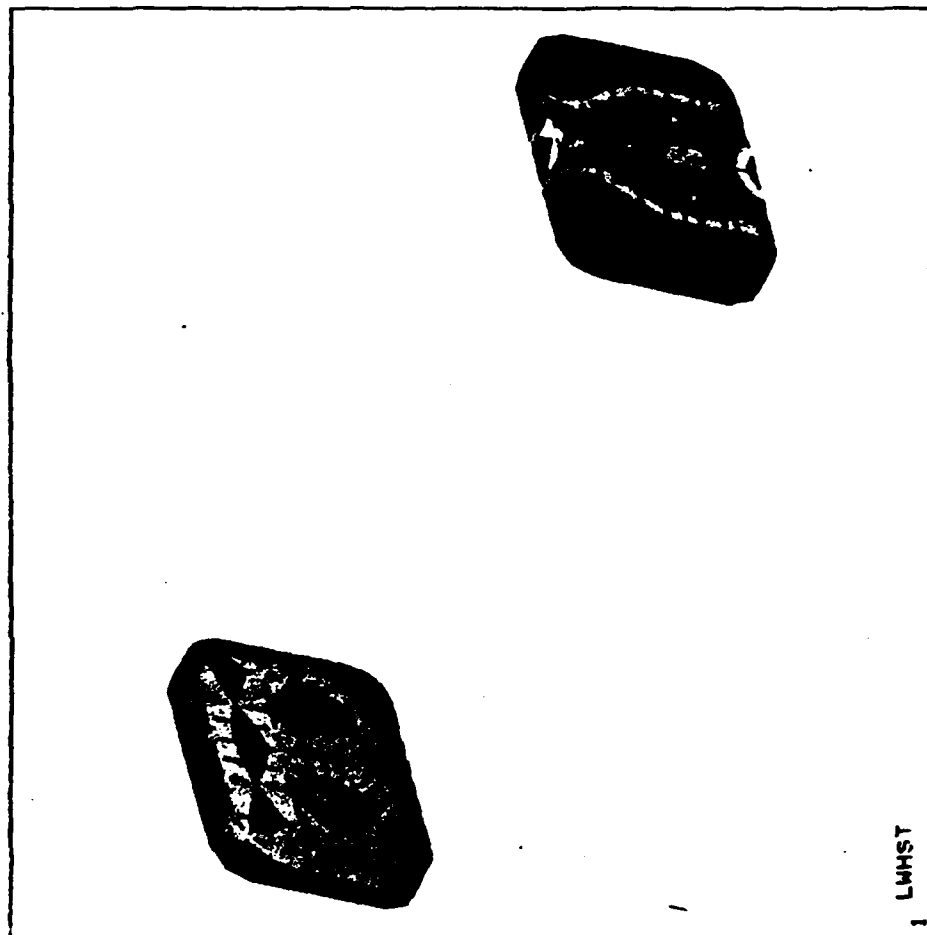


ANSYS 4.2B
 FEB 14 1987
 14:21:35
 PLOT NO. 49
 POST1 STRESS
 STEP=2
 ITER=1
 SKY
 BOTTOM
 STRESS ELEM C8
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=7645
 MN=-5585
 -4119
 -2648
 -1177
 294
 1765
 6178
 7649



1 LHMST

ANSYS 4.2B
 FEB 14 1987
 14:22:23
 PLOT NO. 50
 POST1 STRESS
 STEP=2
 ITER=1
 SIGE
 BOTTOM
 XV=1
 YV=1
 ZV=-1
 DIST=59.9
 YF=1.63
 ZF=-52
 HIDDEN
 MX=257
 MN=8.05
 34.3
 62.3
 90.3
 118
 146
 174
 230
 258

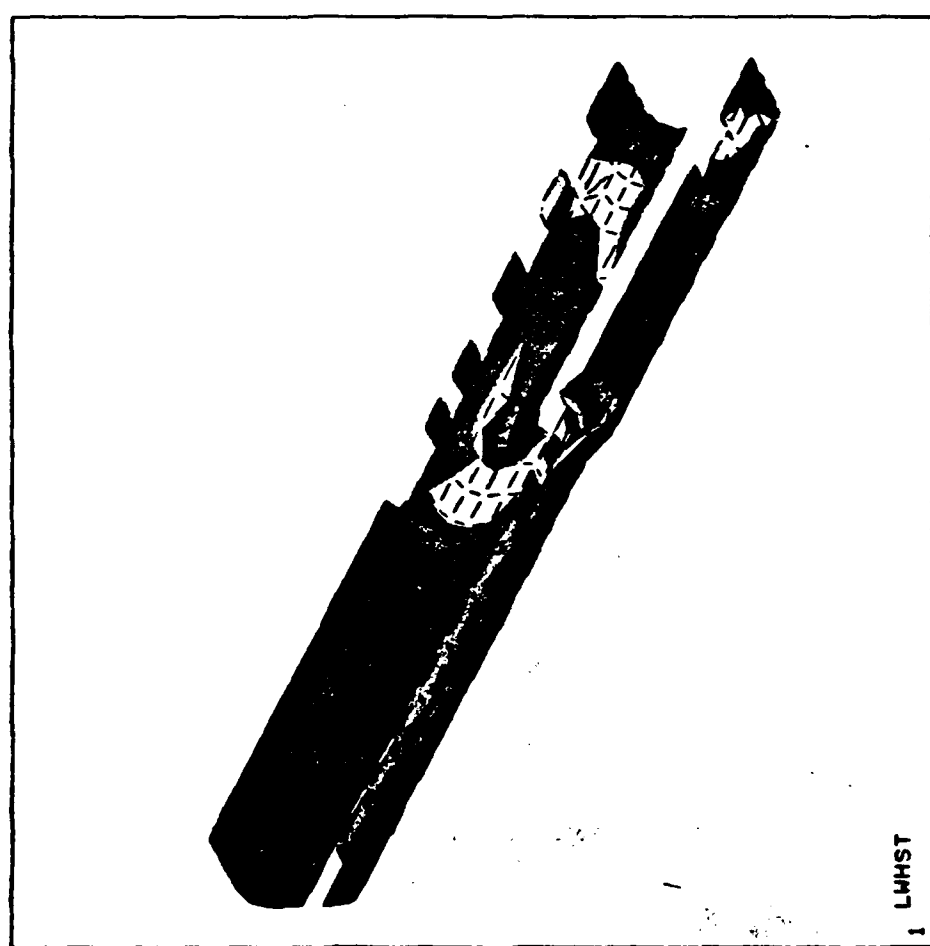


Model

(12)

ANSYS 4.2B
 FEB 14 1987
 14:25:41
 PLOT NO. 51
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 TOP
 STRESS ELEM CS

XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=4939
 MN=-22028
 -19034
 -16037
 -13040
 -10043
 -7046
 4048
 11000



ANSYS 4.2B

FEB 14 1987

14:26:17

PLOT NO. 52

POST1 STRESS

STEP=3

ITER=1

SY

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=16810

MN=-22720

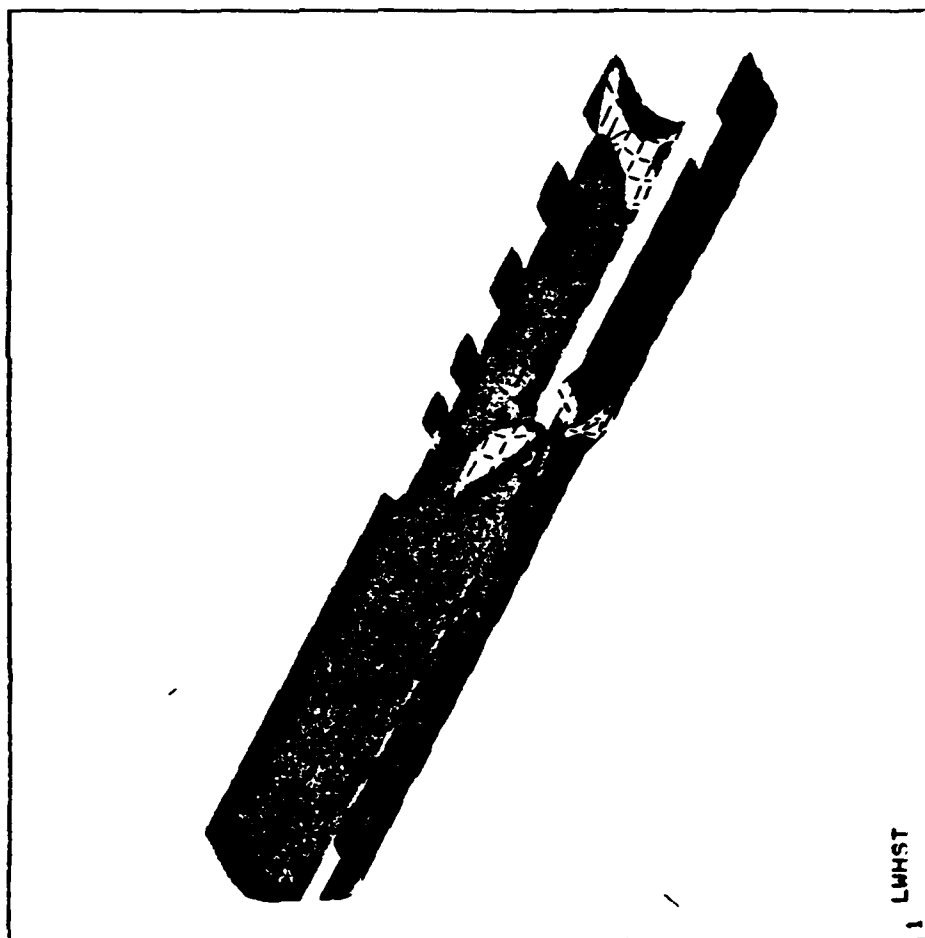
-18330

-13937

-9544

-5151

-758



1, LHMST

ANSYS 4.2B

FEB 14 1987

14:26:50

PLOT NO. 53

POST1 STRESS

STEP=3

ITER=1

SXY

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=15755

MN=-2553

-522

1513

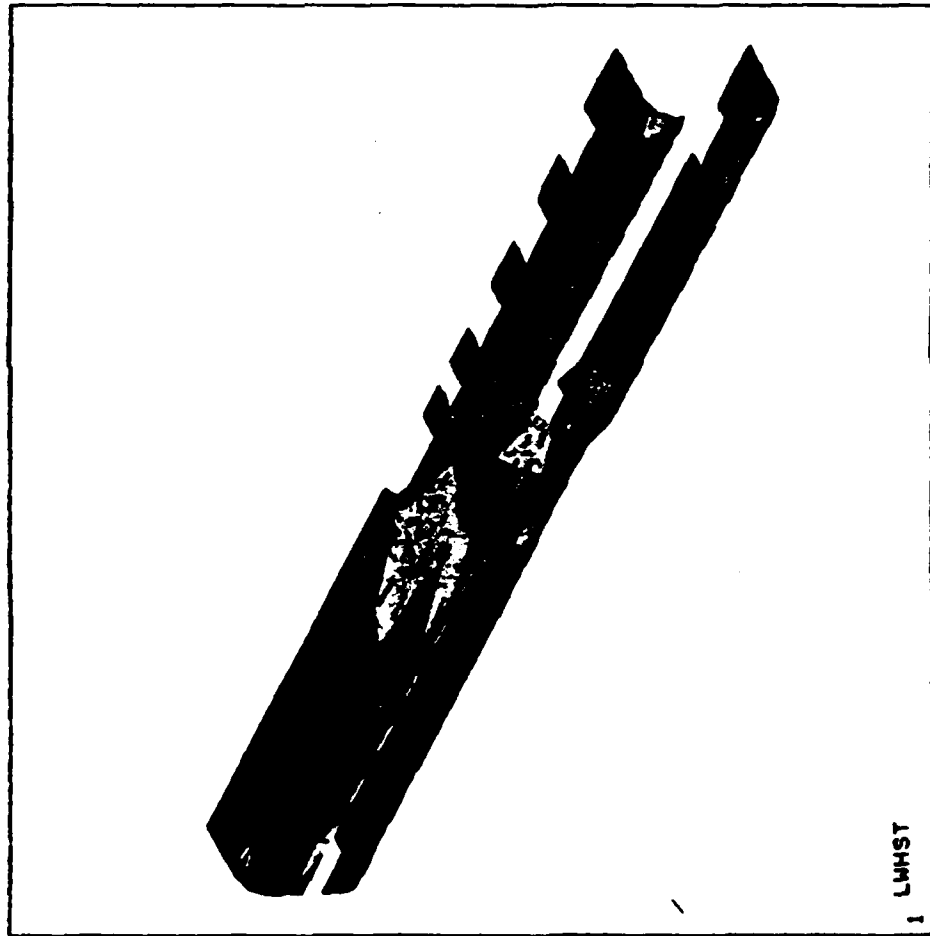
3548

5583

7618

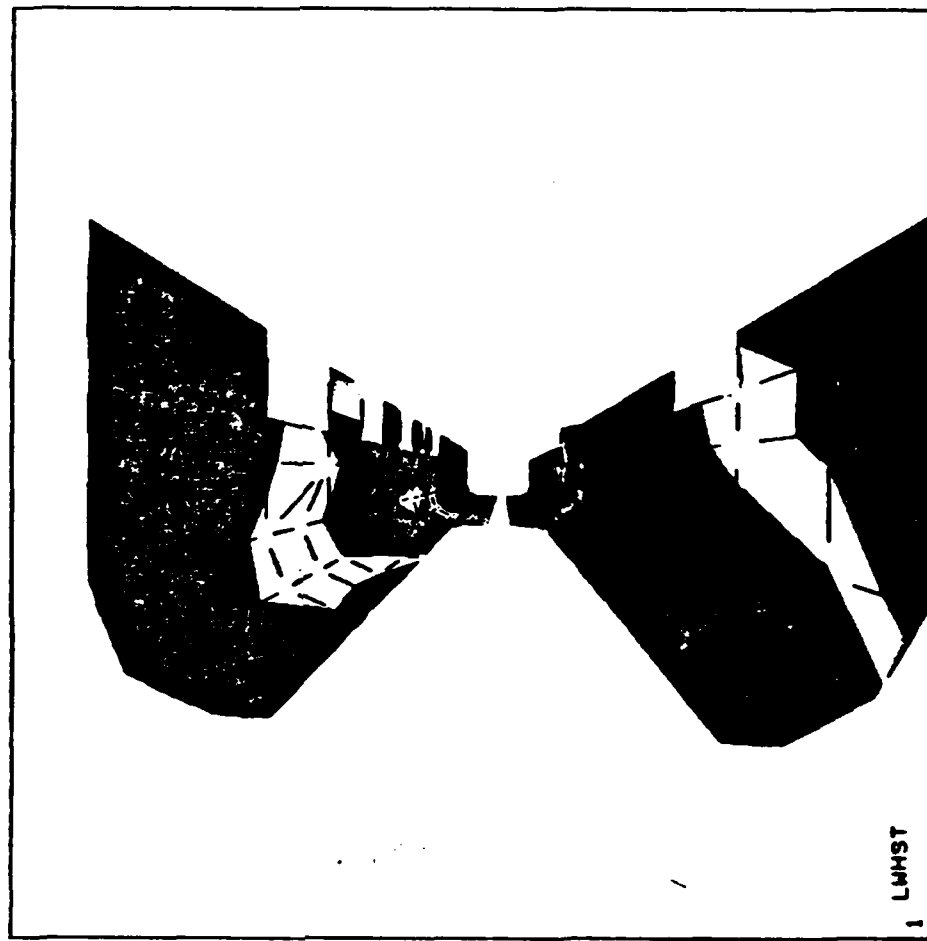
11176

11176



1 LMHST

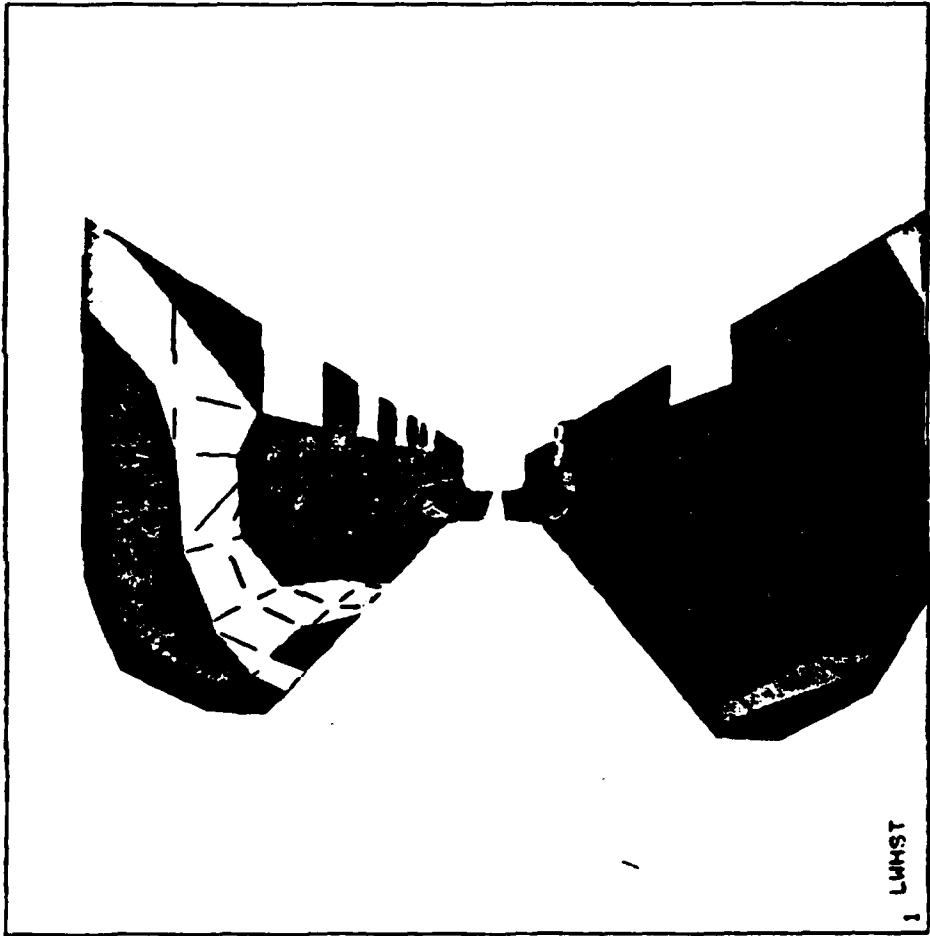
ANSYS 4.2B
 FEB 14 1987
 14:27:20
 PLOT NO. 54
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CDNE=40
 HIDDEN
 MX=4939
 MN=-22028
 -19034
 -16037
 -13040
 -10043
 -7046
 1945
 4942



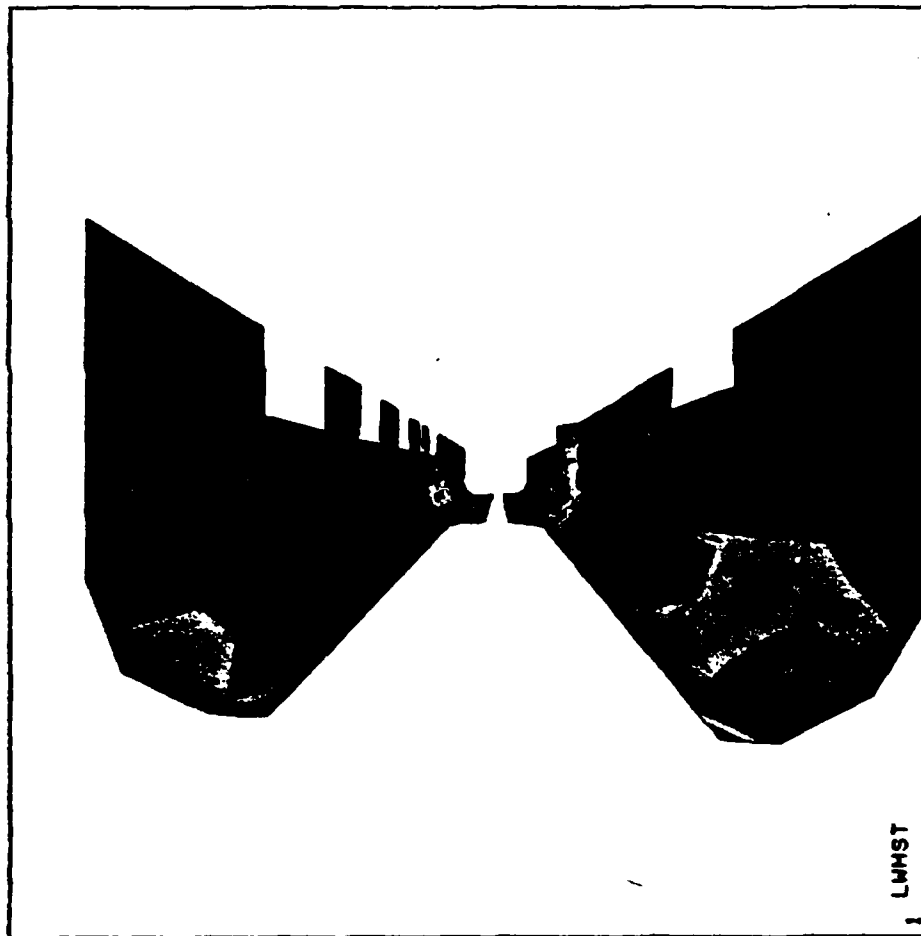
ANSYS 4.2B
FEB 14 1987
14:28:02
PLOT NO. 55
POST1 STRESS
STEP=3
ITER=1
SY
TOP
STRESS ELEM C3

ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=16810
MN=-22720
-18330
-13937
-9544
-5151
-758

12421
16814



ANSYS 4.2B
 FEB 14 1987
 14:28:38
 PLOT NO. 56
 POST1 STRESS
 STEP=3
 ITER=1
 SKY
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=15759
 MN=-2553
 -522
 1513
 3548
 5583
 7618
 13723
 15758



ANSYS 4.2B

FEB 14 1987

14:29:36

PLOT NO. 57

POST1 STRESS

STEP=3

ITER=1

SX

BOTTOM

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=4606

MN=-22602

-19582

-16558

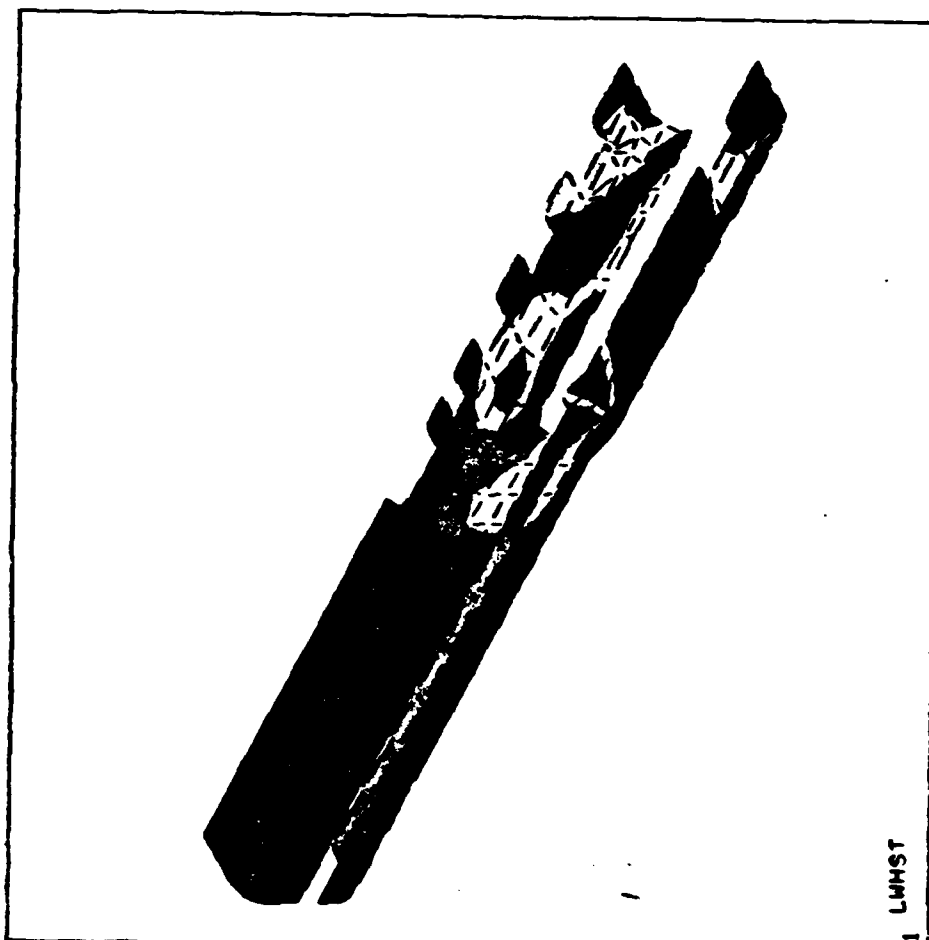
-13534

-10510

-7486

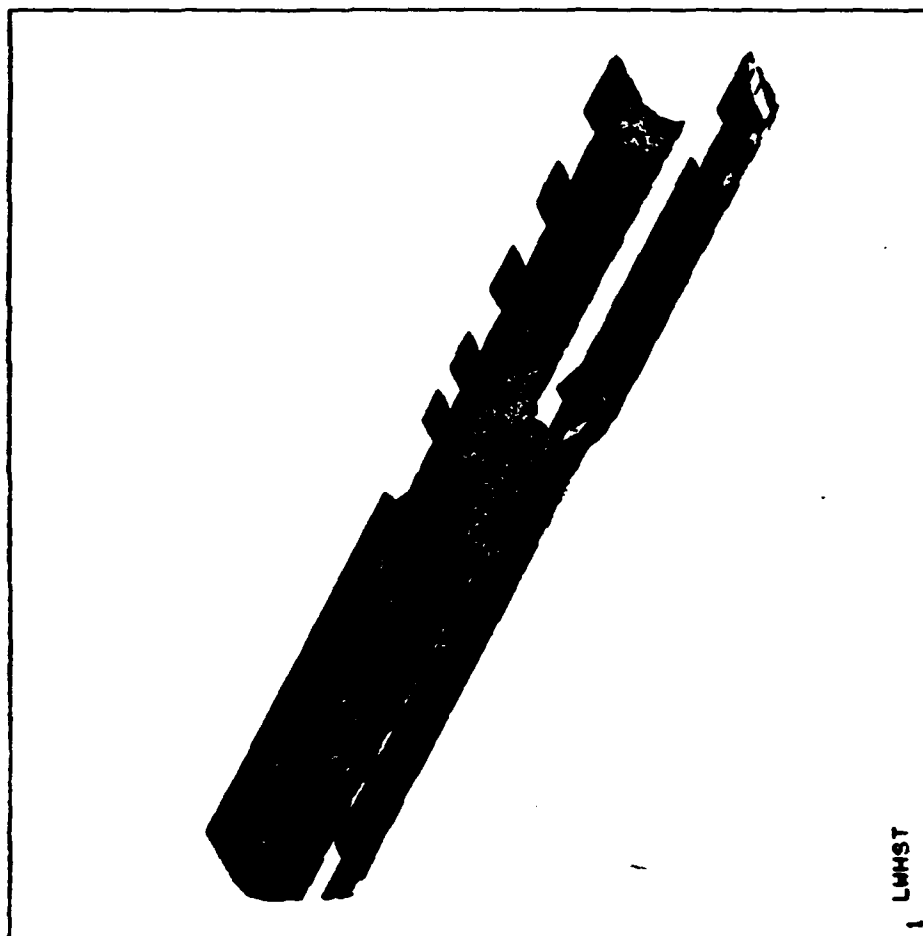
-4111

-1111



1, LMHST

ANSYS 4.2B
 FEB 14 1987
 14:30:12
 PLOT NO. 58
 POST1 STRESS
 STEP=3
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=12375
 MN=-12430
 -9677
 -6920
 -4163
 -1406
 1351
 410
 1351



ANSYS 4.2B

FEB 14 1987

14:30:44

PLOT NO. 59

POST1 STRESS

STEP=3

ITER=1

SXY

BOTTOM

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=9413

MN=-10481

-8272

-6061

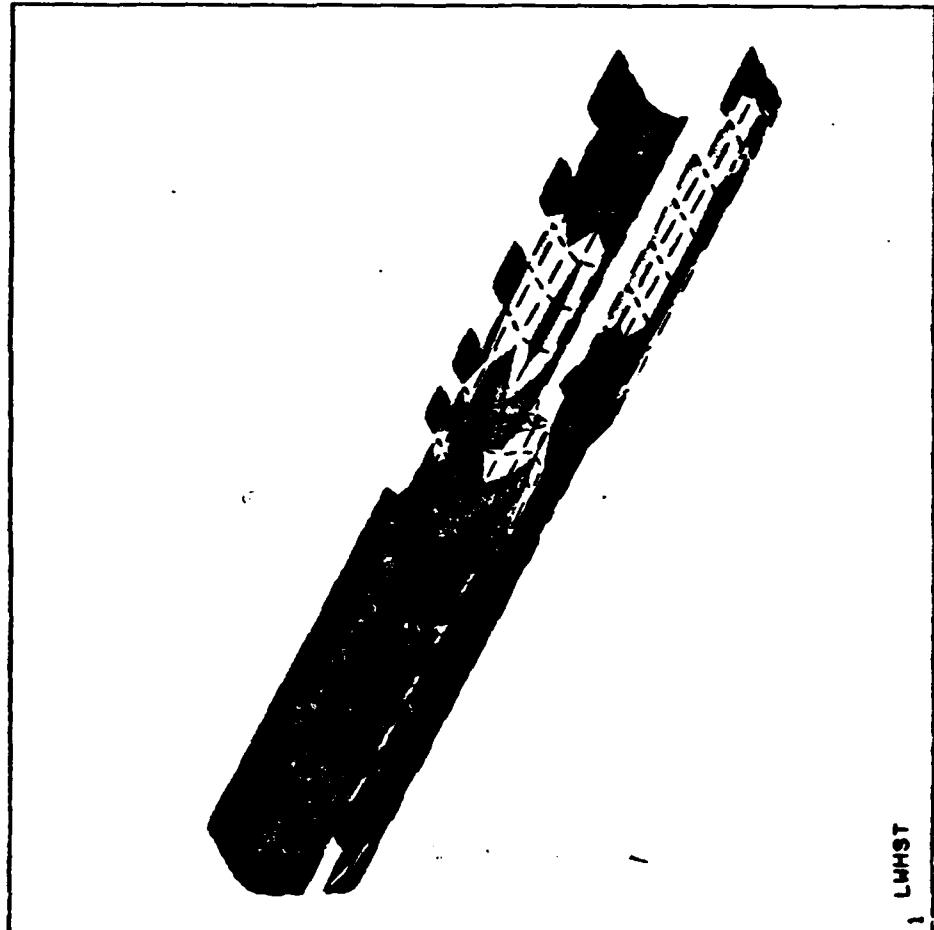
-3850

-1639

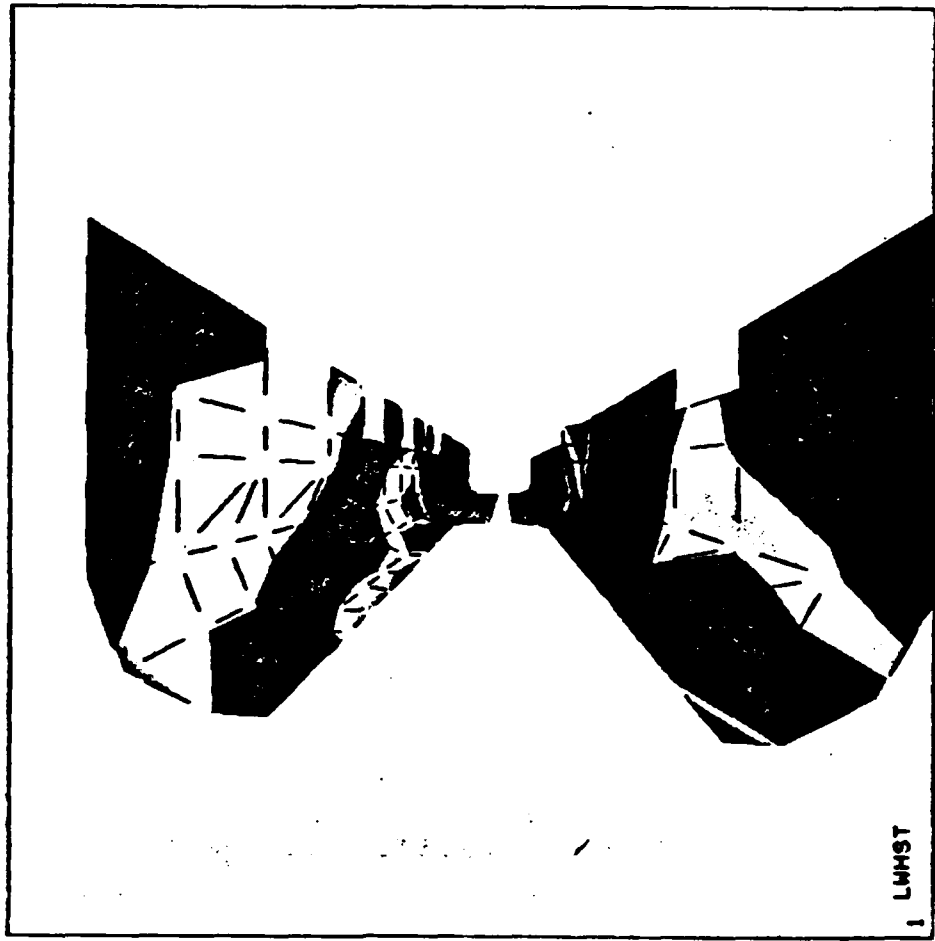
572

572

572

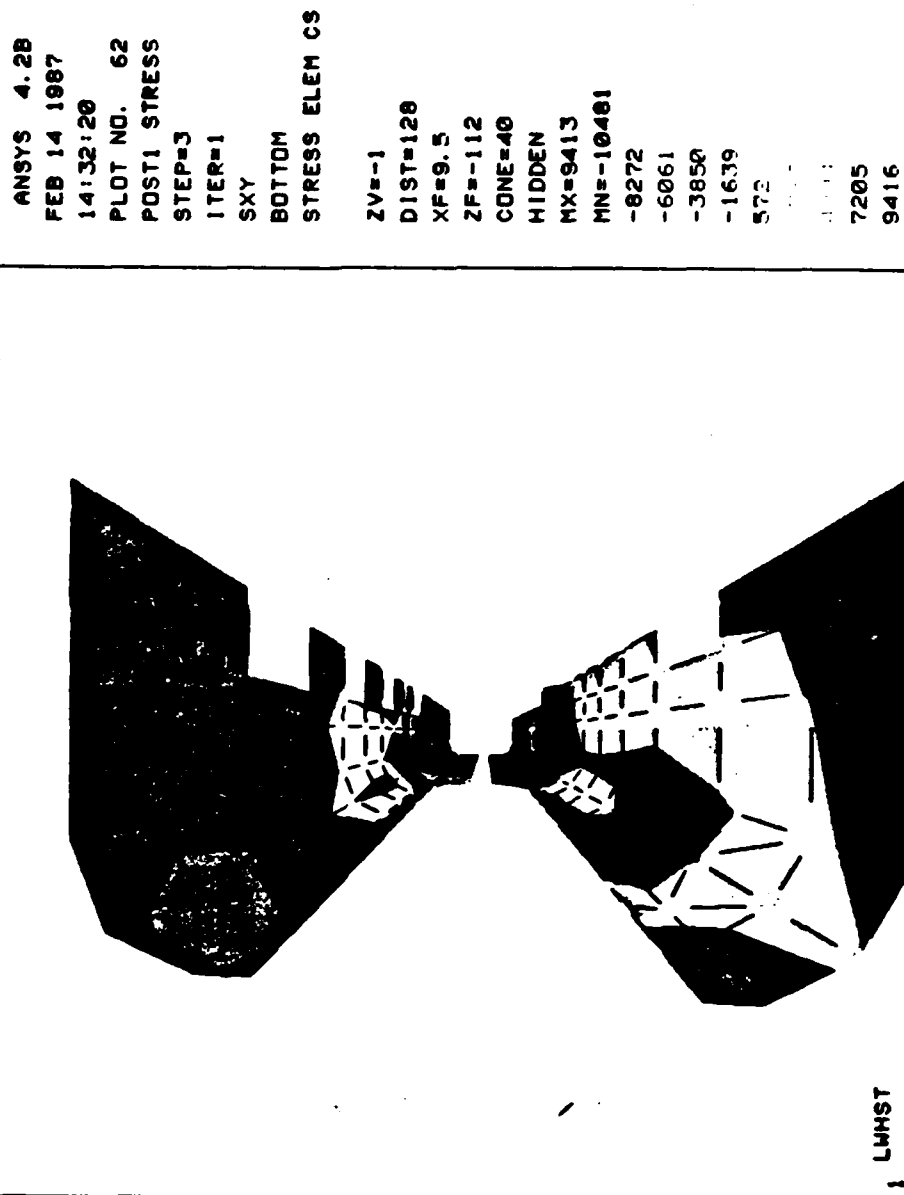


ANSYS 4.2B
 FEB 14 1987
 14:31:15
 PLOT NO. 60
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=4606
 MN=-22602
 -19582
 -16558
 -13534
 -10510
 -7486
 1586
 4610



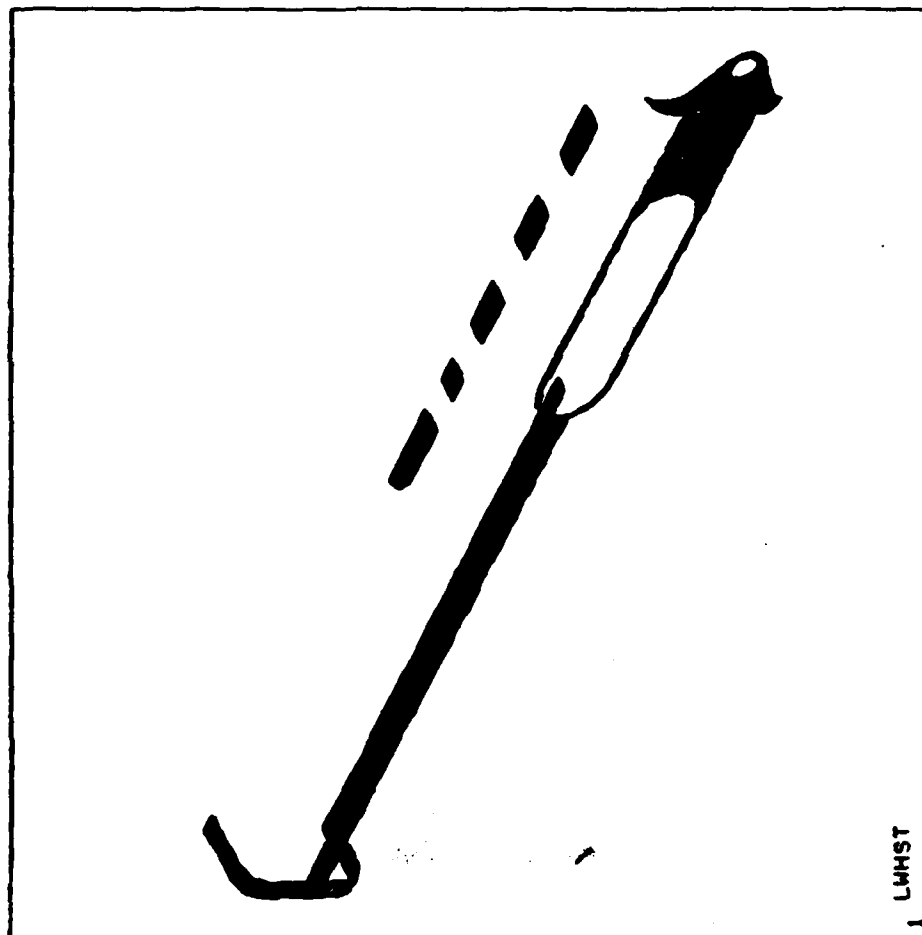
ANSYS 4.2B
FEB 14 1987
14:31:49
PLOT NO. 61
POST1 STRESS
STEP=3
ITER=1
SY
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CDNE=40
HIDDEN
MX=12375
MN=-12430
-9677
-6920
-4163
-1406
1351
9622
12379



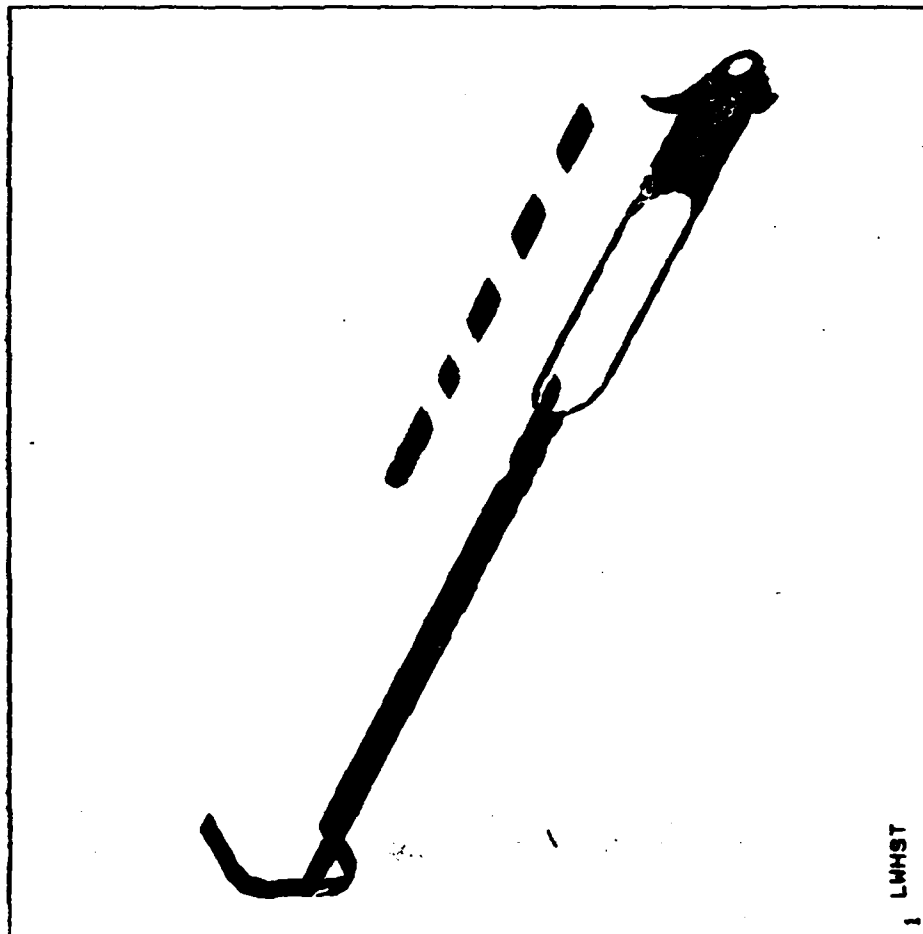


ANSYS 4.2B
 FEB 14 1987
 14:32:20
 PLOT NO. 62
 POST1 STRESS
 STEP=3
 ITER=1
 SXY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=9413
 MN=-10481
 -8272
 -6061
 -3850
 -1639
 572
 7205
 9416

ANSYS 4.28
 FEB 14 1987
 14:33:28
 PLOT NO. 63
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 TOP
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=95647
 MN=-103708
 -81559
 -59408
 -37257
 -15106
 7045
 1 1 1



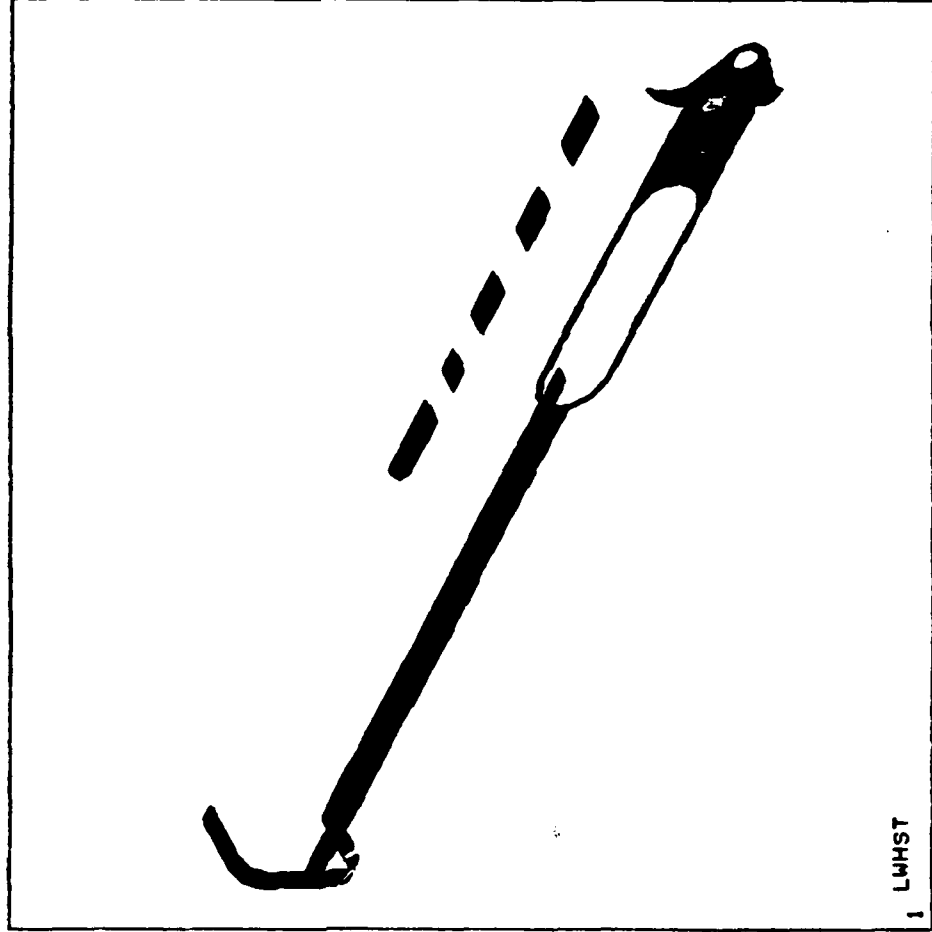
ANSYS 4.2B
 FEB 14 1987
 14:33:47
 PLOT NO. 64
 POST1 STRESS
 STEP=3
 ITER=1
 SY
 TOP
 STRESS ELEM C9
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=51572
 MN=-78673
 -64202
 -49730
 -35258
 -20786
 -6314
 51572
 20786



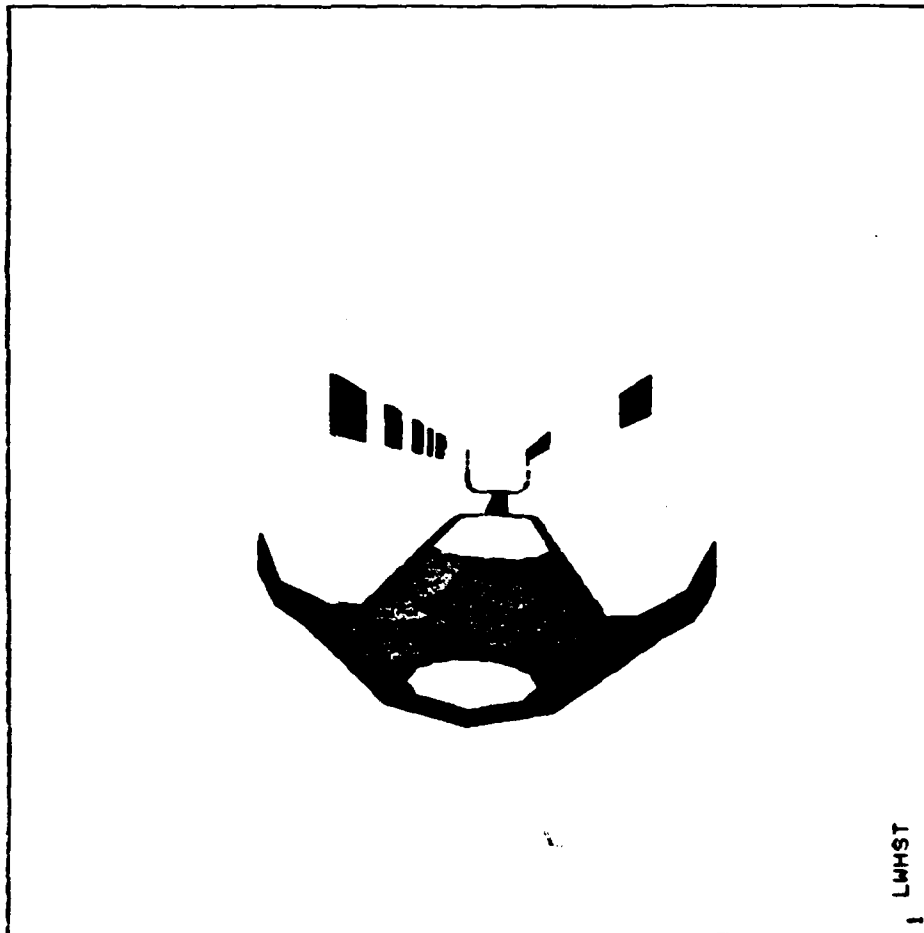
1 LWNST

ANSYS 4.2B
 FEB 14 1987
 14:34:05
 PLOT NO. 65
 POST1 STRESS
 STEP=3
 ITER=1
 SXY
 TOP
 STRESS ELEM CS

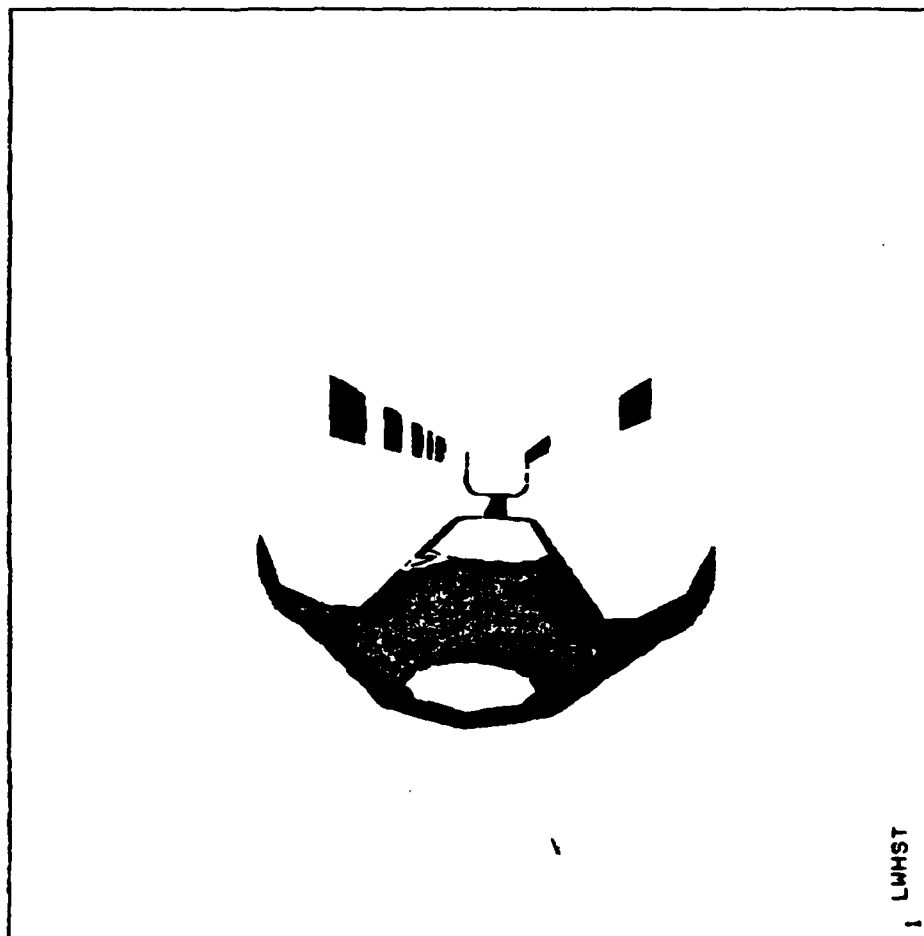
XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=20908
 MN=-17985
 -13665
 -9343
 -5021
 -699
 3627



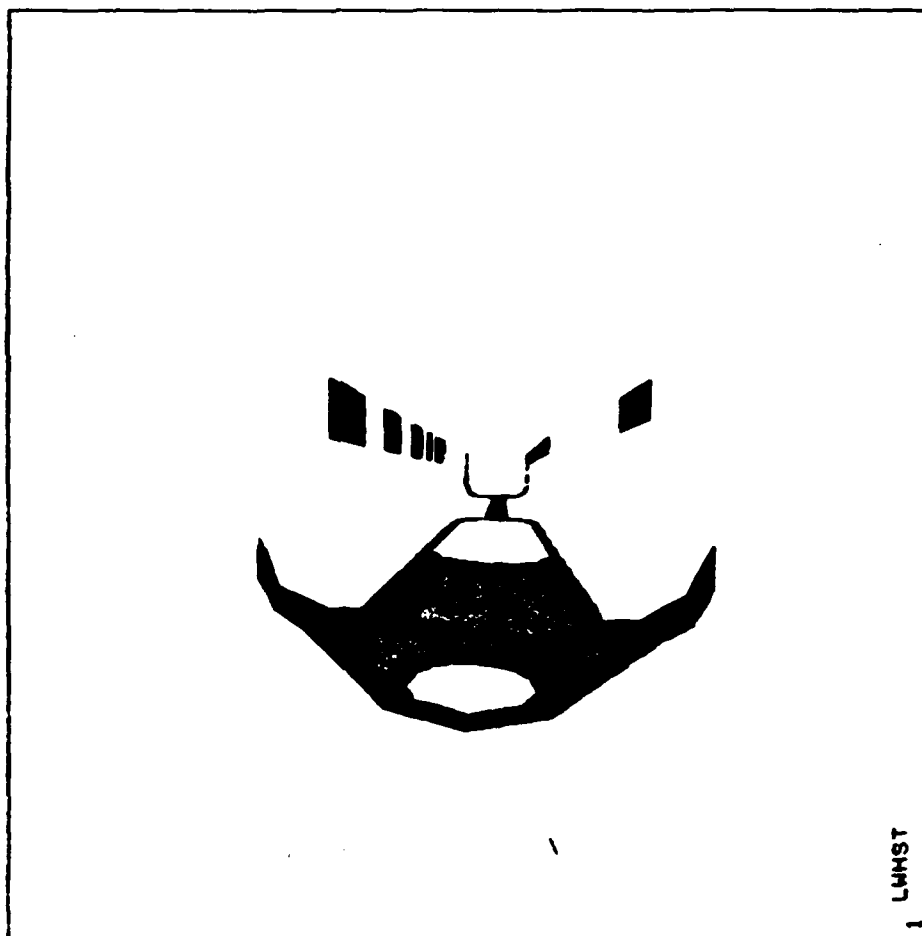
ANSYS 4.2B
 FEB 14 1987
 14:34:22
 PLOT NO. 66
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=95647
 MN=-103708
 -81559
 -59408
 -37257
 -15106
 7045
 73498
 95649

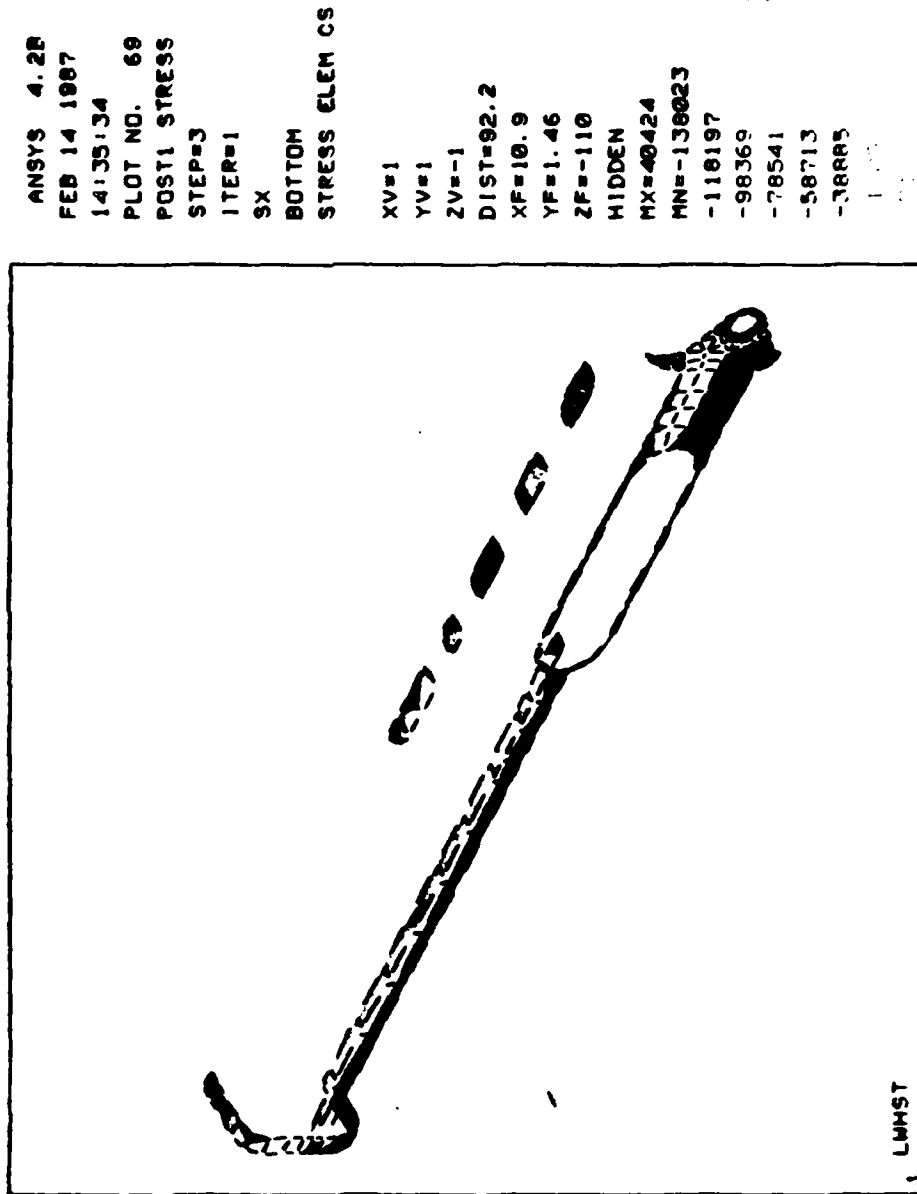


ANSYS 4.2B
 FEB 14 1987
 14:34:39
 PLOT NO. 67
 POST1 STRESS
 STEP=3
 ITER=1
 SY
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=51572
 MN=-78673
 -64202
 -49730
 -35258
 -20786
 -6314
 37102
 51574



ANSYS 4.2B
 FEB 14 1987
 14:34:56
 PLOT NO. 68
 POST1 STRESS
 STEP=3
 ITER=1
 SXY
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=20908
 MN=-17985
 -13665
 -9343
 -5021
 -699
 3623
 16589
 20911

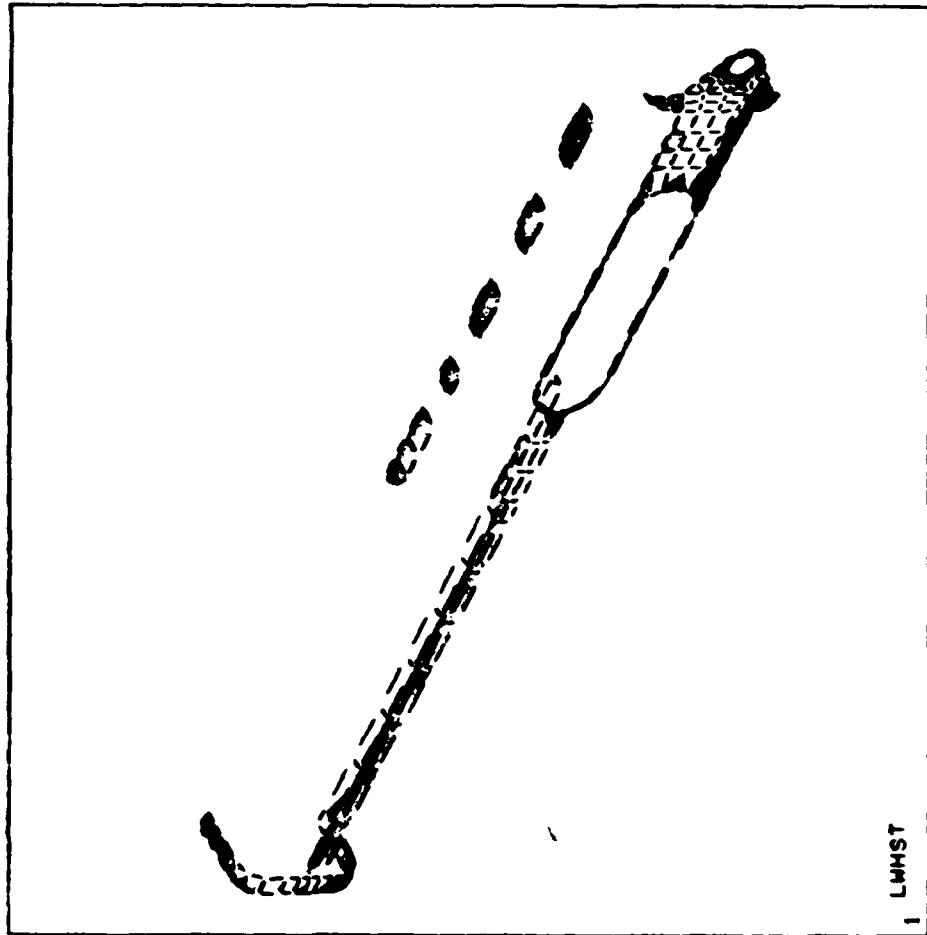




ANSYS 4.2R
FEB 14 1987
14:35:34
PLOT NO. 69
POST1 STRESS
STEP=3
ITER=1
SX
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=40424
MN=-138023
-118197
-98369
-78541
-58713
-38885

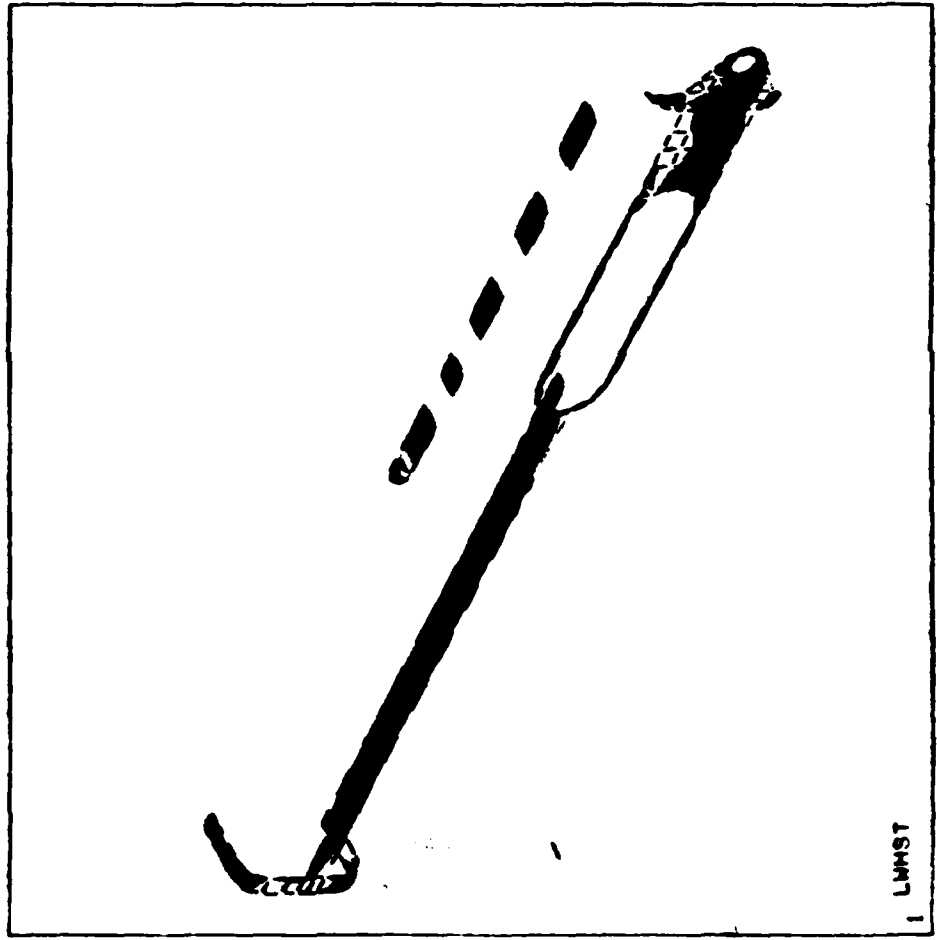
ANSYS 4.2B
 FEB 14 1987
 14:35:55
 PLOT NO. 70
 POST1 STRESS
 STEP=3
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS

XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=27001
 MN=-100595
 -86420
 -72242
 -58064
 -43886
 -29708

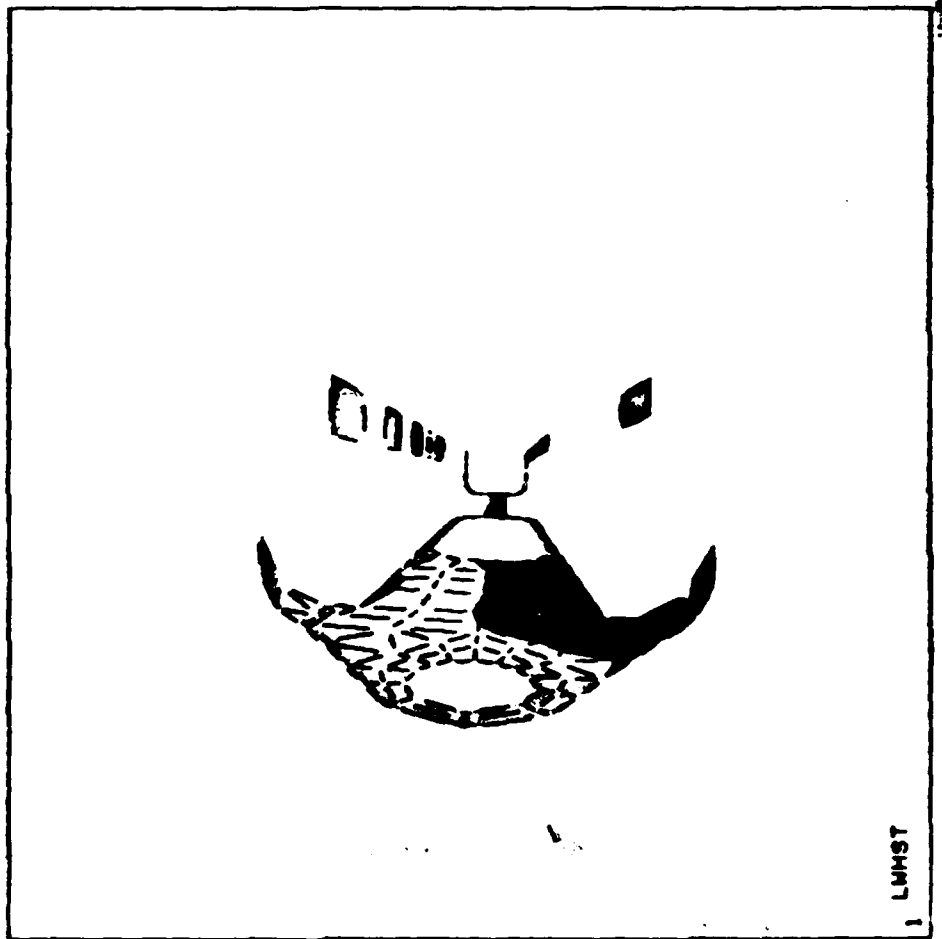


ANSYS 4.2B
FEB 14 1987
14:36:12
PLOT NO. 71
POST1 STRESS
STEP=3
ITER=1
SXY
BOTTOM
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=30622
MN=-62417
-52081
-41743
-31405
-21067
-10729



ANSYS 4.2B
FEB 14 1987
14:36:29
PLOT NO. 72
POST1 STRESS
STEP=3
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=40424
MN=-130023
-110197
-98369
-78541
-58713
-30085
20599
40427



ANSYS 4.28

FEB 14 1987

14:36:47

PLOT NO. 73

POST1 STRESS

STEP=3

ITER=1

SY

BOTTOM

STRESS ELEM CS

ZV=-1

DIST=139

XF=9.5

ZF=-119

CONE=40

HIDDEN

MX=27001

MN=-100595

-66420

-72242

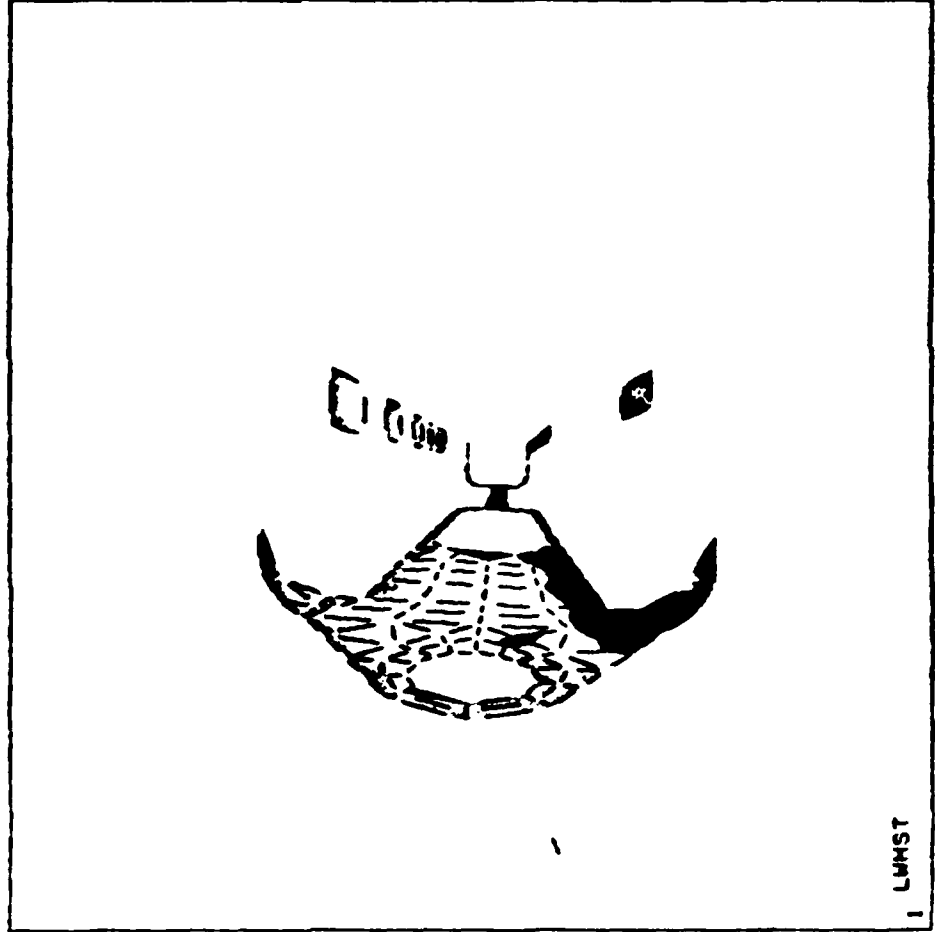
-58064

-43686

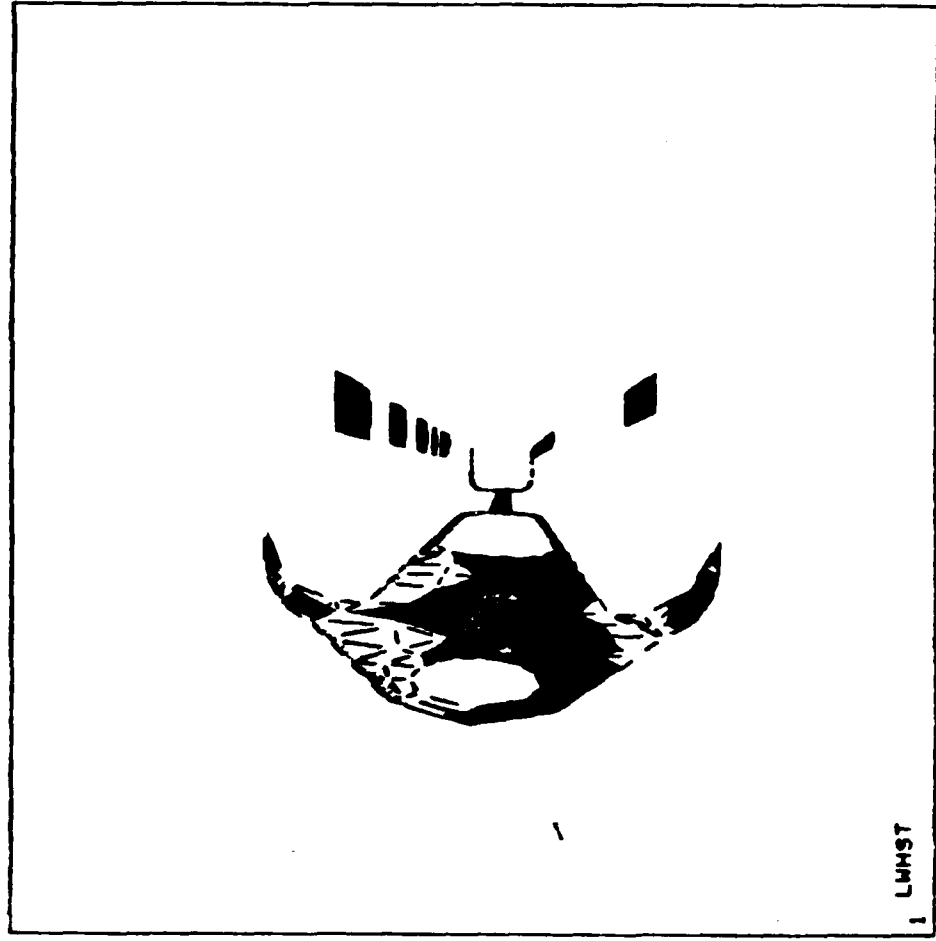
-29708

12826

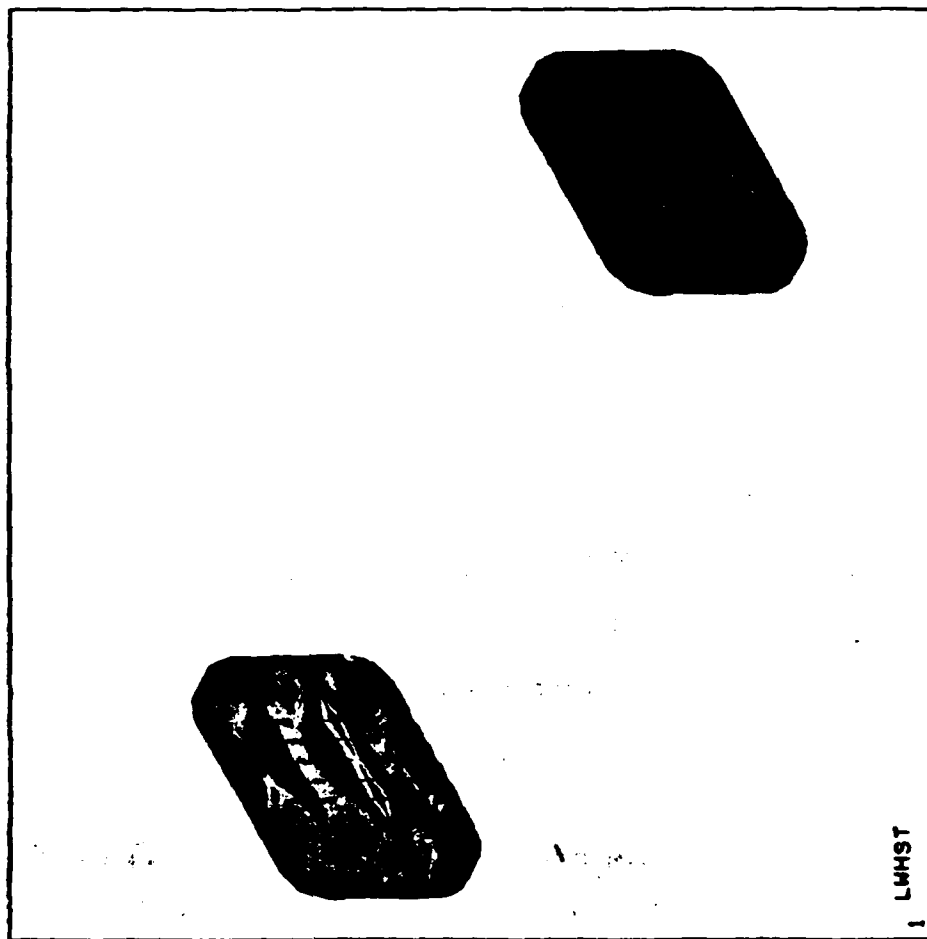
27004



ANSYS 4.2B
 FEB 14 1987
 14:37:04
 PLOT NO. 74
 POST1 STRESS
 STEP=3
 ITER=1
 SXY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=30622
 MN=-62417
 -52081
 -41743
 -31405
 -21067
 -10729
 20285
 30623



ANSYS 4.2B
 FEB 14 1987
 14:38:01
 PLOT NO. 75
 POST1 STRESS
 STEP=3
 ITER=1
 SICE
 BOTTOM
 XV=1
 YV=1
 ZV=-1
 DIST=59.9
 YF=1.63
 ZF=-52
 HIDDEN
 MX=2509
 MN=12.9
 288
 566
 844
 1122
 1400
 1778
 2156
 2534
 2912



D2/320

MCR MEMO: FEBRUARY 27, 1987



ASSOCIATES, INC.

2
111 W. Evelyn Ave., Suite 301
Sunnyvale, California 94086
(408) 736-1636

February 27, 1987

Larry Libhardt
FMC Corporation
3989 Central Ave NE
Minneapolis, Minn 55421

Model #13

3-2-87
LJL

Dear Larry,

Enclosed is the input listing, stress contour plots and short results printout for model #13. The main changes that were made are that the core has been reduced from 2 inches to 1 inch. The connection between the front manifold and the shell was adjusted so that there is a full bearing surface in the Z direction only. There is a connection at the lower center of the manifold to the shell in the X and Y directions and a spring connects the upper center in the X direction with a spring constant of 1000 pounds/inch. Short beams were extended from the manifold out to an X value of + or - 23 inches and connected to the cables. Four load cases were run which consist of recoil, torque, gravity, and finally all three loads combined. The detailed printout is being sent and you should receive it the first week of March.

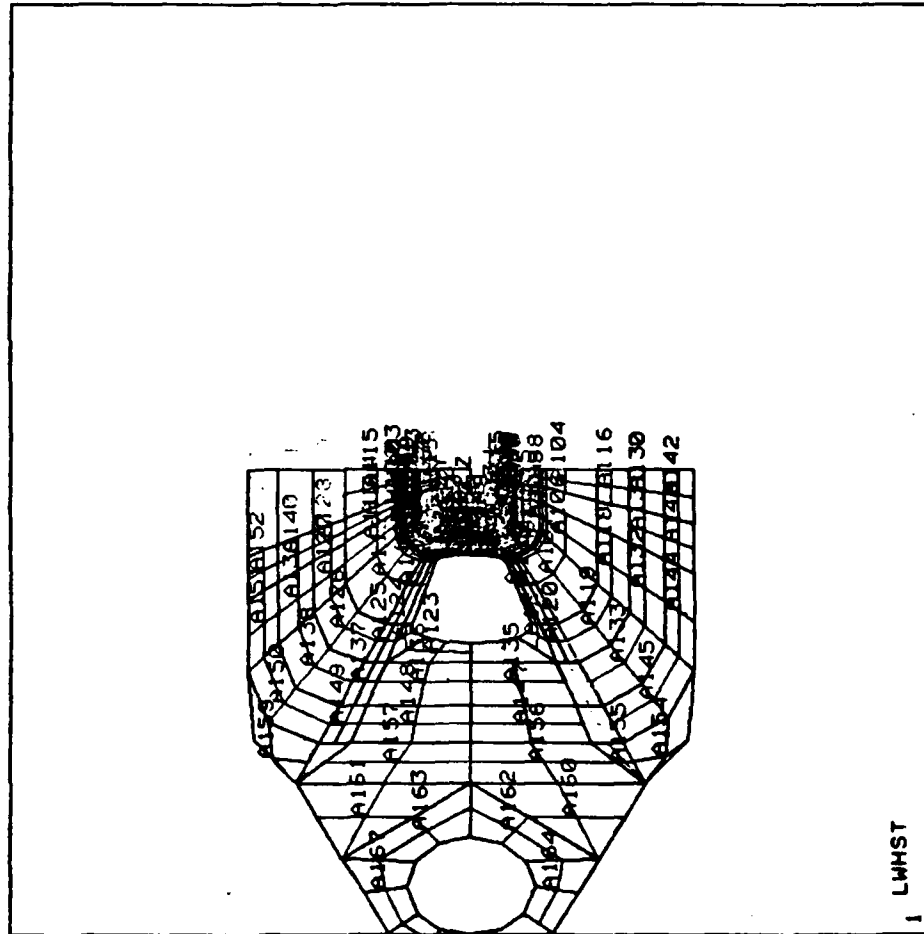
Best regards,

Mark C. Rodamaker

Mark C. Rodamaker

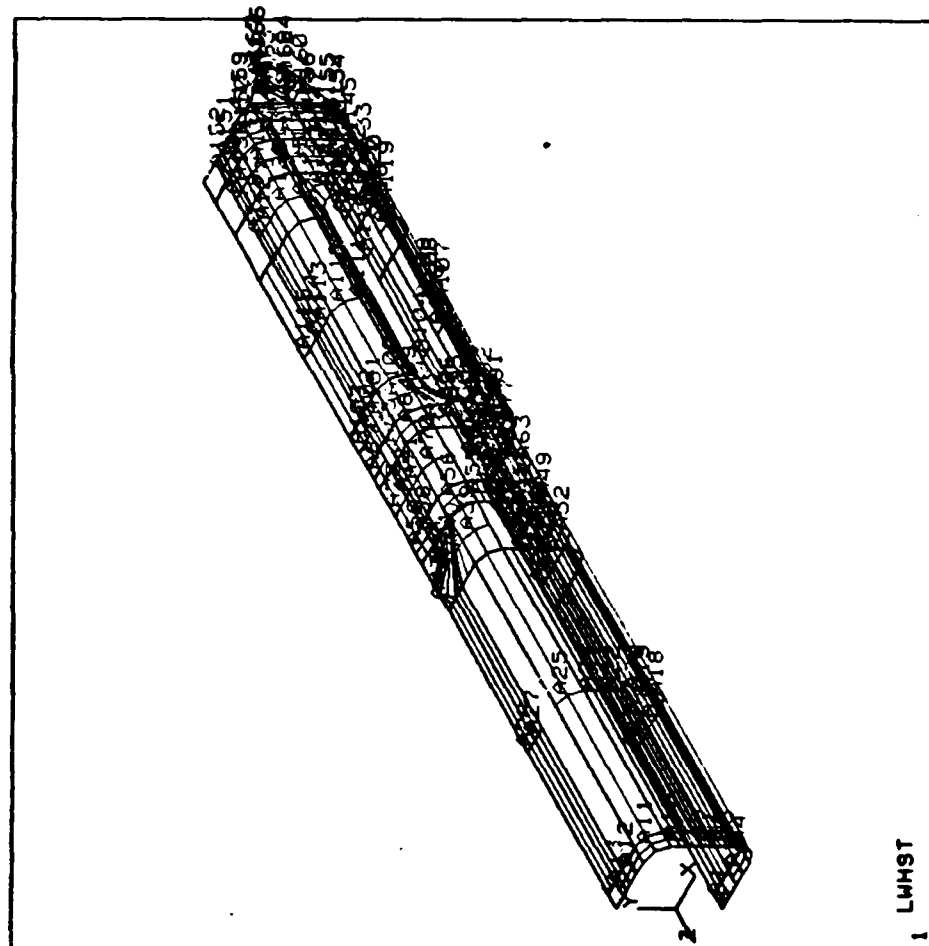
ANSYS 4.2B
 FEB 26 1987
 16:47:10
 PLOT NO. 6
 PREP7 AREAS

ZV=-1
 # DIST=139
 # ZF=-119
 CONE=40



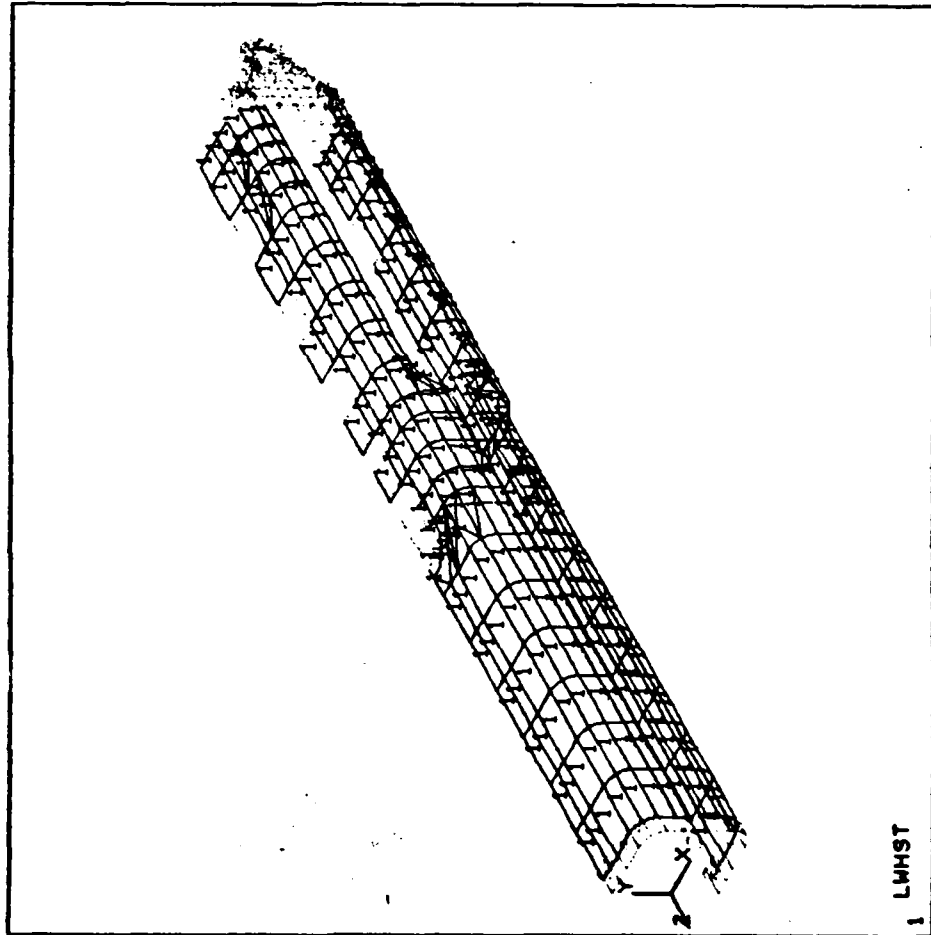
ANSYS 4.2B
FEB 26 1987
18:45:52
PLOT NO. 3
PREP7 AREAS

XV=1
YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.33
ZF=-116

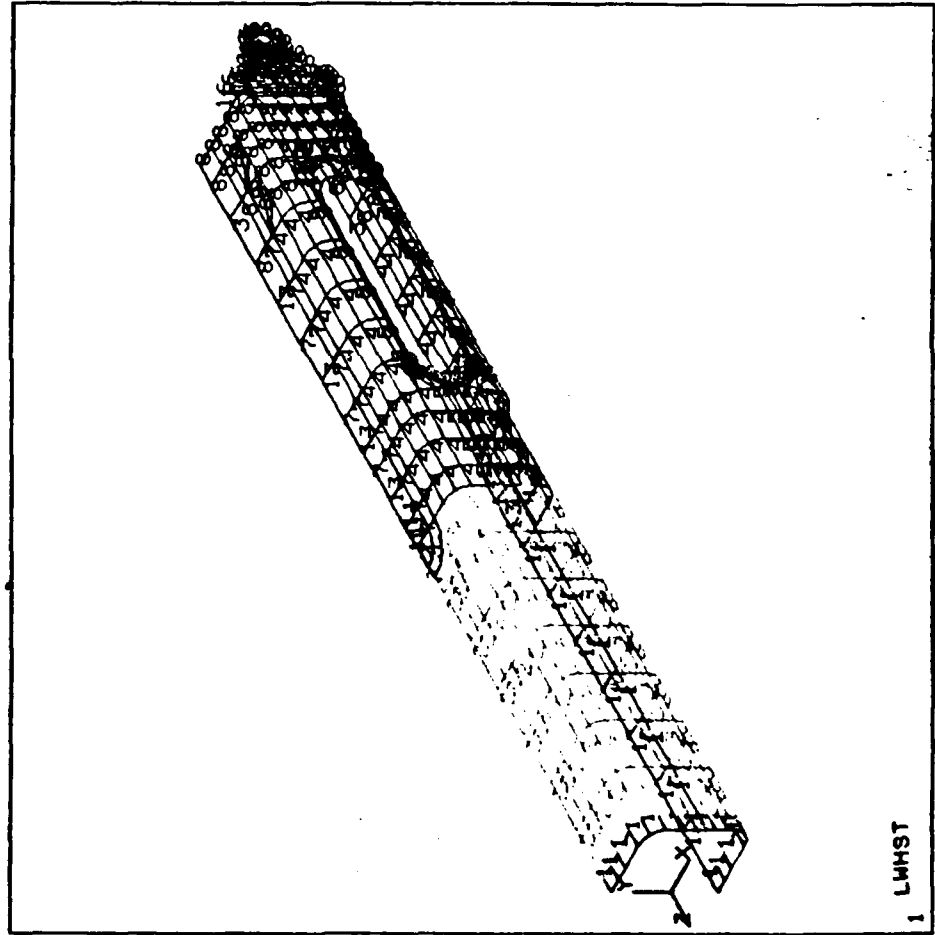


ANSYS 4.2B
FEB 26 1987
18:45:17
PLOT NO. 1
PREP7 ELEMENTS
TNUM=1

XV=1
YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.24
ZF=-115

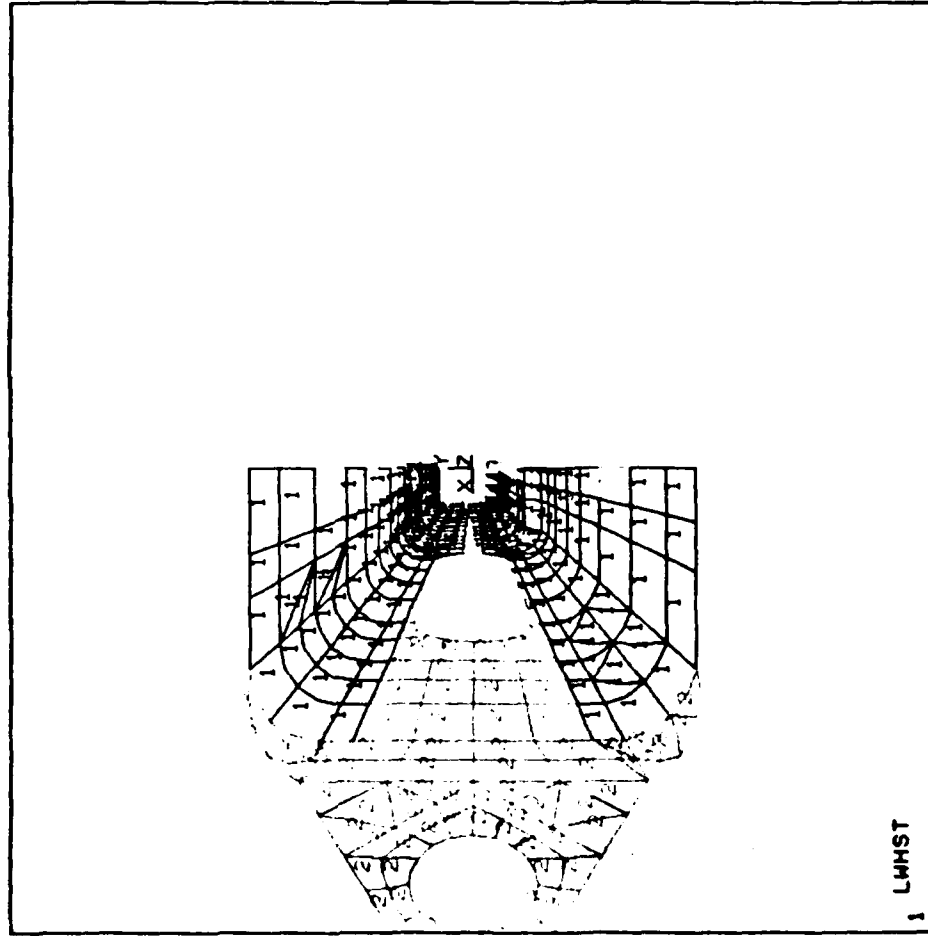


ANSYS 4.2B
FEB 26 1987
18:45:37
PLOT NO. 2
PREP7 ELEMENTS
RNUM=1
XV=1
YV=1
ZV=1
DIST=99.6
XF=12.5
YF=1.24
ZF=-115



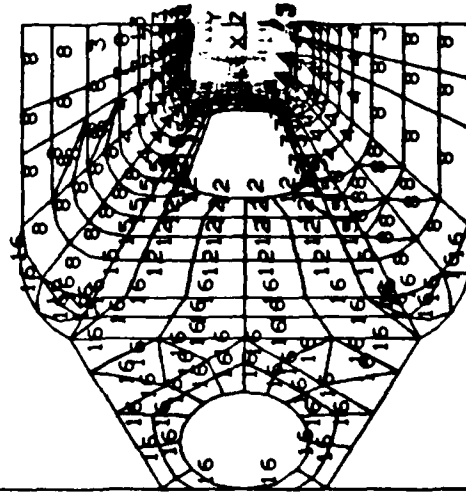
ANSYS 4.2B
FEB 26 1987
18:46:25
PLOT NO. 4
PREP7 ELEMENTS
TNUM=1

ZV=-1
DIST=139
ZF=-119
CONE=40



ANSYS 4.2B
FEB 26 1987
18:46:41
PLOT NO. 5
PREP7 ELEMENTS
RNUM=1

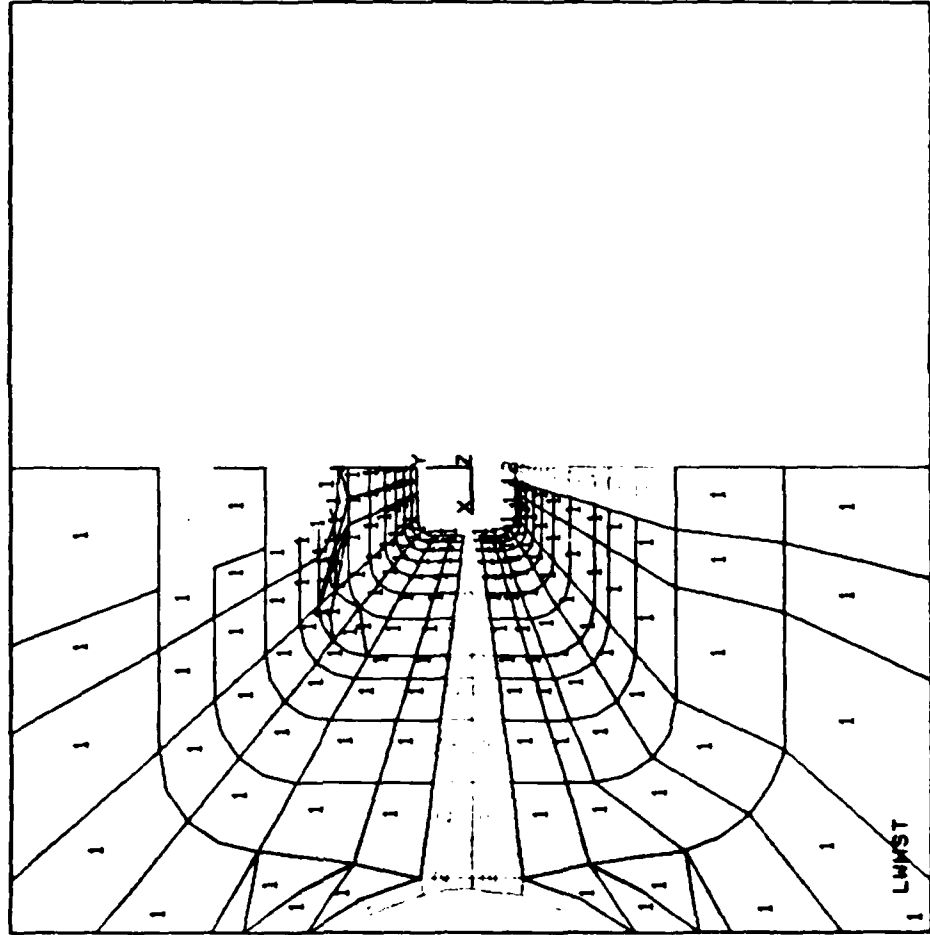
ZV=-1
DIST=139
ZF=-119
CONE=40



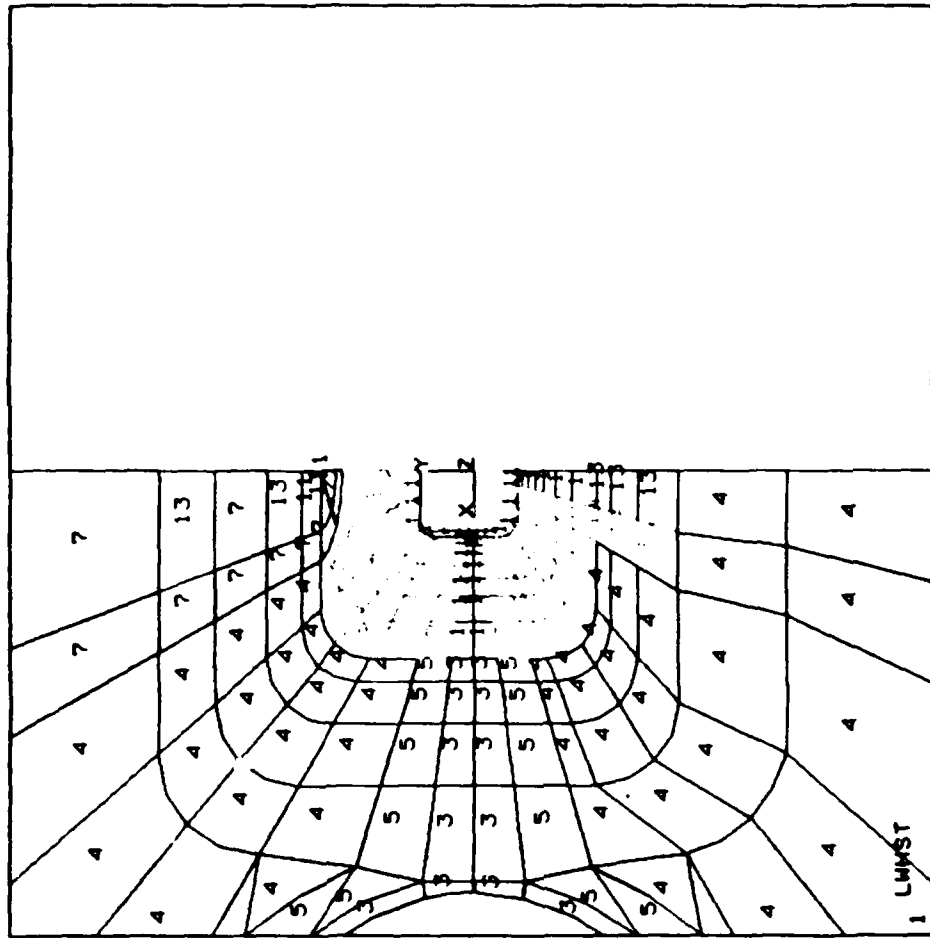
1 LWST

ANSYS 4.2B
FEB 26 1987
18:46:56
PLOT NO. 6
PREP7 ELEMENTS
TNUM=1

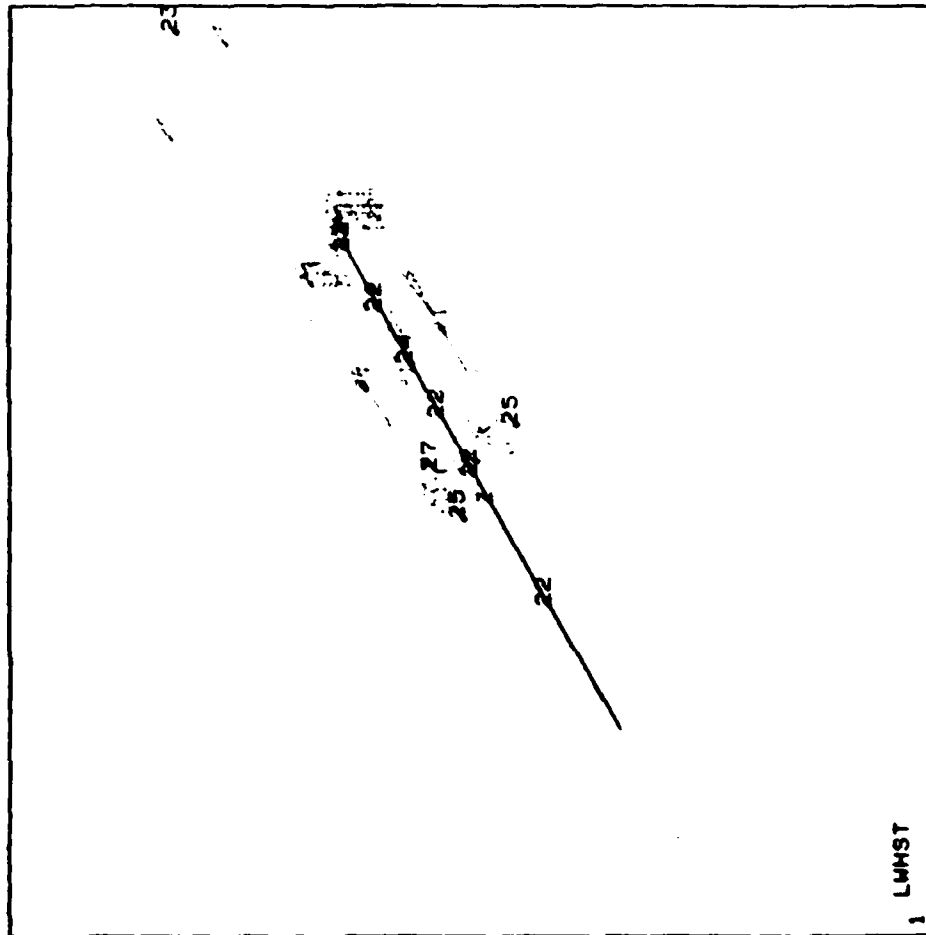
ZV=-1
DIST=160
CONE=40



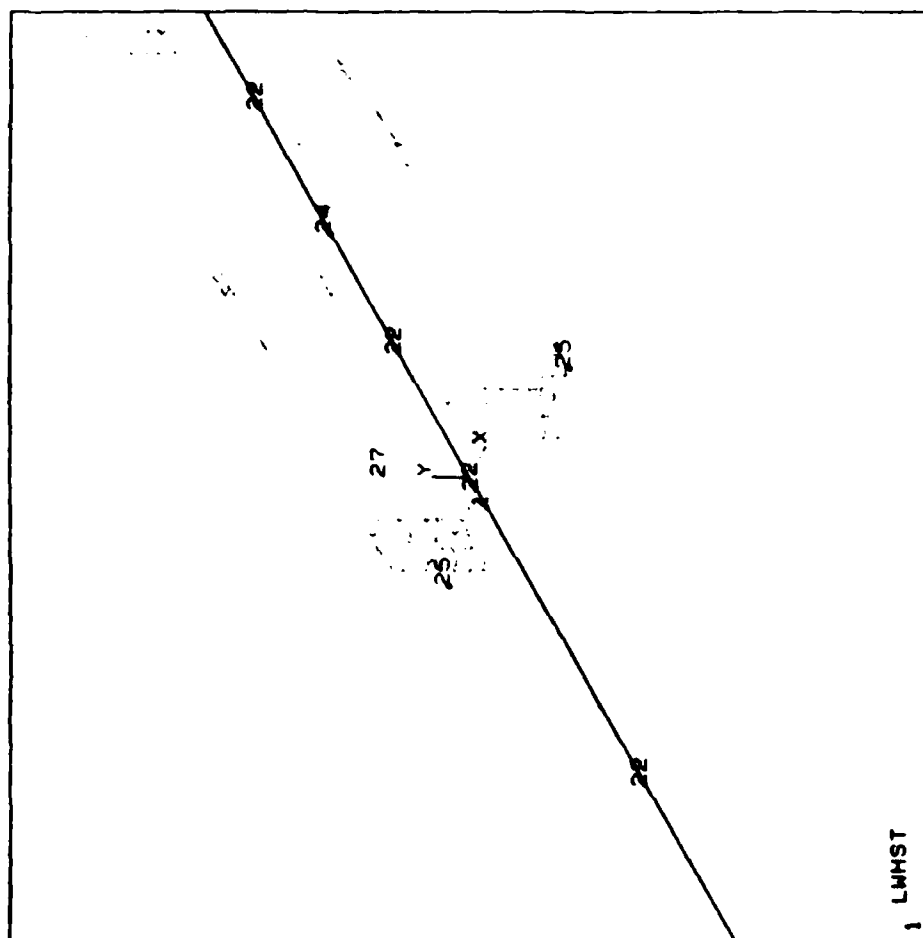
ANSYS 4.2B
FEB 26 1987
18:47:07
PLOT NO. 7
PREP7 ELEMENTS
RNUM=1
ZV=-1
DIST=160
CONE=40



ANSYS 4.2B
FEB 26 1987
18:47:20
PLOT NO. 0
PREP7 ELEMENTS
RNUM=1
XV=1
YV=1
ZV=1
DIST=160



ANSYS 4.28
FEB 26 1987
18:47:20
PLOT NO. 6
PREP7 ELEMENTS
RNUM=1
XV=1
YV=1
ZV=1
* DIST=70



ANSYS 4.2B

FEB 27 1987

3:59:32

PLOT NO. 1

POST1 STRESS

STEP=1

ITER=1

SX

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=7900

MN=-16975

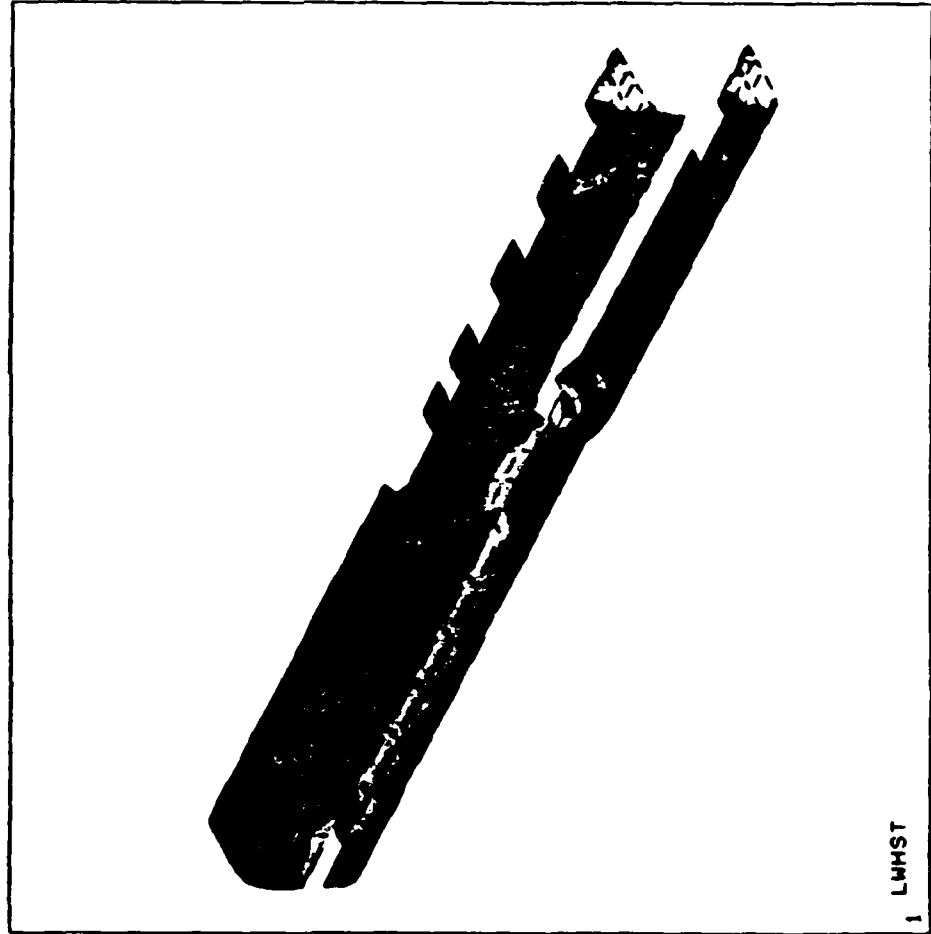
-14212

-11448

-8684

-5920

-3156



ANSYS 4.2B
FEB 27 1987
3:59:50

PLOT NO. 2

POST1 STRESS

STEP=1

ITER=1

SY

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=5484

MN=-5800

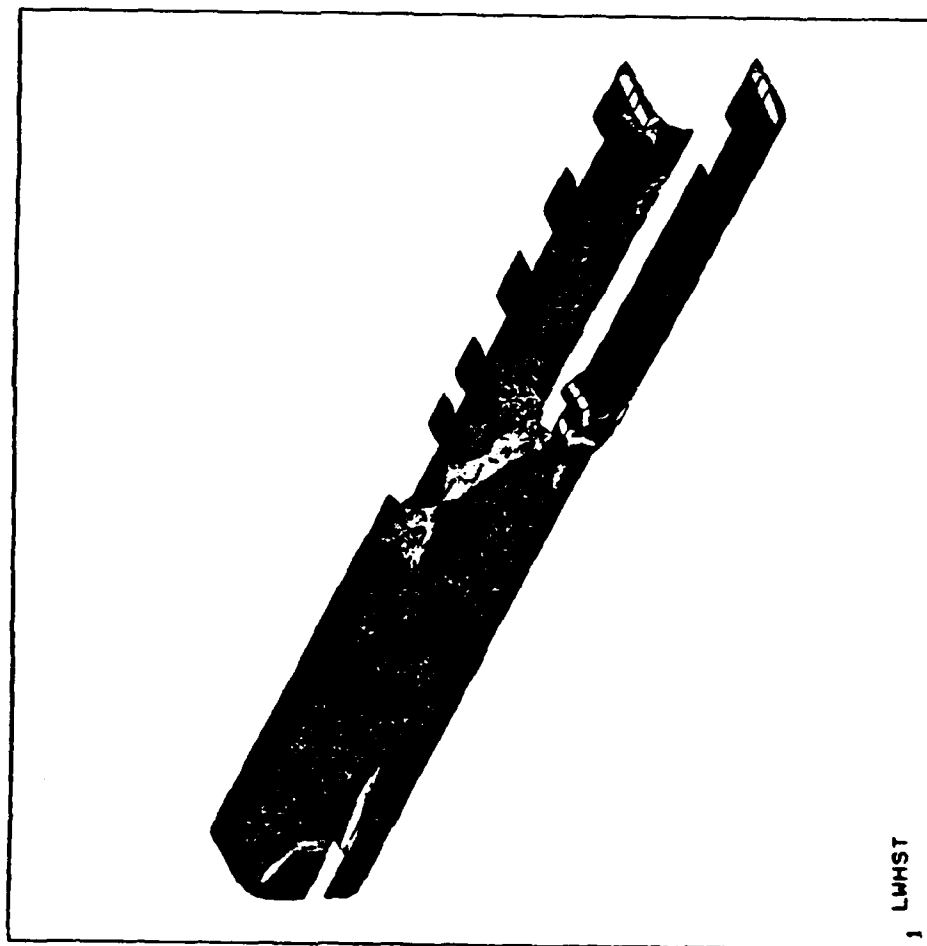
-4547

-3293

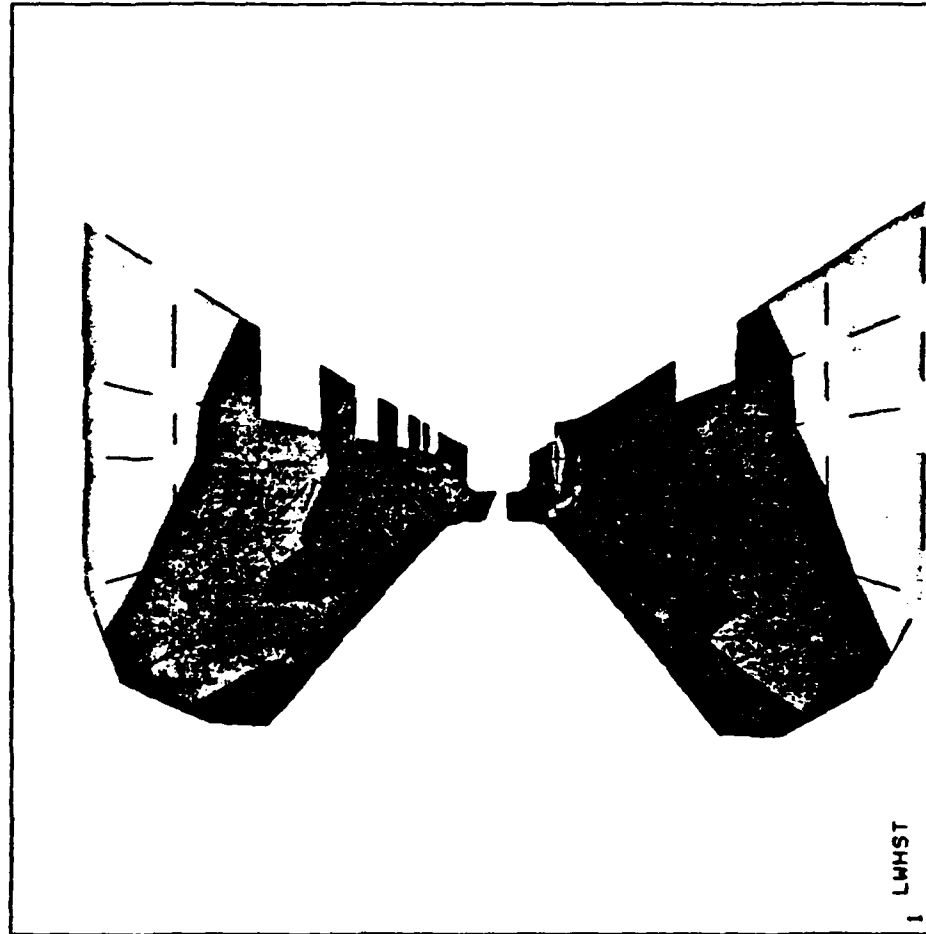
-2039

-785

469



ANSYS 4.2B
 FEB 27 1987
 4:00:07
 PLOT NO. 3
 POST1 STRESS
 STEP=1
 ITER=1
 SX
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=7900
 MN=-16975
 -14212
 -11448
 -8684
 -5920
 -3156
 5136
 7900



ANSYS 4.2B
FEB 27 1987

4:00:23

PLOT NO. 4

POST1 STRESS

STEP=1

ITER=1

SY

TOP

STRESS ELEM CS

ZV=-1

DIST=128

XF=9.5

ZF=-112

CONE=40

HIDDEN

MX=5484

MN=-5800

-4547

-3293

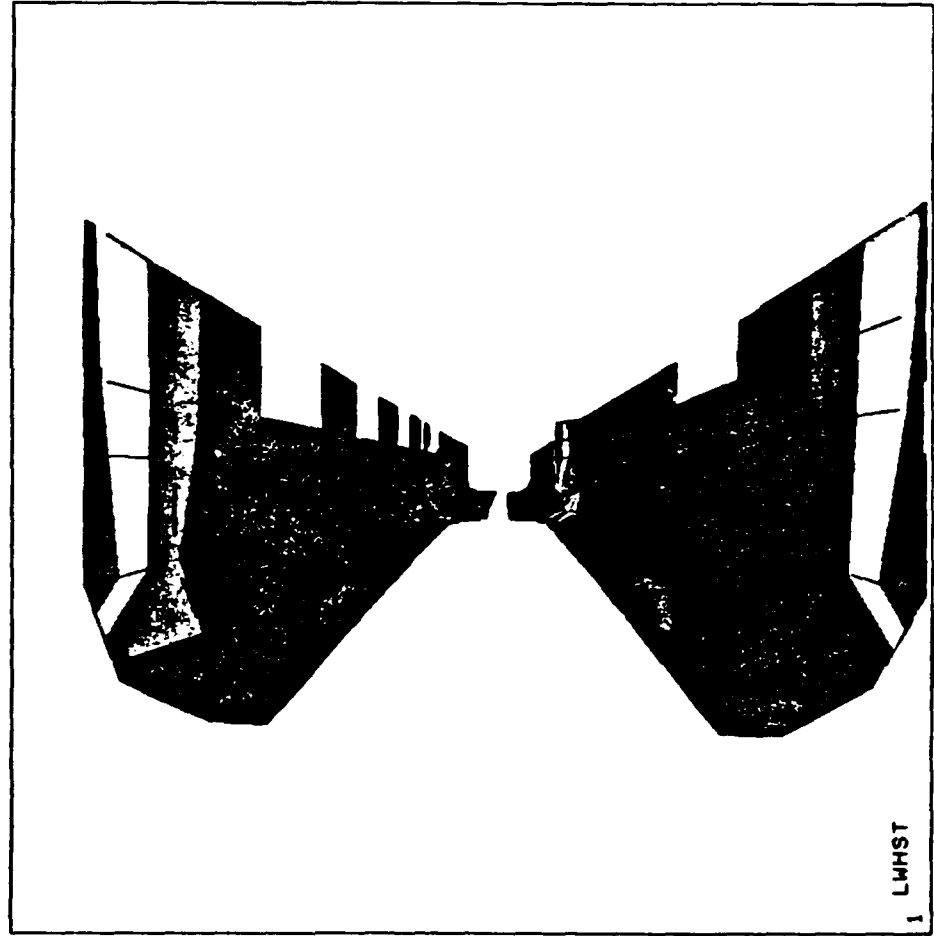
-2039

-785

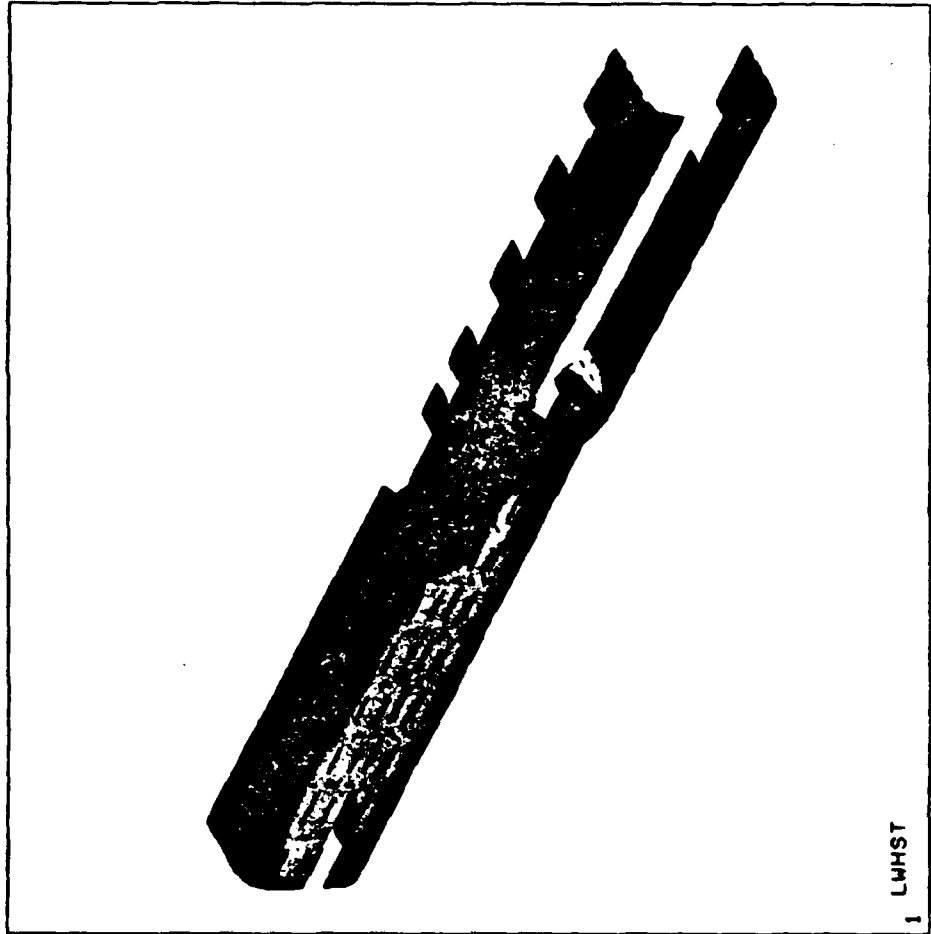
469

4231

5485



ANSYS 4.2B
FEB 27 1987
4:00:48
PLOT NO. 5
POST1 STRESS
STEP=1
ITER=1
SX
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=12017
MN=-17691
-14391
-11090
-7789
-4488
-1187



1 LWHST

ANSYS 4.2B
FEB 27 1987

4:01:04

PLOT NO. 6

POST1 STRESS

STEP=1

ITER=1

SY

BOTTOM

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=3773

MN=-6449

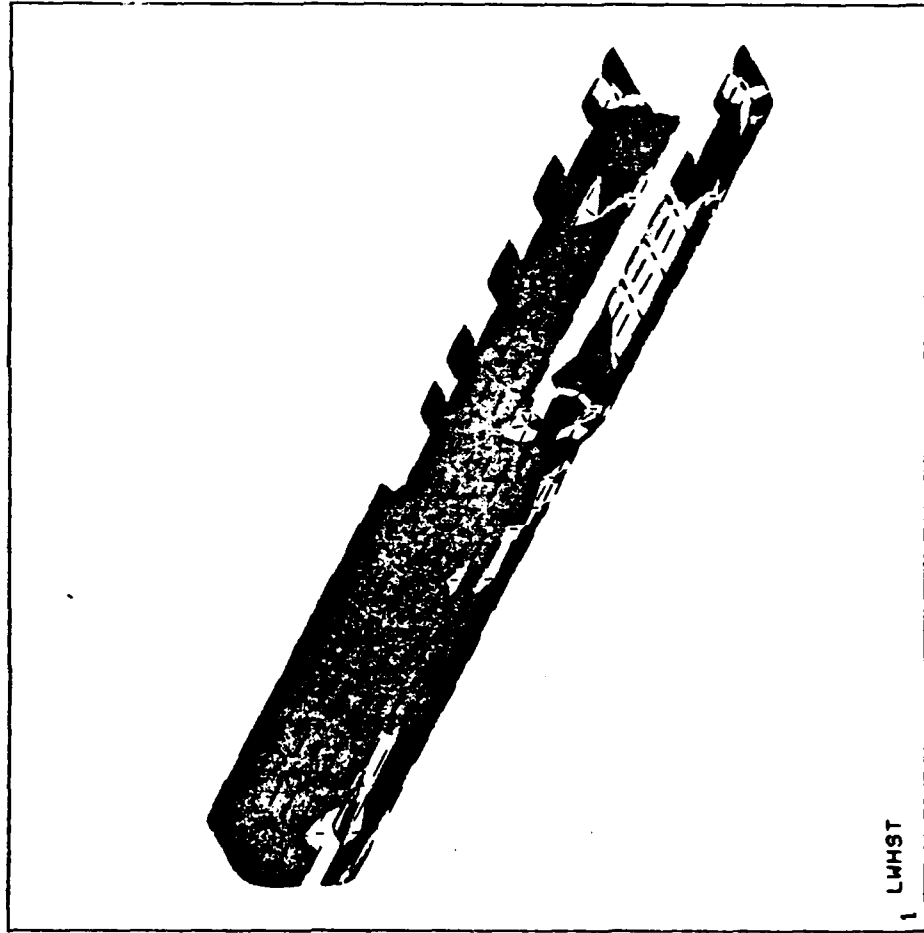
-5314

-4178

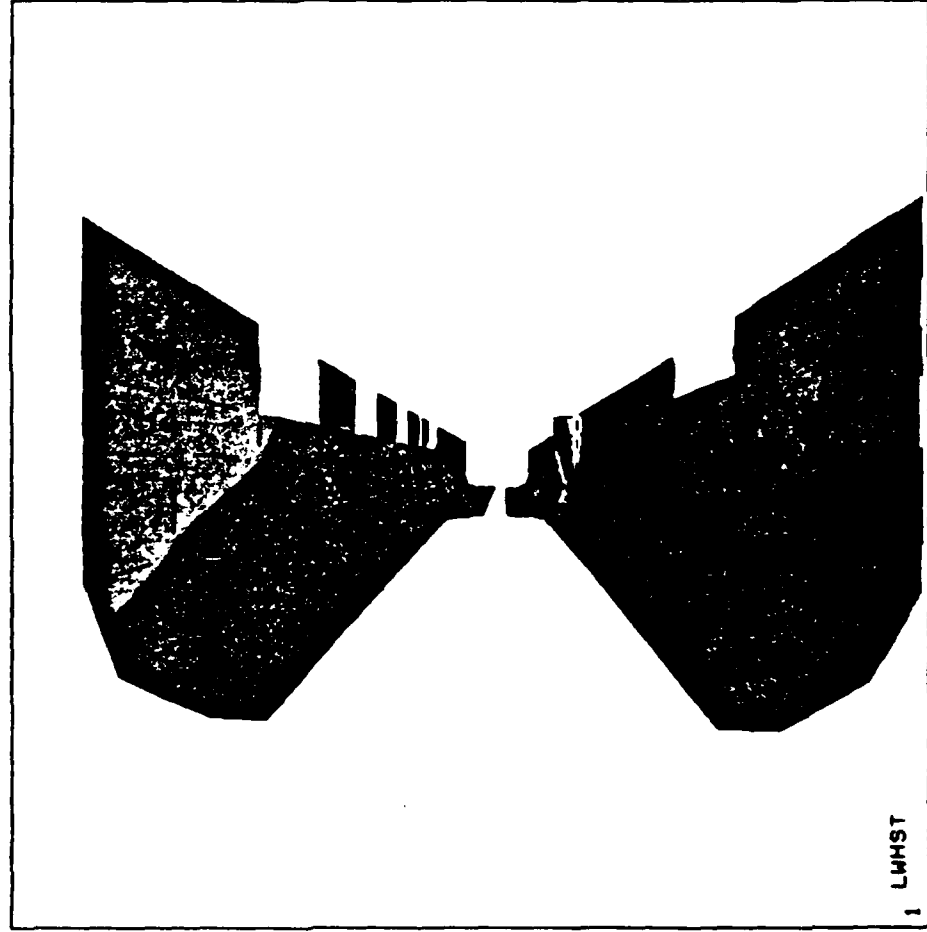
-3042

-1906

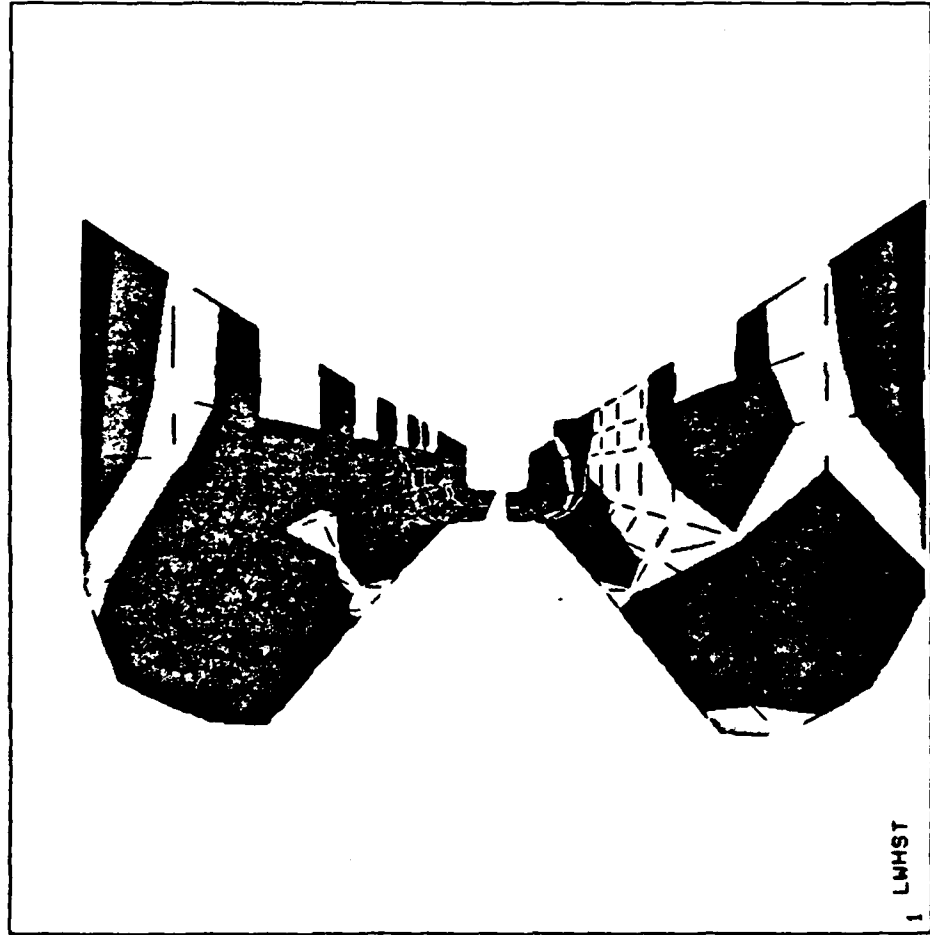
-770



ANSYS 4.2B
FEB 27 1987
4:01:18
PLOT NO. 7
POST1 STRESS
STEP=1
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=12017
MN=-17691
-14391
-11090
-7789
-4488
-1187
8716
12017

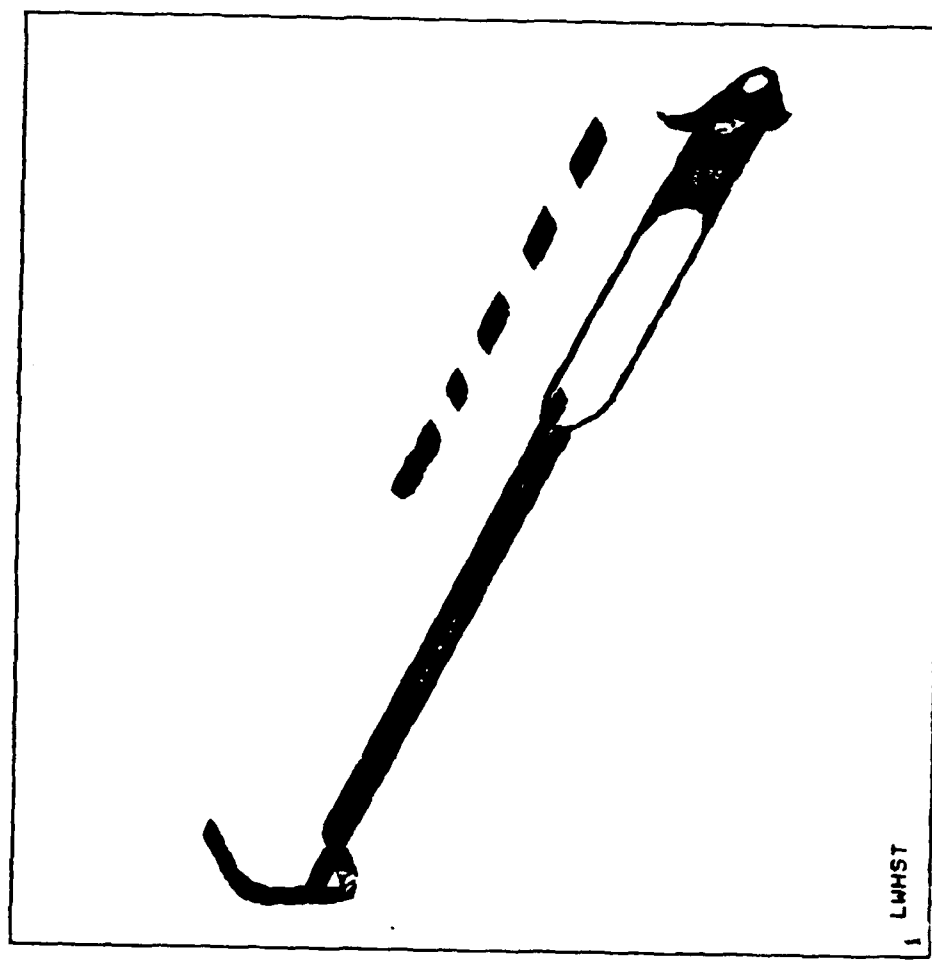


ANSYS 4.2B
 FEB 27 1987
 4:01:34
 PLOT NO. 8
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=3773
 MN=-6449
 -5314
 -4178
 -3042
 -1906
 -770
 2638
 3774

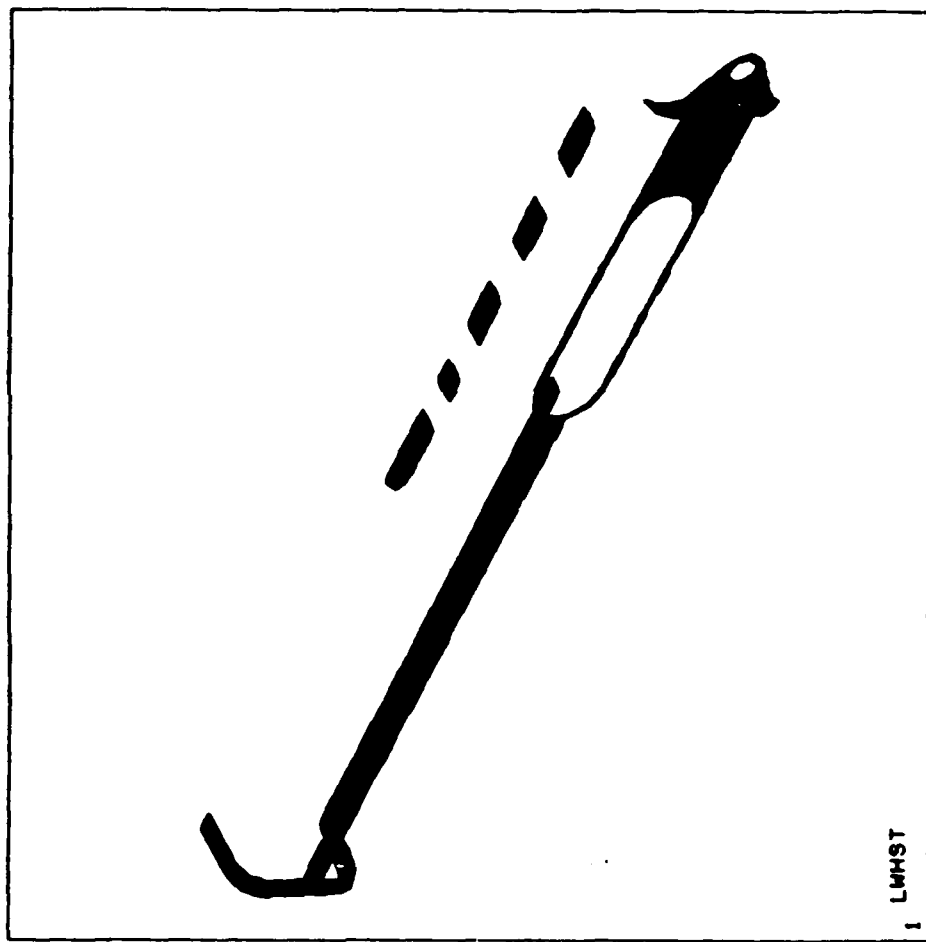


ANSYS 4.2B
FEB 27 1987
4:02:06
PLOT NO. 9
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=40501
MN=-50316
-40226
-30135
-20044
-9953
13R



ANSYS 4.2B
 FEB 27 1987
 4:02:13
 PLOT NO. 10
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 TOP
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=55580
 MN=-55608
 -43256
 -30901
 -18546
 -6191
 6164
 10014
 50000



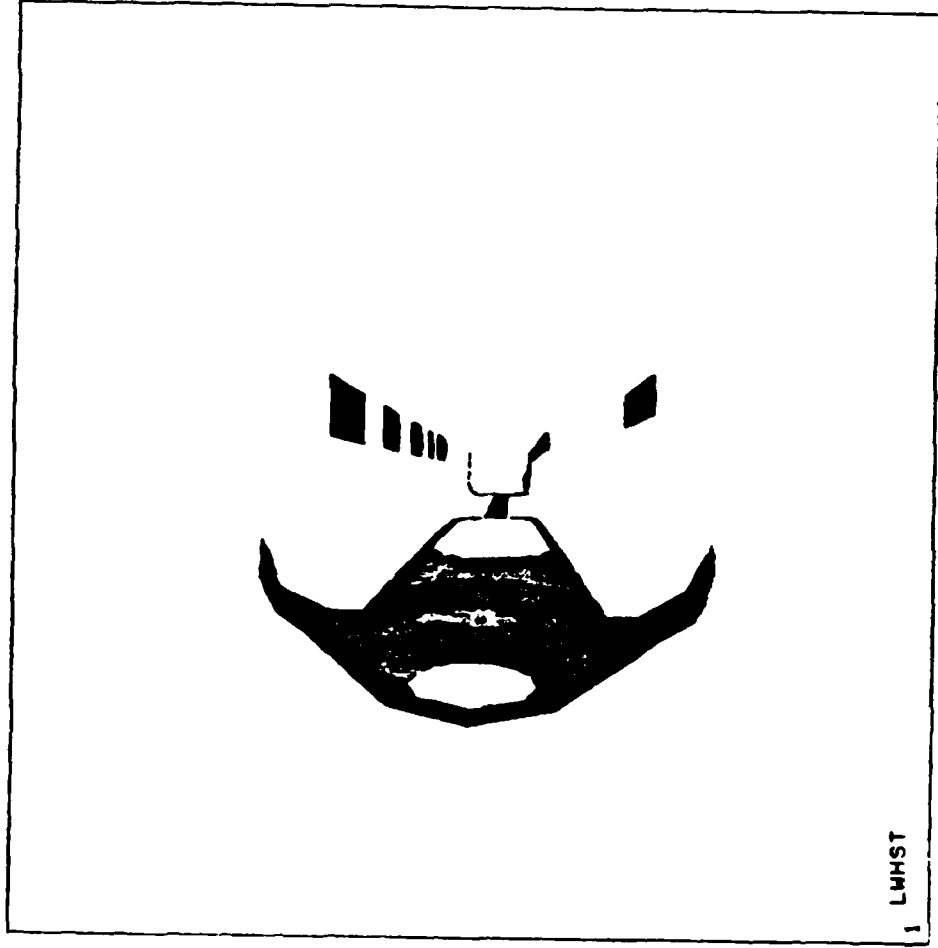
ANSYS 4.2B
FEB 27 1987
4:02:21

PLOT NO. 11
POST1 STRESS
STEP=1
ITER=1

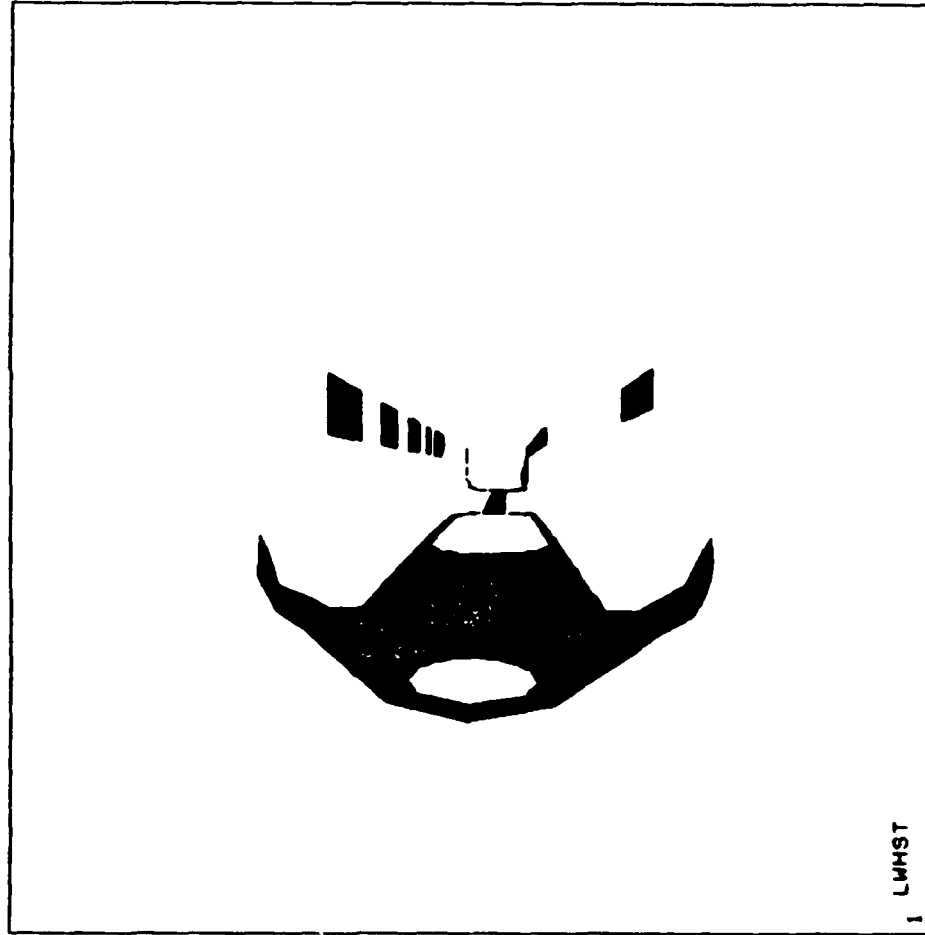
SX
TOP
STRESS ELEM CS

ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=40501
MN=-50316
-40226
-30135
-20044
-9953
13R

30411
40502

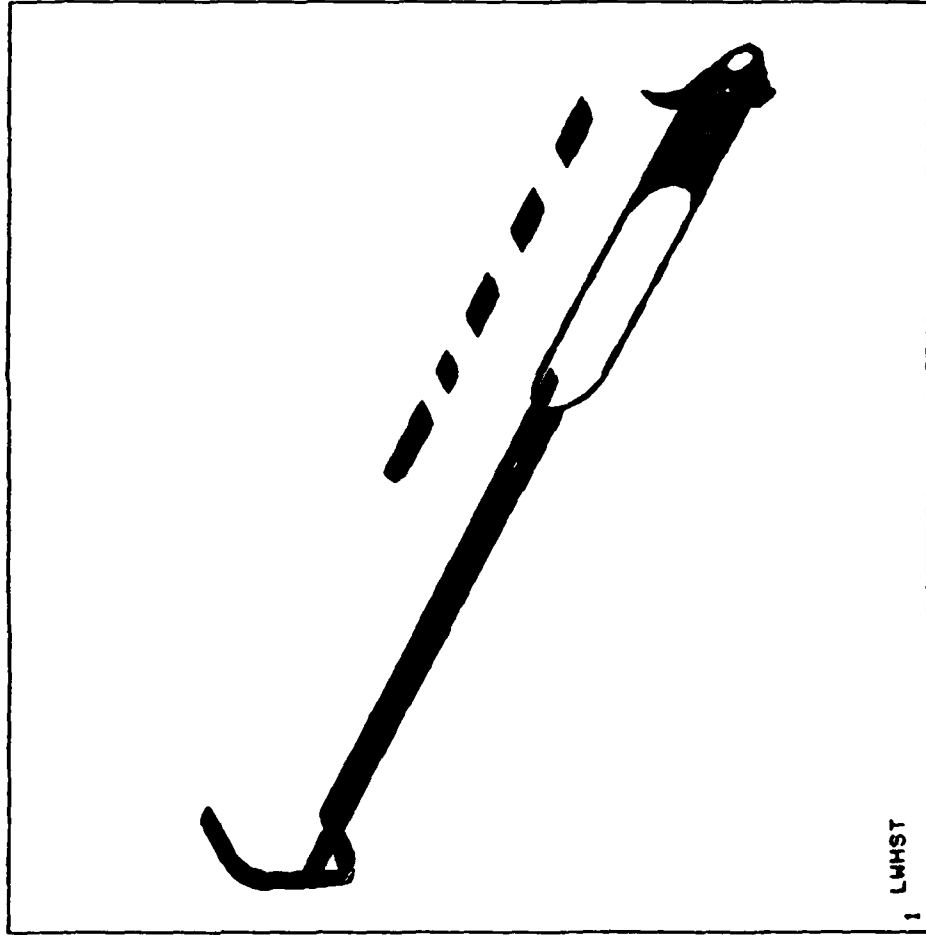


ANSYS 4.28
 FEB 27 1987
 4:02:31
 PLOT NO. 12
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=55580
 MN=-55608
 -43256
 -30901
 -18546
 -6191
 6164
 43229
 55584

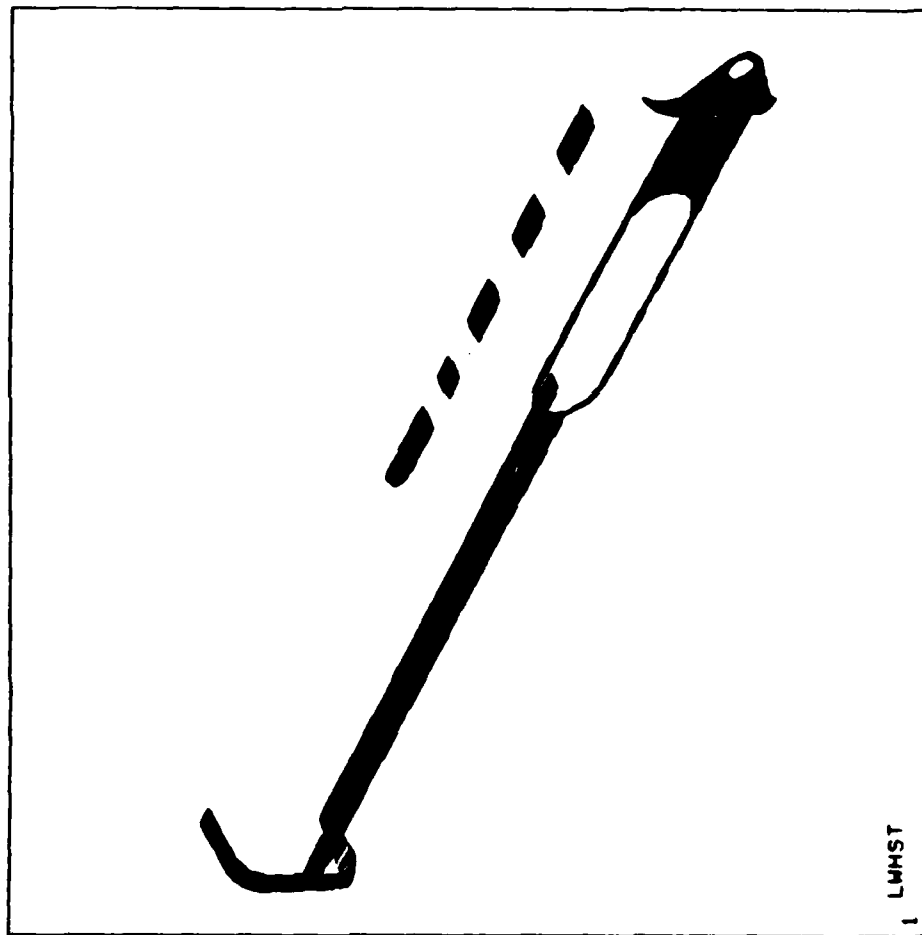


ANSYS 4.2B
FEB 27 1987
4:02:47
PLOT NO. 13
POST1 STRESS
STEP=1
ITER=1
SX
BOTTOM
STRESS ELEM CS

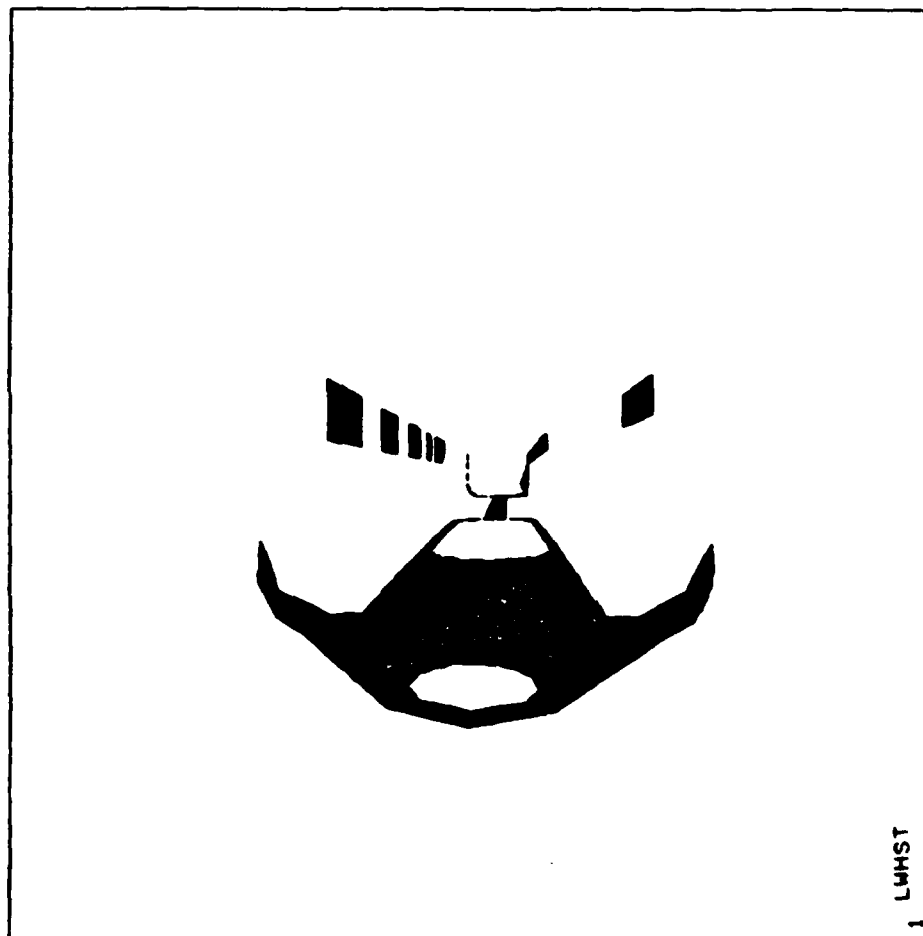
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=28595
MN=-24215
-18348
-12480
-6612
-744
5124
10000
10000



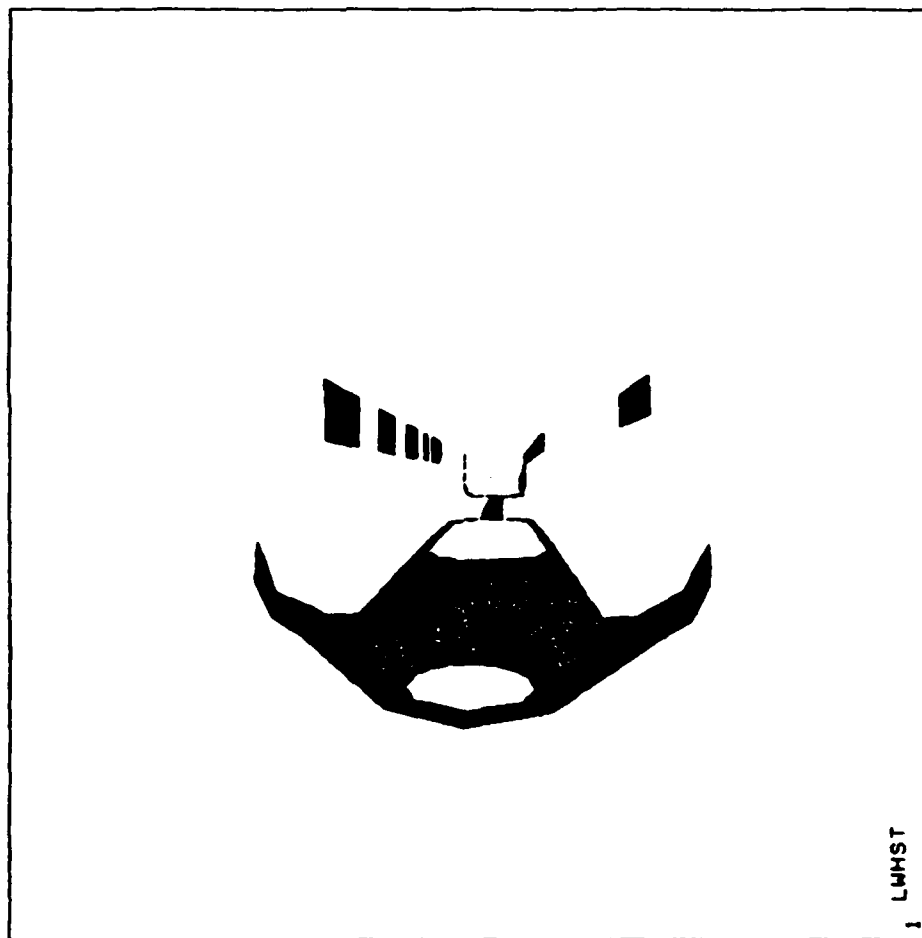
ANSYS 4.2B
 FEB 27 1987
 4:02:54
 PLOT NO. 14
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=34391
 MN=-33595
 -26045
 -18490
 -10935
 -3380
 4175
 11
 11



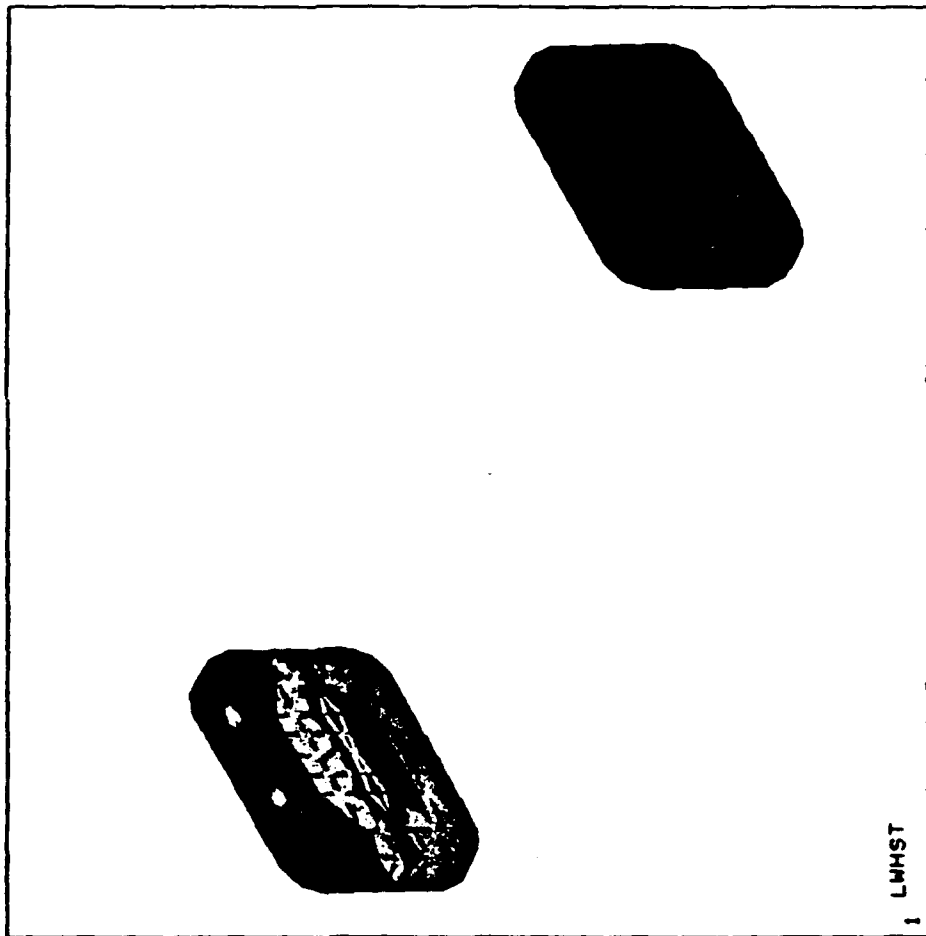
ANSYS 4.2B
 FEB 27 1987
 4:03:03
 PLOT NO. 15
 POST1 STRESS
 STEP=1
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=28595
 MN=-24215
 -18348
 -12480
 -6612
 -744
 5124
 22728
 28596



ANSYS 4.2B
FEB 27 1987
4:03:12
PLOT NO. 16
POST1 STRESS
STEP=1
ITER=1
SY
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=34391
MN=-33595
-26045
-18490
-10935
-3380
4175
26840
34395



ANSYS 4.2B
FEB 27 1987
4:03:34
PLOT NO. 17
POST1 STRESS
STEP=1
ITER=1
SIGE
BOTTOM
XV=1
YV=1
ZV=-1
DIST=59.9
YF=1.63
ZF=-52
HIDDEN
MX=2464
MN=4.41
275
549
823
1097
1371
1645
1919
2193
2467



ANSYS 4.2B

FEB 27 1987

4:05:04

PLOT NO. 18

POST1 STRESS

STEP=2

ITER=1

SX

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=11589

MN=-6562

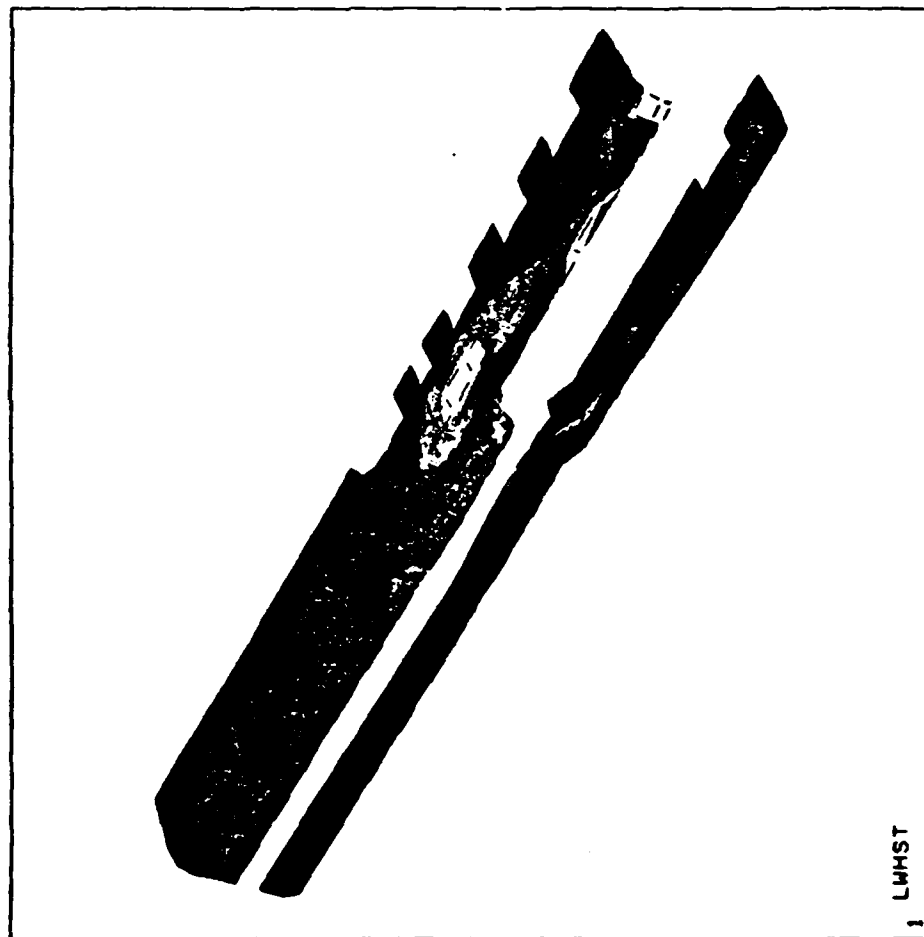
-4546

-2529

-512

1505

3522



1, LHMST

ANSYS 4.2B

FEB 27 1987

4:05:23

PLOT NO. 19

POST1 STRESS

STEP=2

ITER=1

SY

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=18058

MN=-17974

-13972

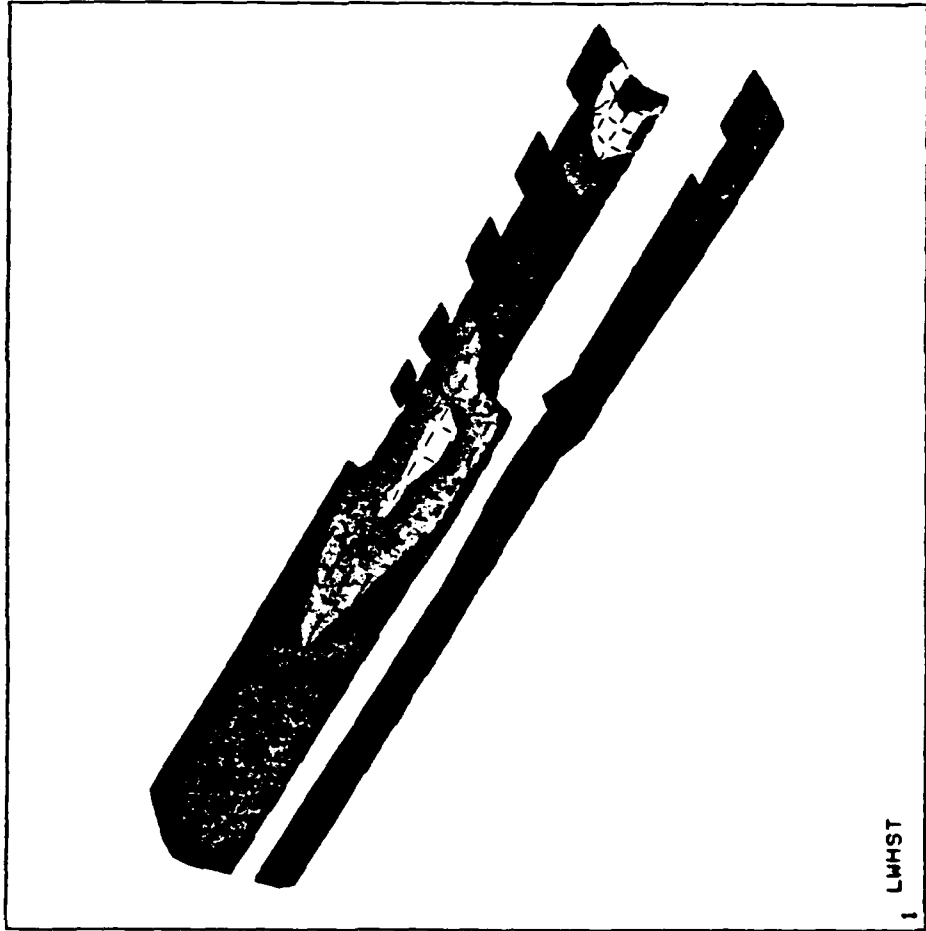
-9968

-5964

-1960

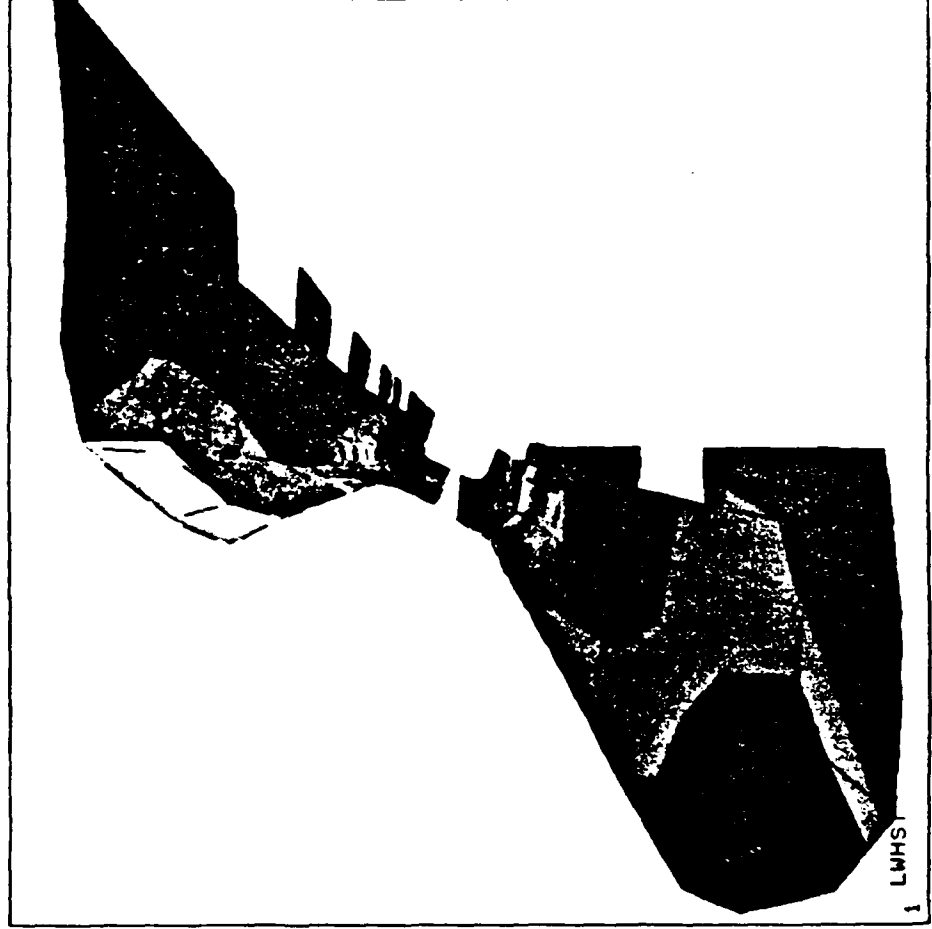
2044

1 LMHST

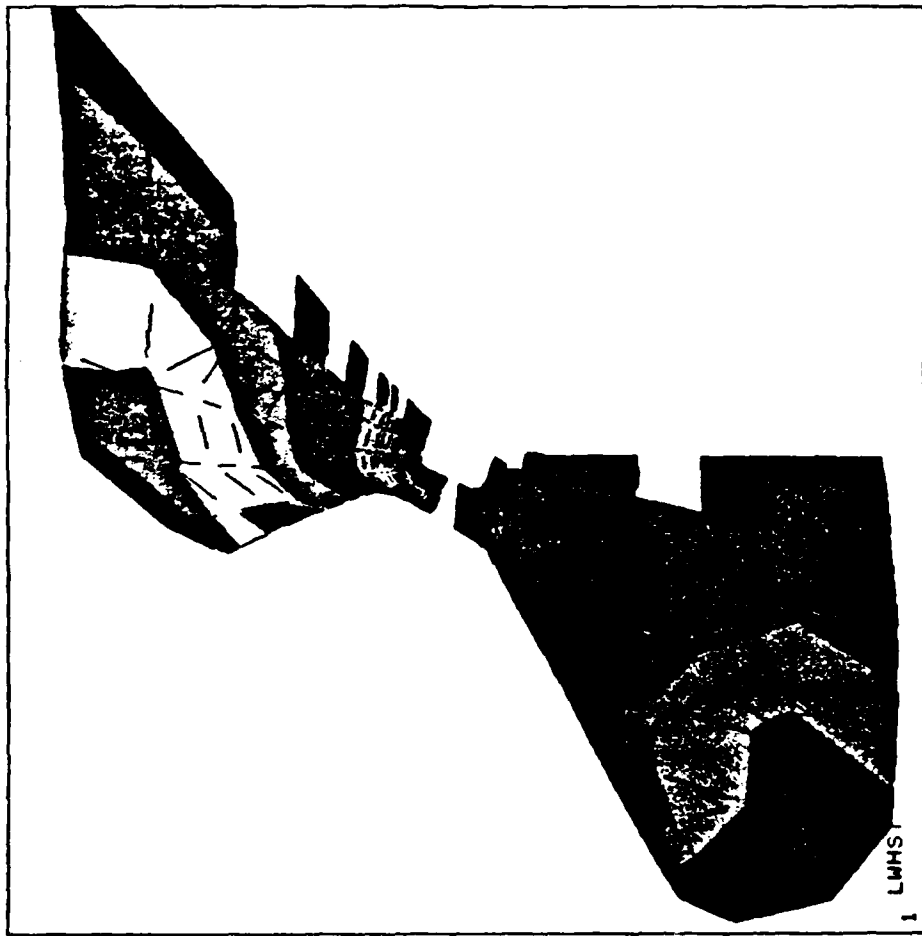


ANSYS 4.2B
FEB 27 1987
4:05:38
PLOT NO. 20
POST1 STRESS
STEP=2
ITER=1
SX
TOP
STRESS ELEM CS

ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=11589
MN=-6562
-4546
-2529
-512
1505
3522
9573
11590

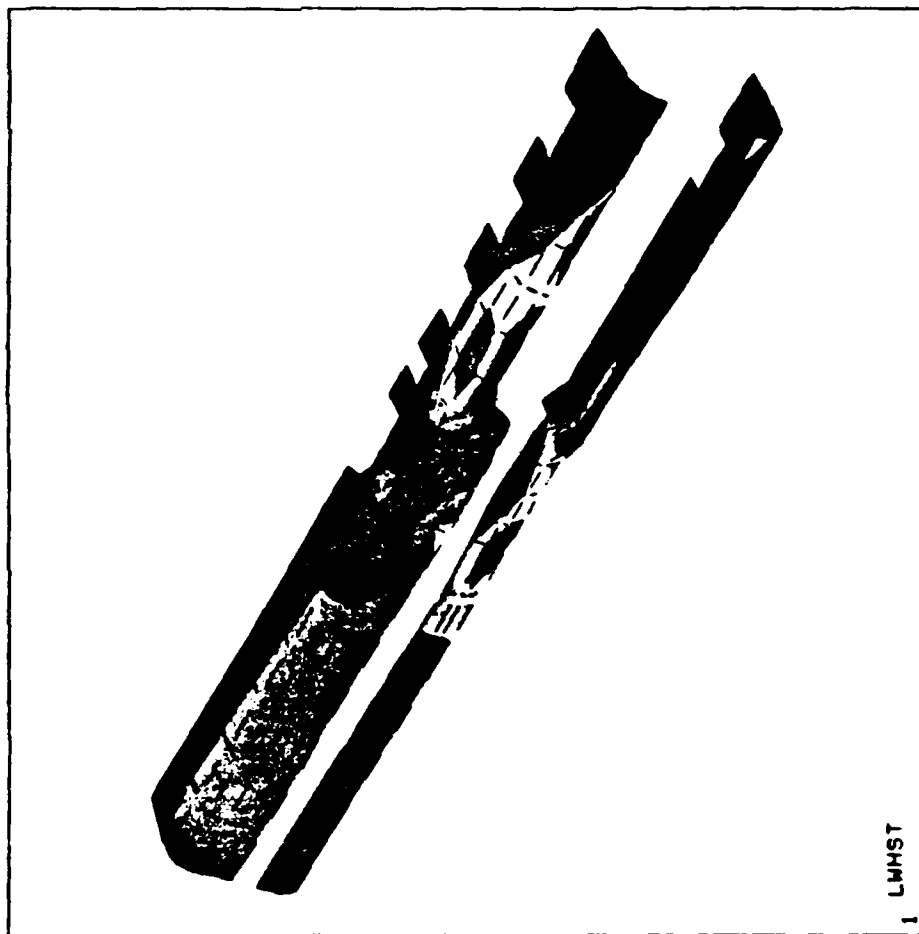


ANSYS 4.2B
 FEB 27 1987
 4:05:56
 PLOT NO. 21
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=18058
 MN=-17974
 -13972
 -9968
 -5964
 -1960
 2044
 14056
 18060

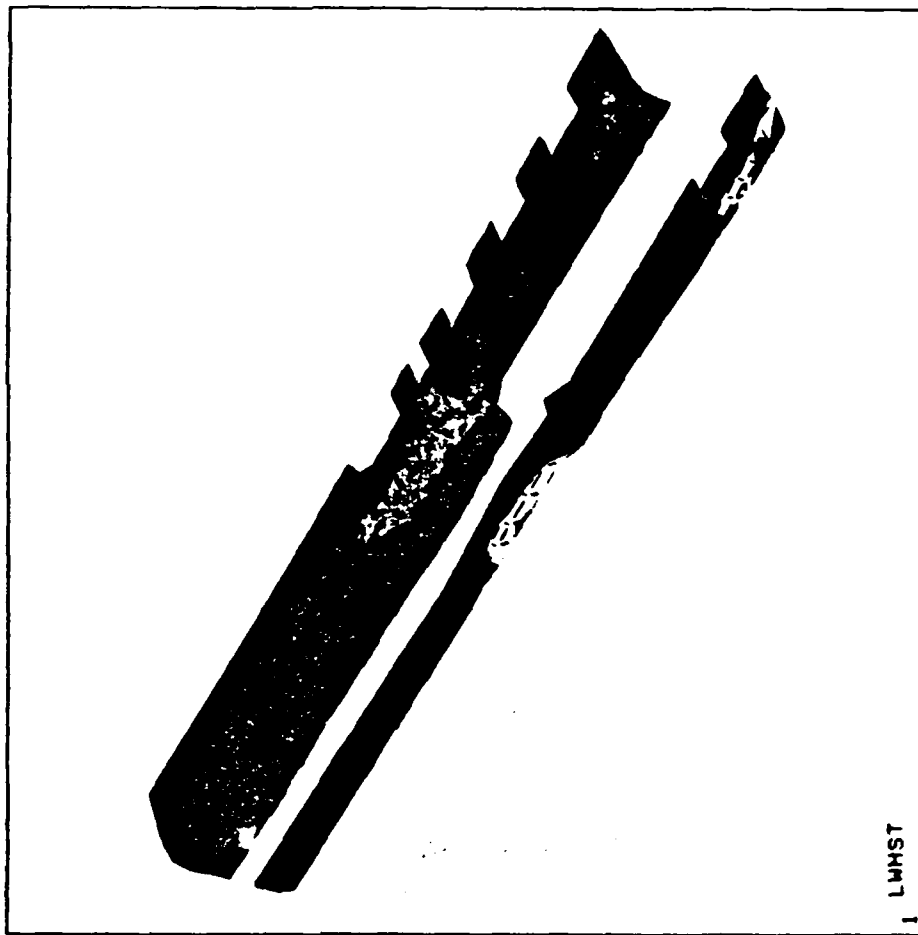


ANSYS 4.2B
 FEB 27 1987
 4:06:20
 PLOT NO. 22
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS

XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=8566
 MN=-7171
 -5424
 -3675
 -1926
 -177
 1572
 1572
 1572

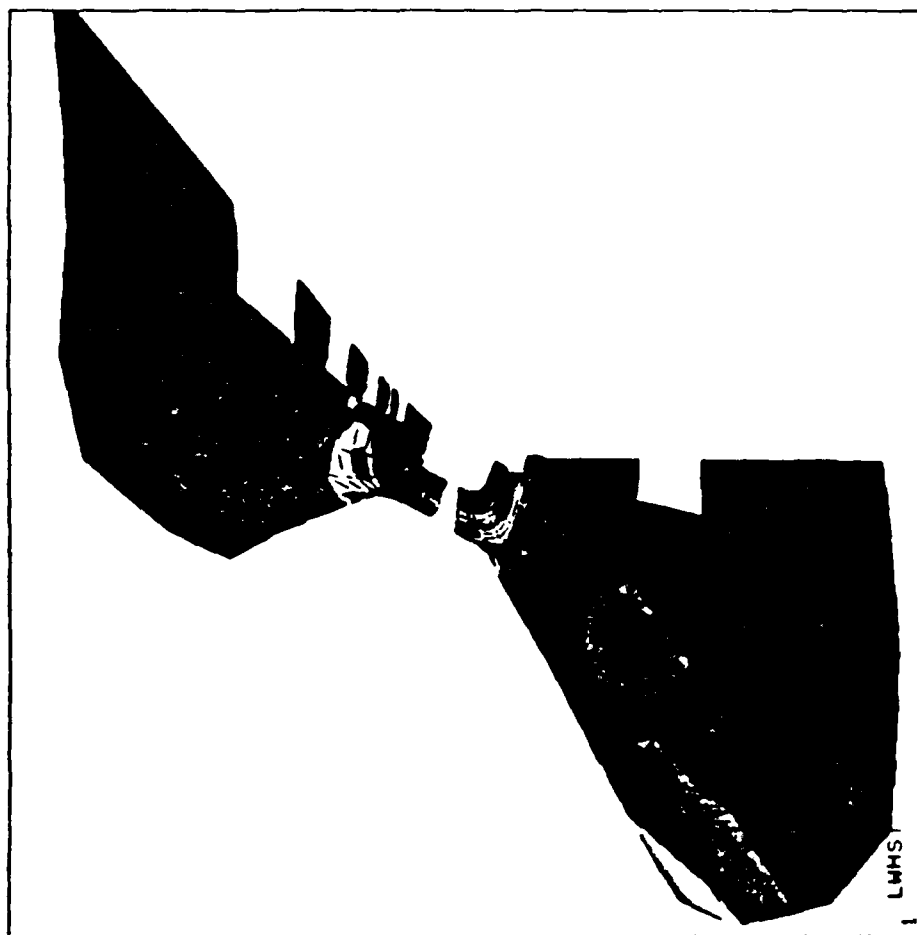


ANSYS 4.2B
 FEB 27 1987
 4:06:37
 PLOT NO. 23
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=13503
 MN=-13296
 -10320
 -7342
 -4364
 -1386
 1592



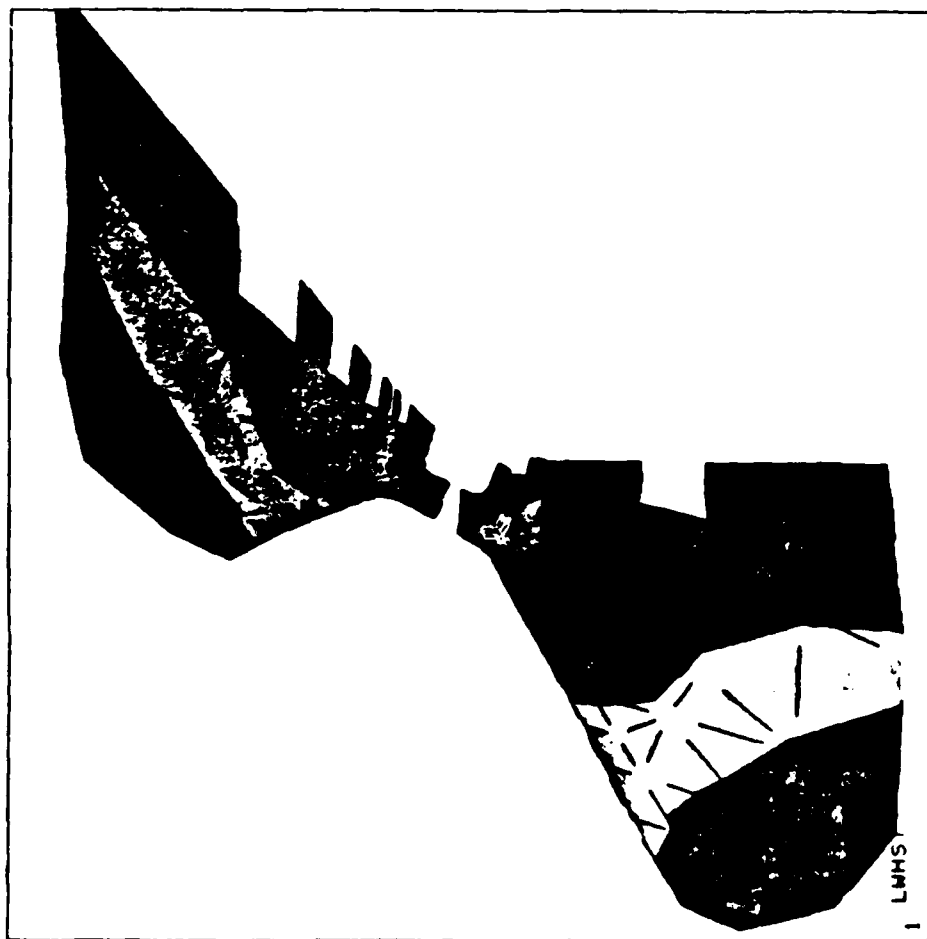
1, LMHST

ANSYS 4.2B
 FEB 27 1987
 4:06:52
 PLOT NO. 24
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=8566
 MN=-7171
 -5424
 -3675
 -1926
 -177
 1572
 6819
 8568



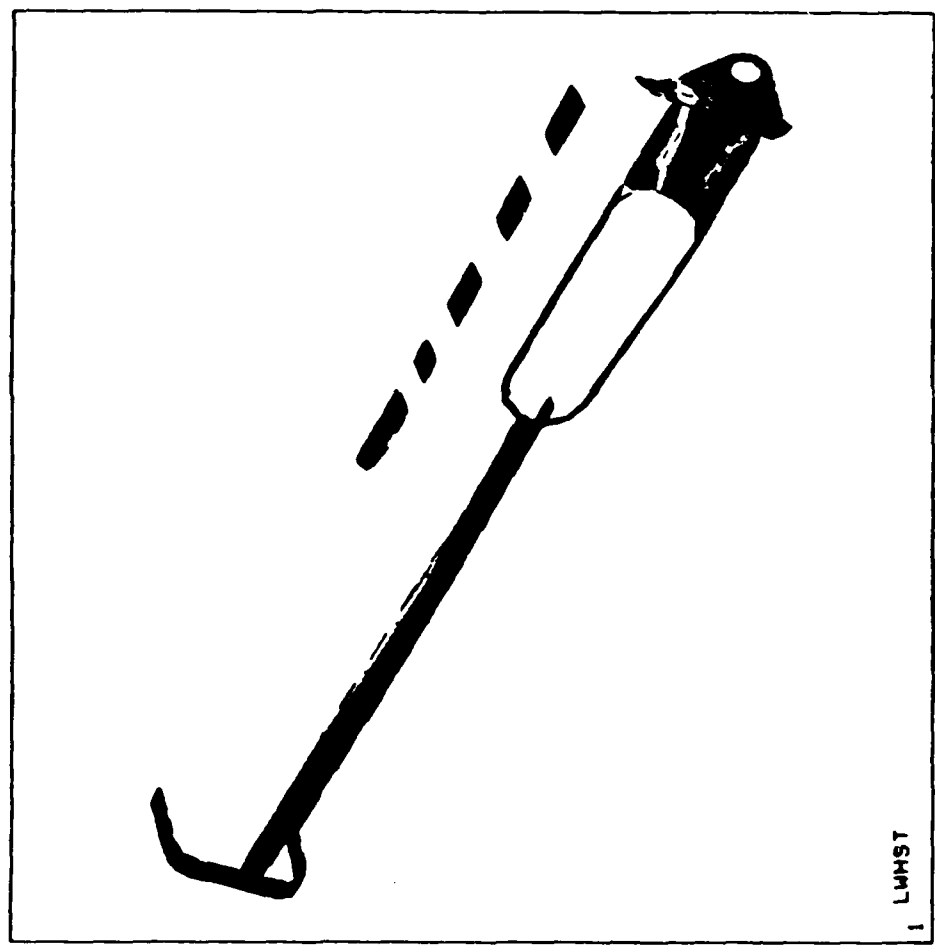
ANSYS 4.2B
 FEB 27 1987
 4:07:07
 PLOT NO. 25
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS

ZV=-1
 DIST=120
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=13503
 MN=-13296
 -10320
 -7342
 -4364
 -1386
 1592
 10526
 13504



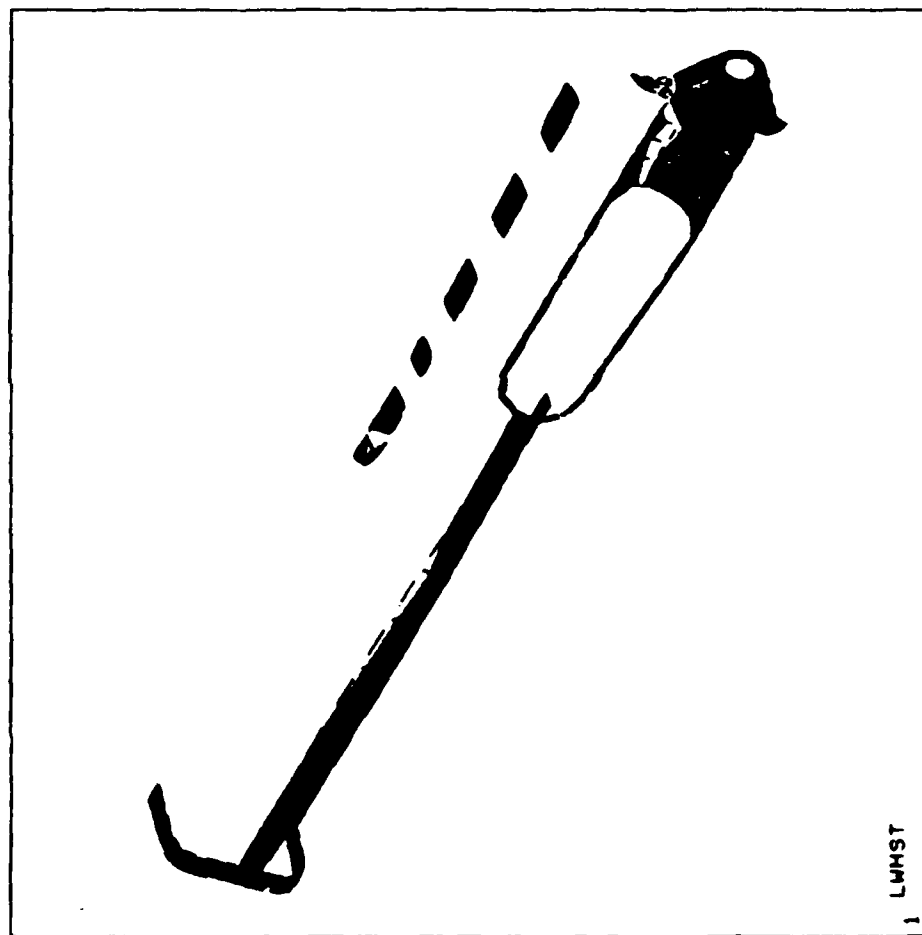
ANSYS 4.2B
FEB 27 1987
4:07:39
PLOT NO. 26
POST1 STRESS
STEP=2
ITER=1
SX
TDP
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=22509
MN=-22468
-17472
-12474
-7476
-2478
2520

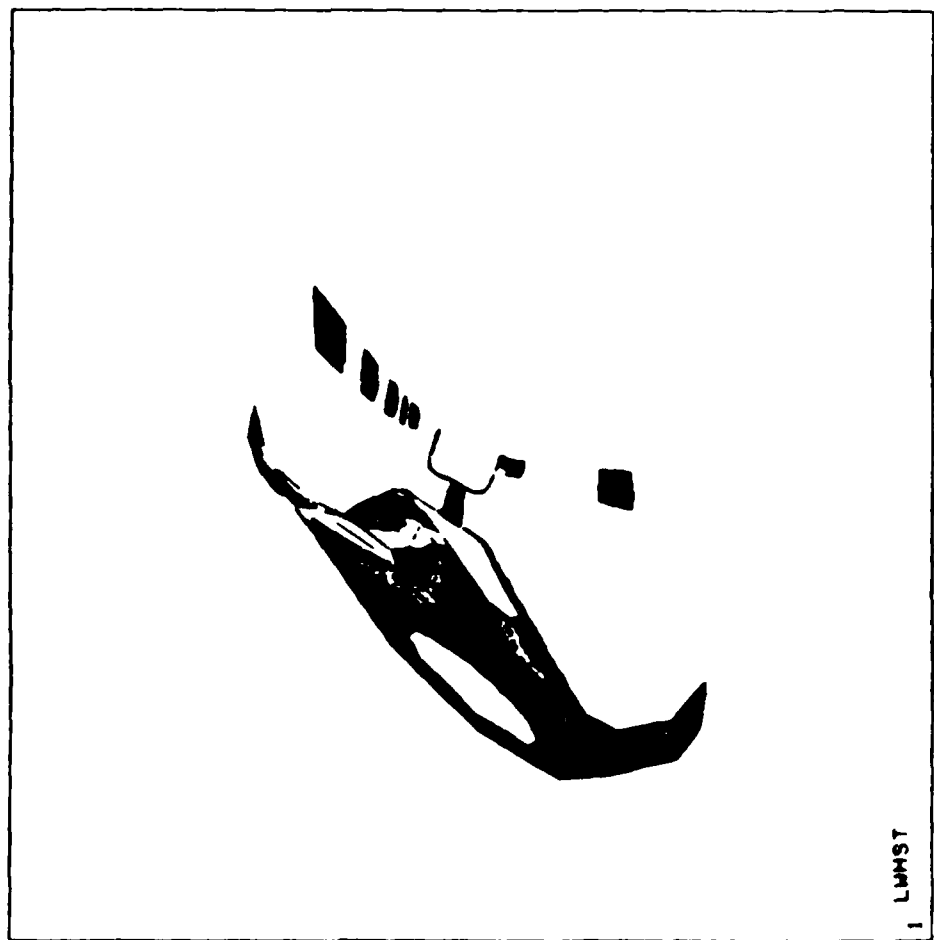


ANSYS 4.2B
 FEB 27 1987
 4:07:47
 PLOT NO. 27
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 TOP
 STRESS ELEM CS

XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=14090
 MN=-13787
 -10691
 -7593
 -4495
 -1397
 1701



ANSYS 4.2B
 FEB 27 1987
 4:07:57
 PLOT NO. 28
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=22509
 MN=-22468
 -17472
 -12474
 -7476
 -2478
 2520
 17514
 22512



ANSYS 4.2B
FEB 27 1987

4:00:04

PLOT NO. 29

POST1 STRESS

STEP=2

ITER=1

SY

TOP

STRESS ELEM CS

ZV=-1

DIST=139

XF=9.5

ZF=-119

CONE=40

HIDDEN

MX=14090

MN=-13767

-18691

-7593

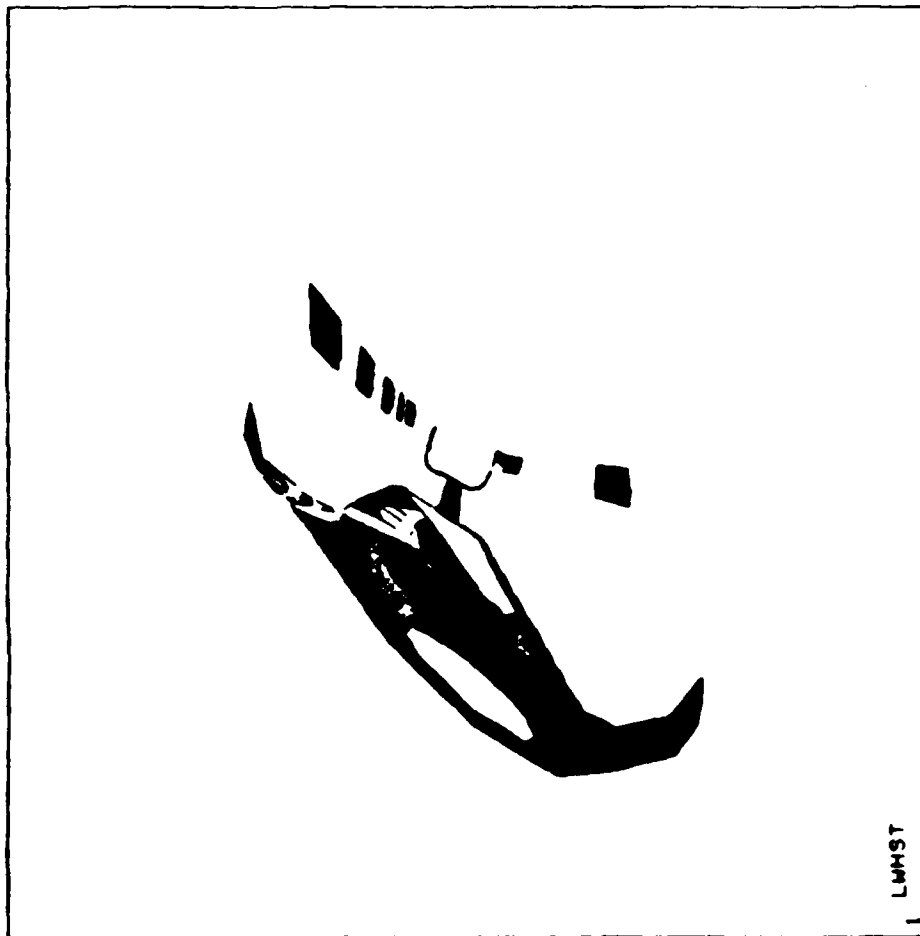
-4495

-1397

1701

10995

14093



ANSYS 4.2B
FEB 27 1987
4:08:21

PLOT NO. 30
POST1 STRESS

STEP=2
ITER=1

SX

BOTTOM

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=92.2

XF=10.9

YF=1.46

ZF=-110

HIDDEN

MX=22876

MN=-27937

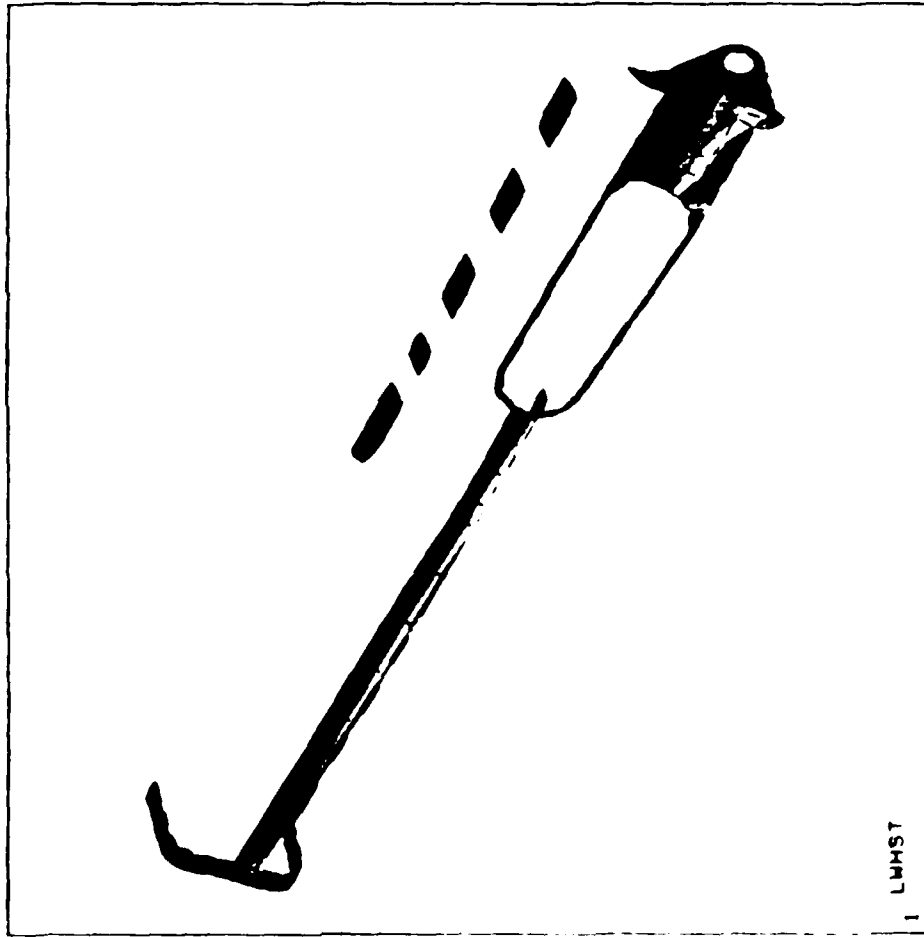
-22291

-16645

-10999

-5353

293



ANSYS 4.28

FEB 27 1987

4:08:30

PLOT NO. 31

POST1 STRESS

STEP=2

ITER=1

SY

BOTTOM

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=92.2

XF=10.9

YF=1.46

ZF=-110

HIDDEN

MX=12131

MN=-11644

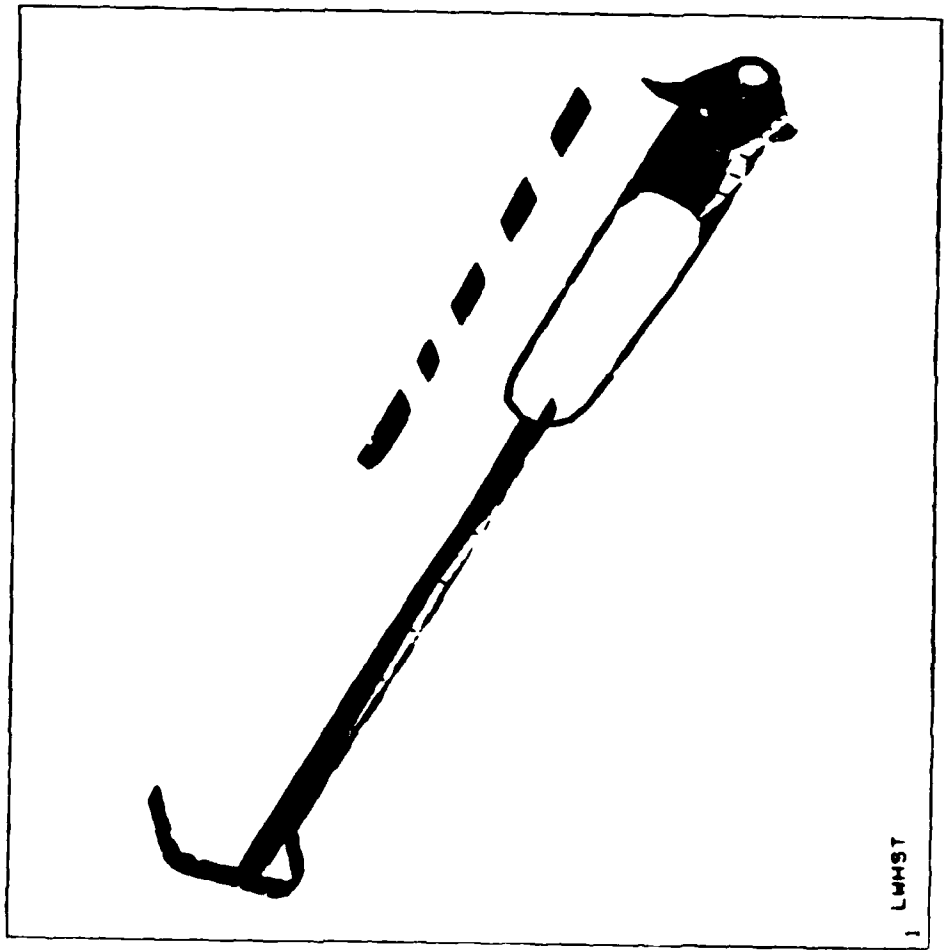
-9004

-6362

-3720

-1078

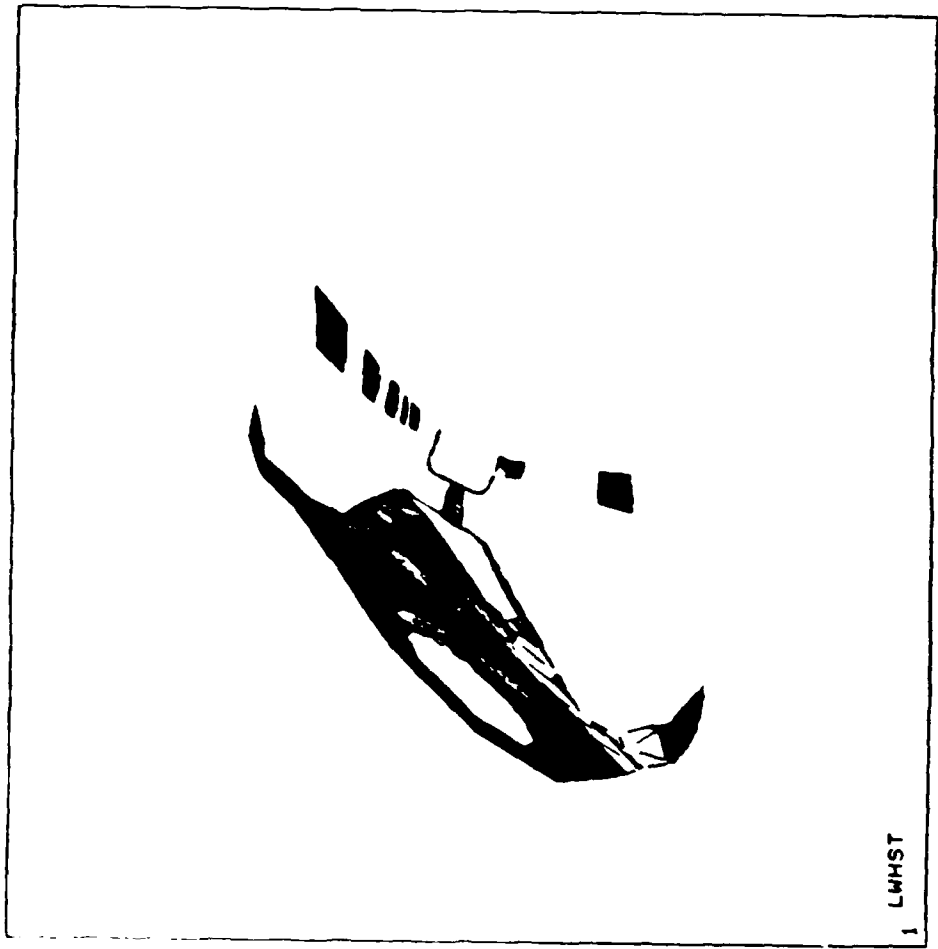
1564



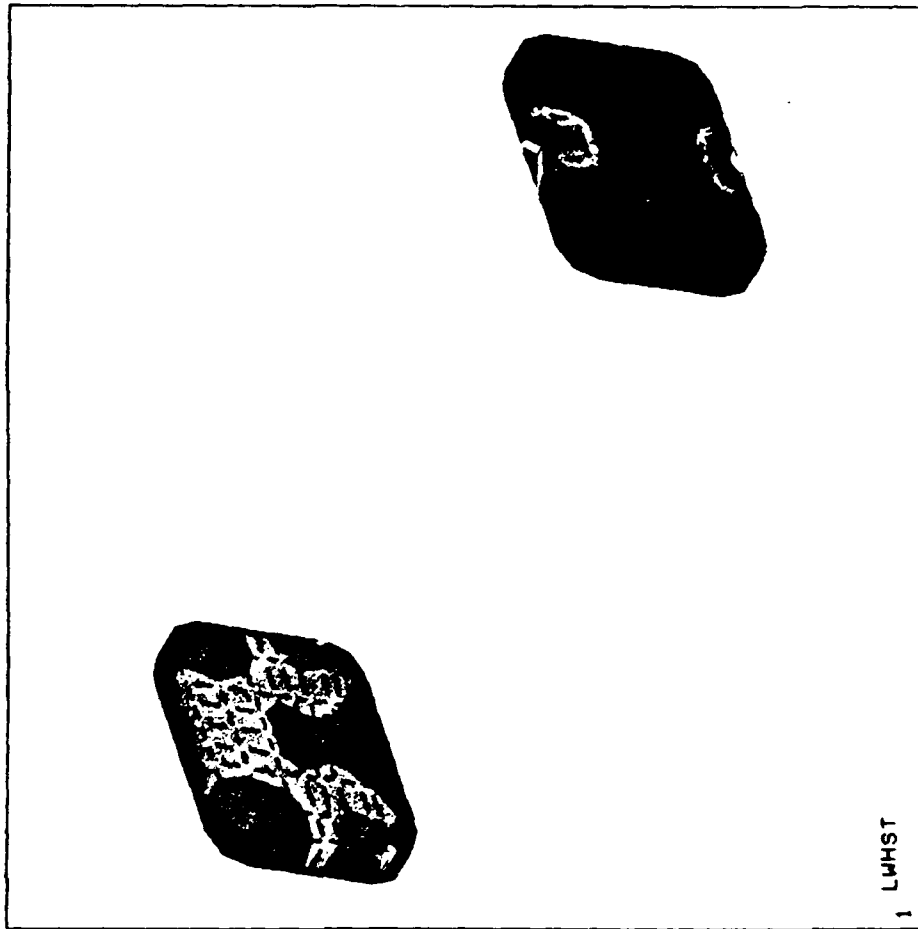
ANSYS 4.2B
 FEB 27 1987
 4:08:40
 PLOT NO. 32
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=22876
 MN=-27937
 -22291
 -16645
 -10999
 -5353
 297
 17231
 22877



ANSYS 4.2B
FEB 27 1987
4:08:48
PLOT NO. 33
POST1 STRESS
STEP=2
ITER=1
SY
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=12131
MN=-11644
-9004
-6362
-3720
-1078
1564
1
9490
12132

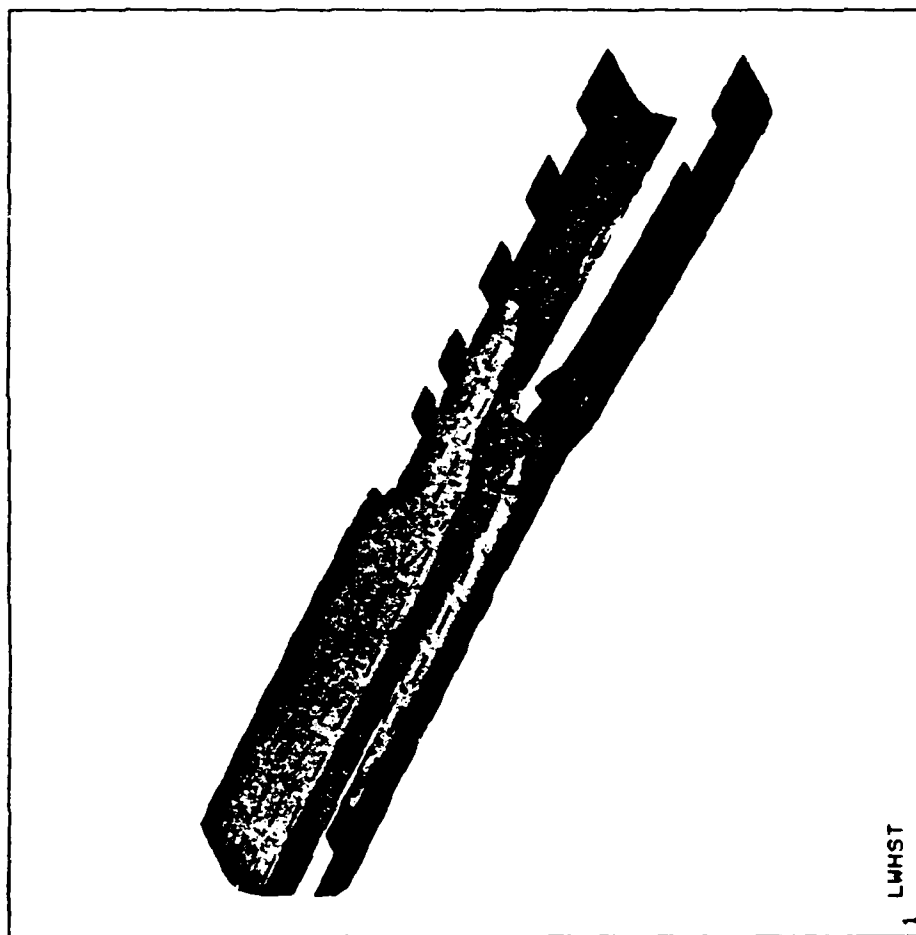


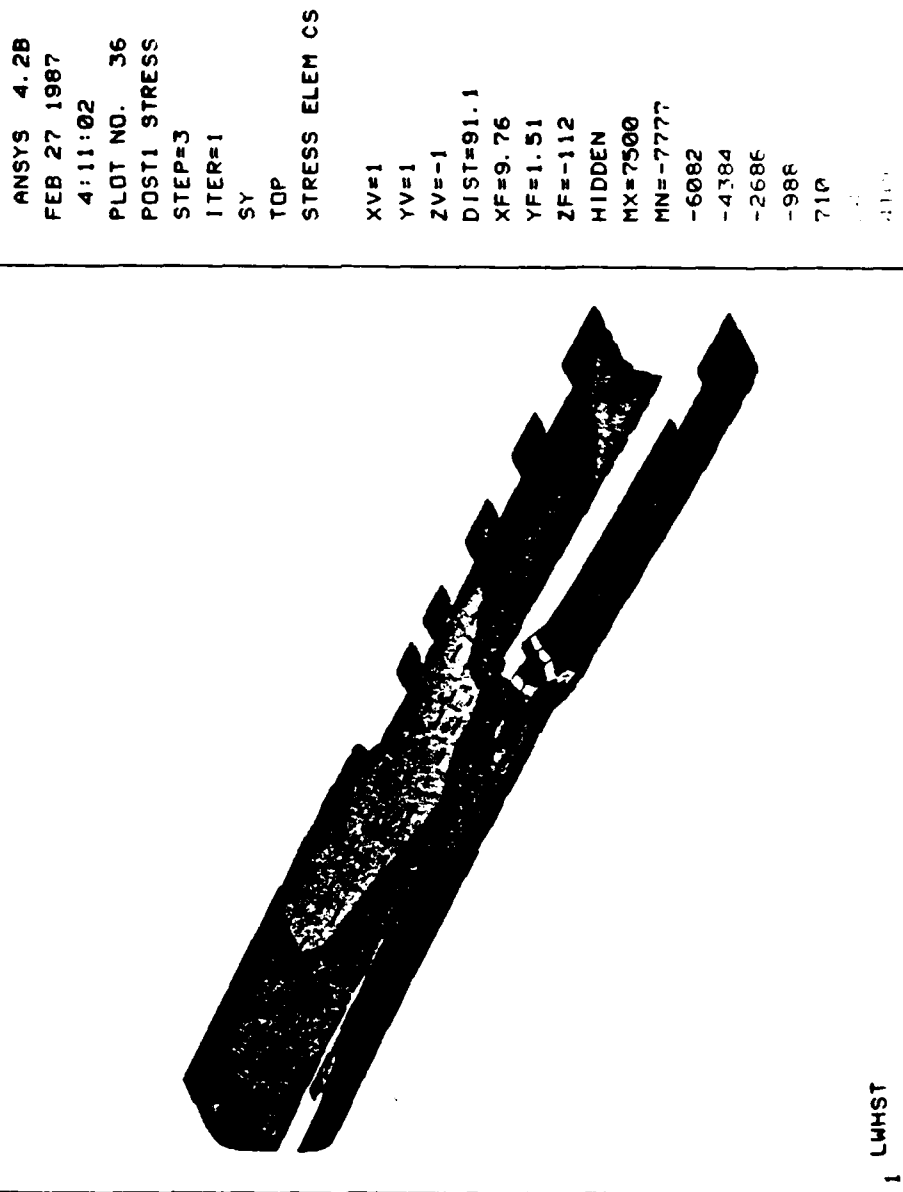
ANSYS 4.2B
 FEB 27 1987
 4:09:10
 PLOT NO. 34
 POST1 STRESS
 STEP=2
 ITER=1
 SICE
 BOTTOM
 XV=1
 YV=1
 ZV=-1
 DIST=59.9
 YF=1.63
 ZF=-52
 HIDDEN
 MX=1147
 MN=18.8
 142
 268
 394
 520
 646
 1024
 1150



ANSYS 4.2B
FEB 27 1987
4:10:44
PLOT NO. 35
POST1 STRESS
STEP=3
ITER=1
SX
TOP
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=9475
MN=-9150
-7082
-5012
-2942
-872
1198





ANSYS 4.2B
FEB 27 1987

4:11:19

PLOT NO. 37

POST1 STRESS

STEP=3

ITER=1

SX

TOP

STRESS ELEM CS

ZV=-1

DIST=128

XF=9.5

ZF=-112

CONE=40

HIDDEN

MX=9475

MN=-9150

-7082

-5012

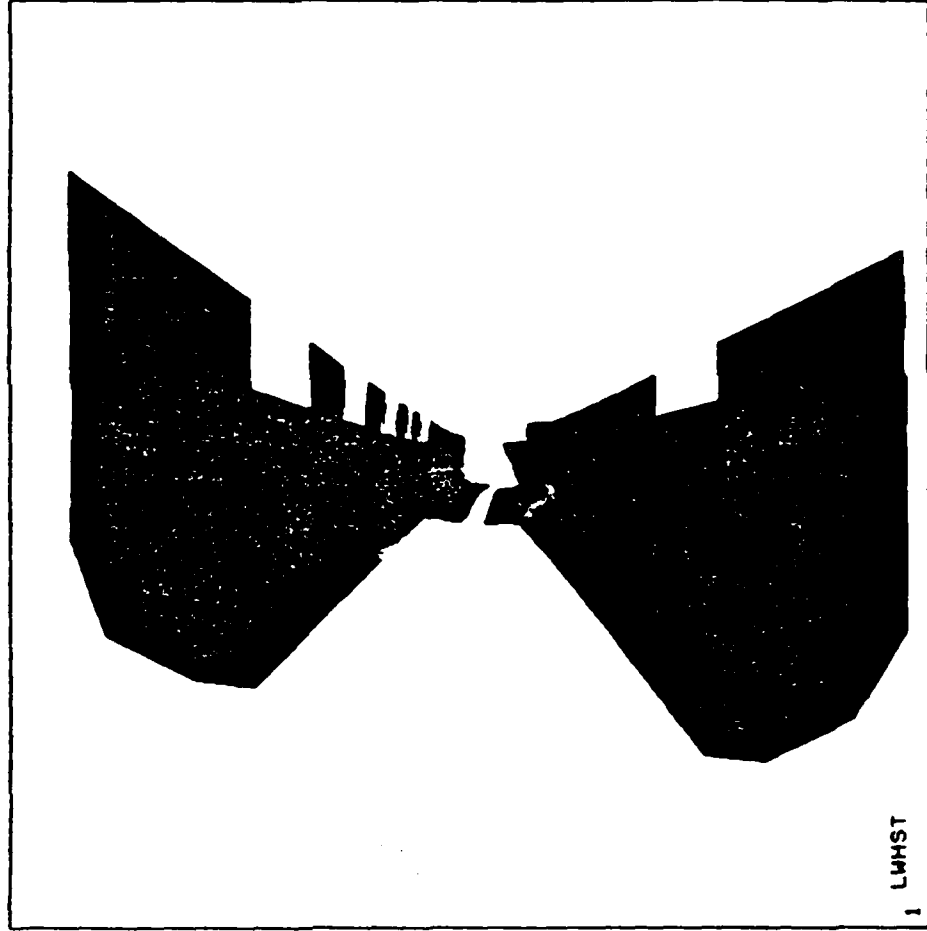
-2942

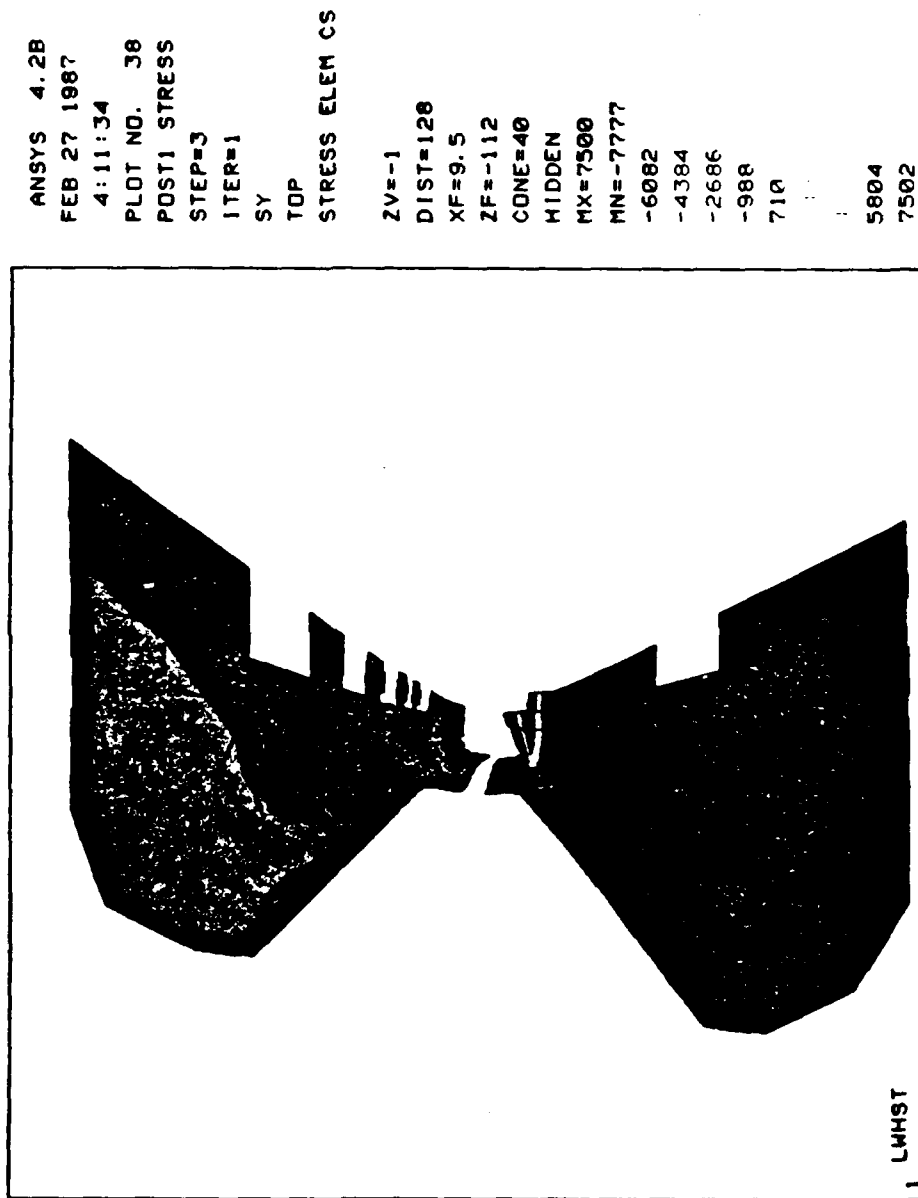
-872

1198

7408

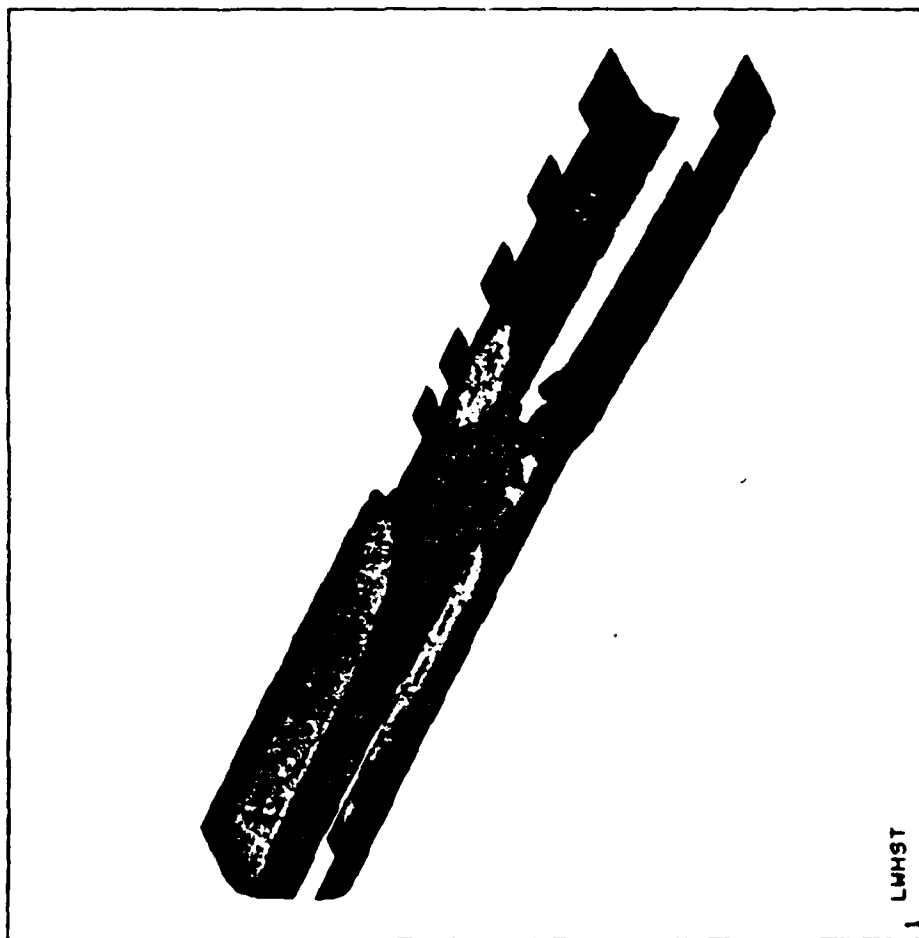
9478





ANSYS 4.2B
 FEB 27 1987
 4:12:00
 PLOT NO. 39
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS

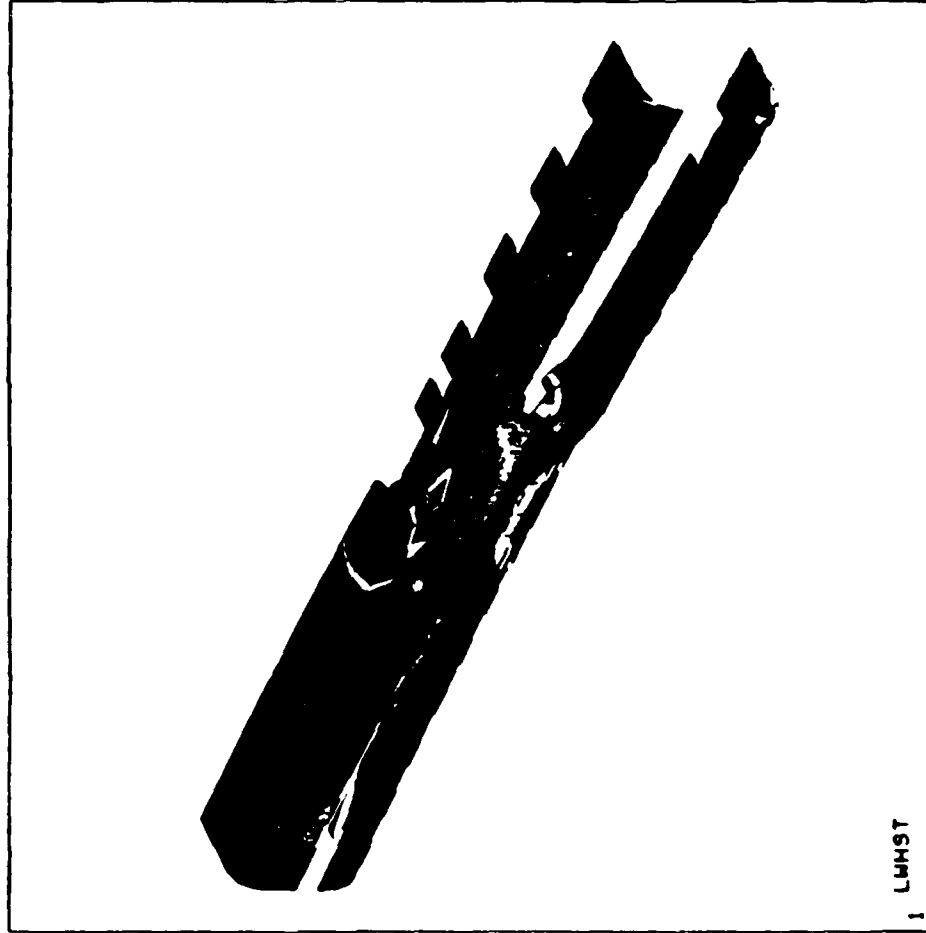
XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=12674
 MN=-11621
 -8923
 -6223
 -3523
 -823
 1877



1 LWHST

ANSYS 4.2B
FEB 27 1987
4:12:15
PLOT NO. 40
POST1 STRESS
STEP=3
ITER=1
SY
BOTTOM
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=5376
MN=-6886
-5526
-4163
-2800
-1437
-73.8



ANSYS 4.2B
FEB 27 1987
4:12:30

PLOT NO. 41
POST1 STRESS

STEP=3

ITER=1

SX

BOTTOM

STRESS ELEM CS

ZV=-1

DIST=120

XF=9.5

ZF=-112

CONE=40

HIDDEN

MX=12674

MN=-11621

-8923

-6223

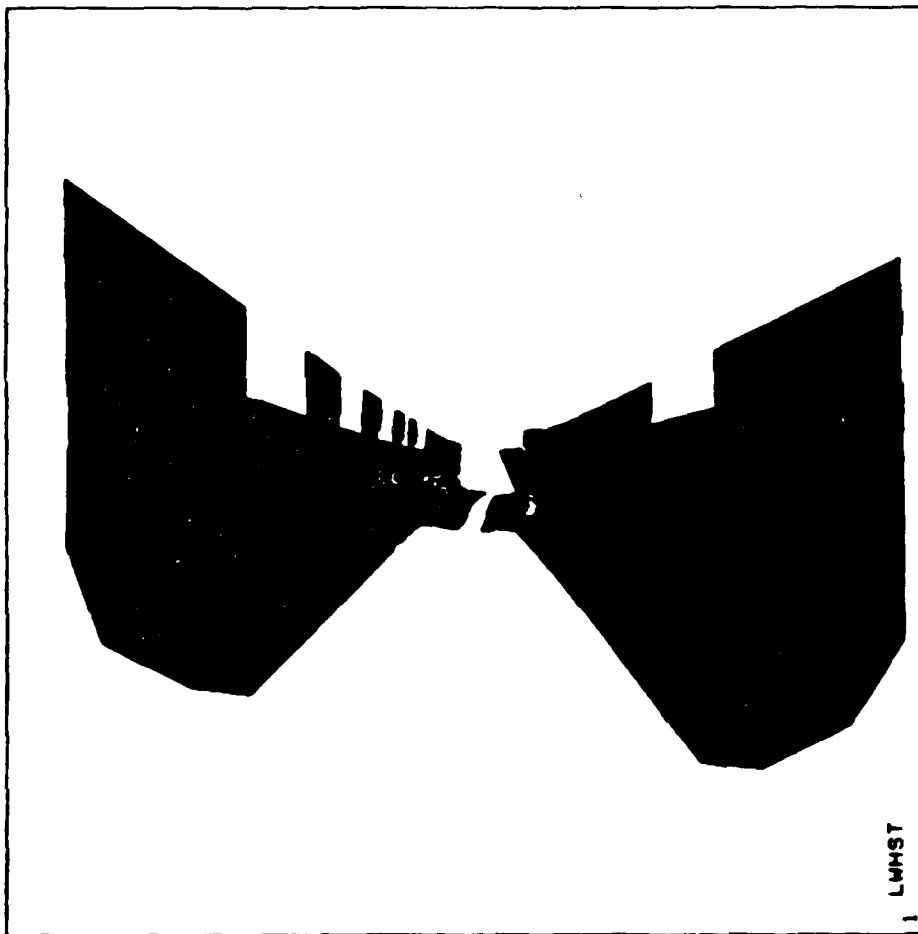
-3523

-823

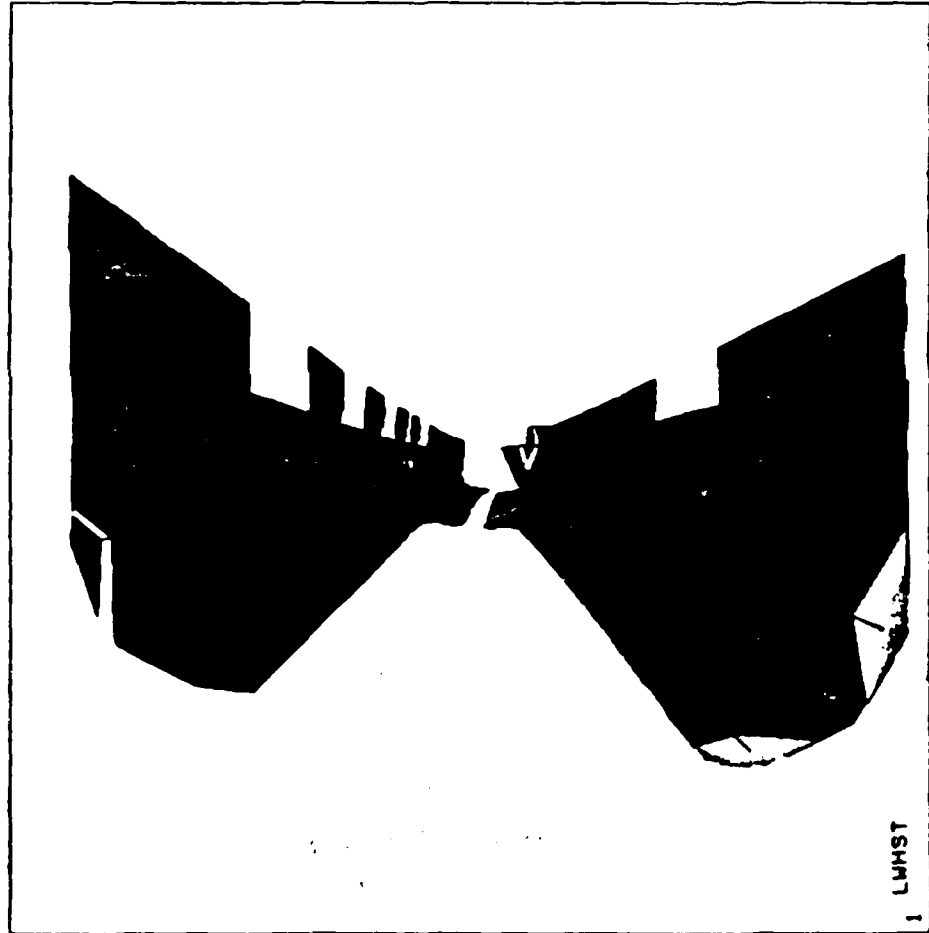
1877

9977

12677



ANSYS 4.28
 FEB 27 1987
 4:12:47
 PLOT NO. 42
 POST1 STRESS
 STEP=3
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=5376
 MN=-6886
 -5526
 -4163
 -2800
 -1437
 -73.8
 4015
 5378



ANSYS 4.2R
FEB 27 1987
4:13:18

PLOT NO. 43
POST1 STRESS

STEP=3

ITER=1

9X

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=92.2

XF=10.9

YF=1.46

ZF=-110

HIDDEN

MX=30049

MN=-36395

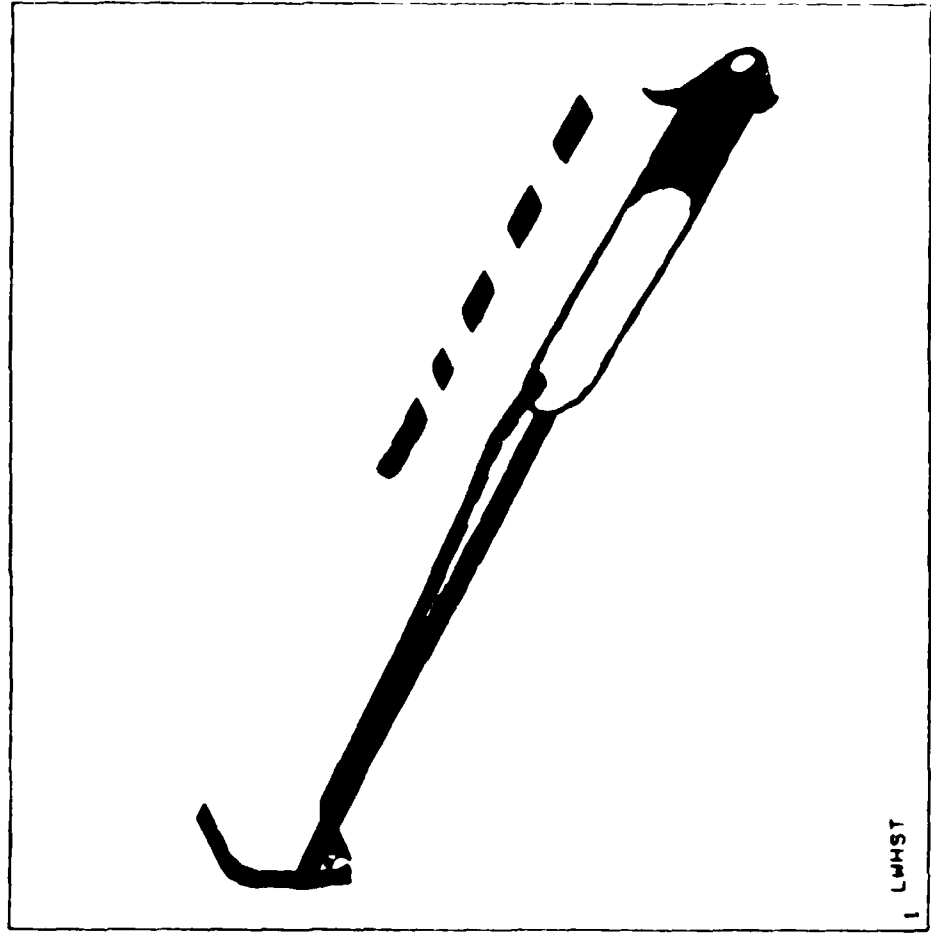
-28925

21453

11000

-65000

000



ANSYS 4.2D

FEB 27 1987

4:13:26

PLOT NO. 44

POST1 STRESS

STEP=3

ITER=1

SY

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=92.2

XF=10.9

YF=1.46

ZF=-110

HIDDEN

MX=47052

MN=-38579

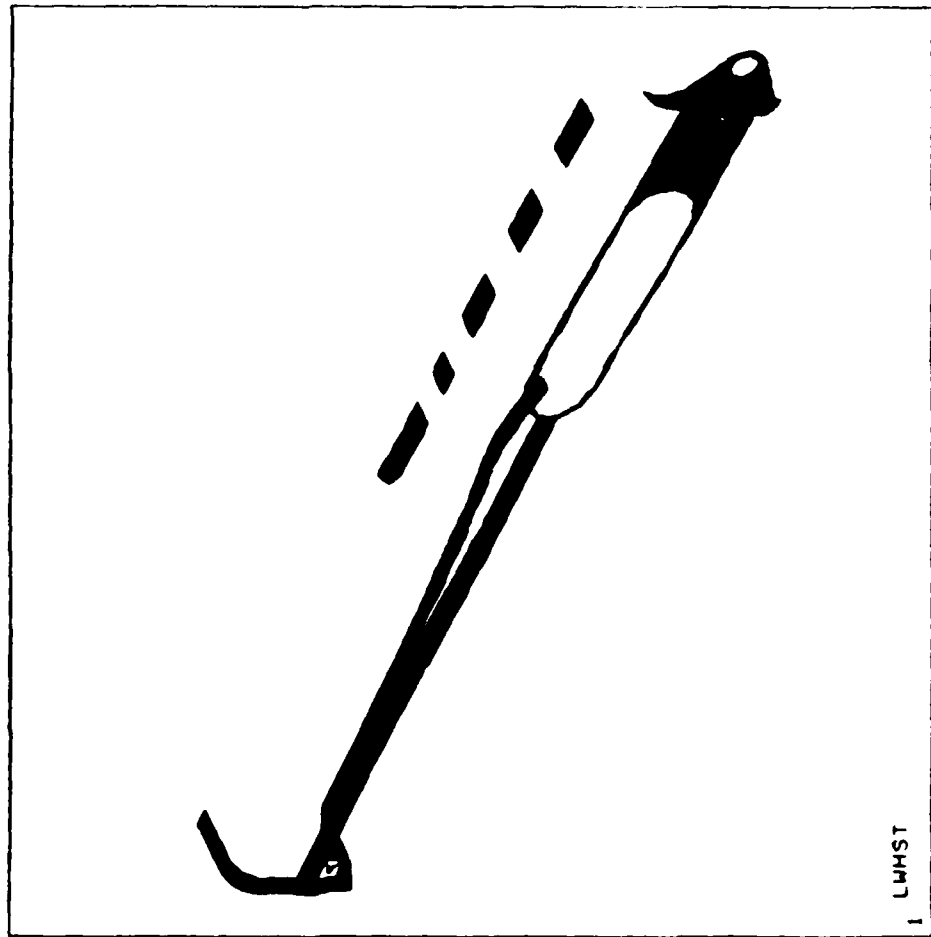
-29066

-19551

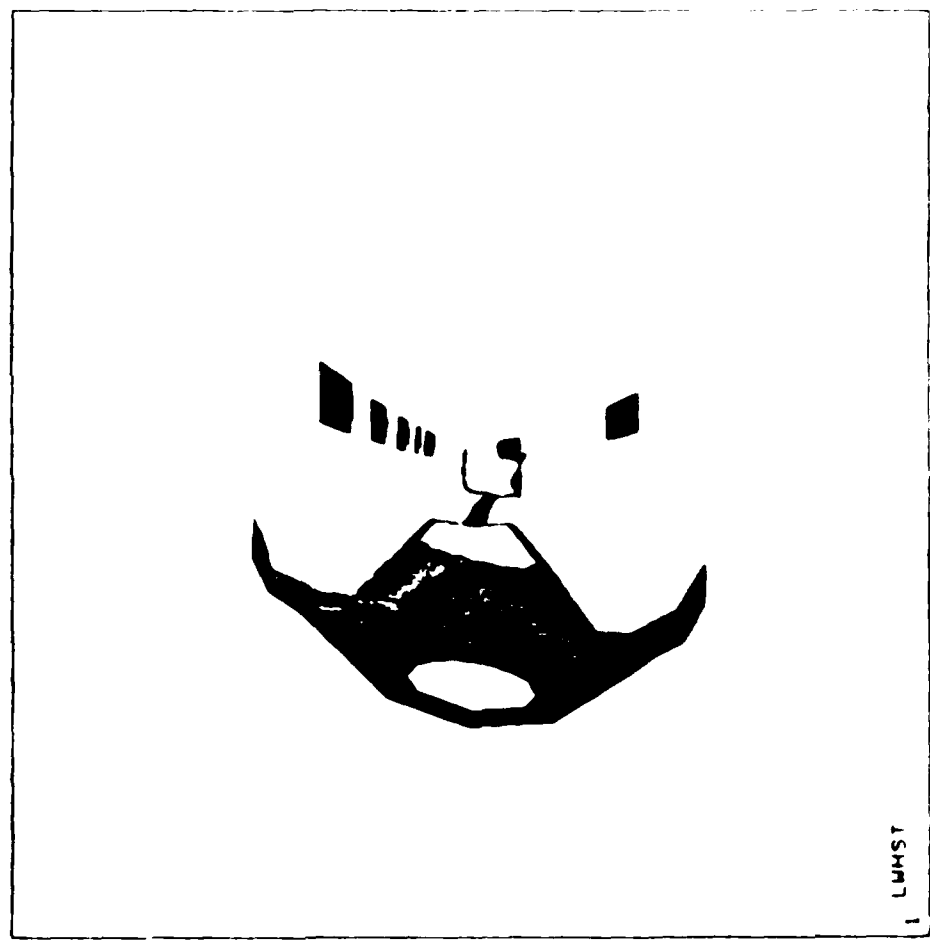
-10036

-521

qqqj



ANSYS 4 2B
 FEB 27 1987
 4:13:33
 PLOT NO. 45
 POST1 STRESS
 STEP=3
 ITER=1
 Sx
 TOP
 STRESS ELEM CS
 ZVE=-1
 DIST=139
 RF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MAX=10849
 MIN=-36395
 -28925
 11411
 11401
 4500
 900
 21119
 10001



ANALYSIS 4 2P
FEB 27 1961

100

PLOT NO 46

POST: 11509

51505

12345

52

TOP

50 4373 553615

200-1

DIS-13a

56-374

282-119

ONE - 40

INDEX

NY-47852

MM-38579

29965

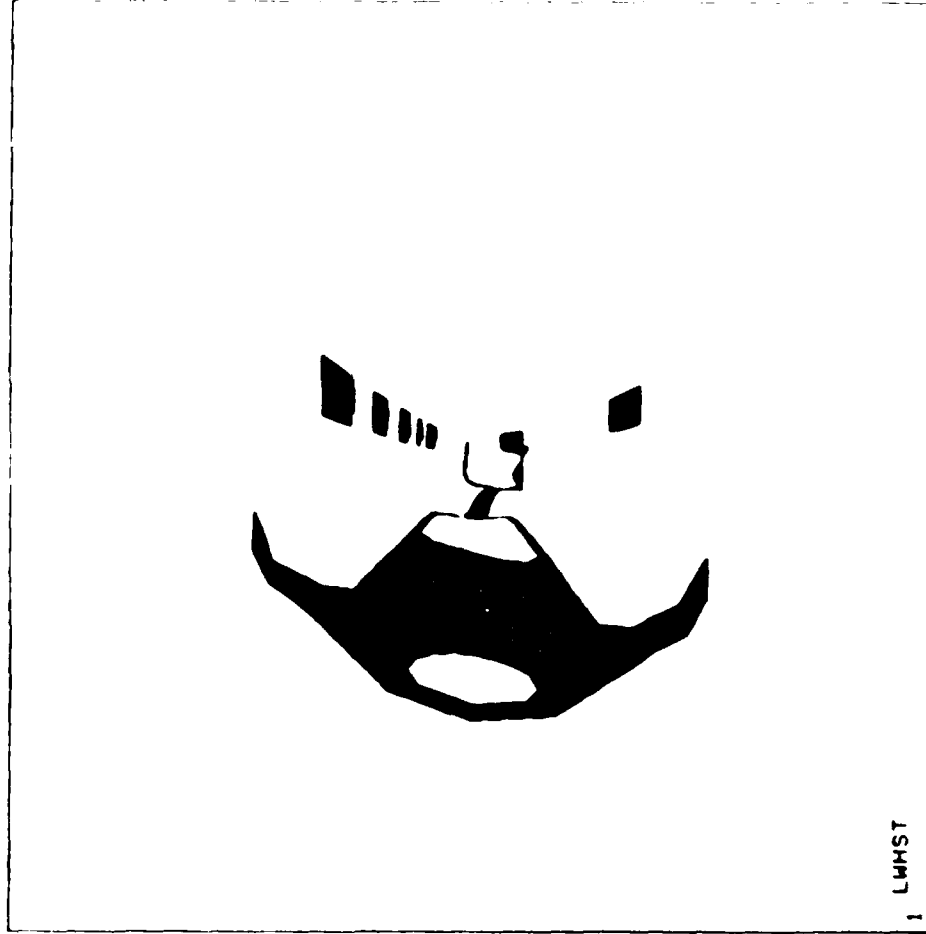
2299:

1

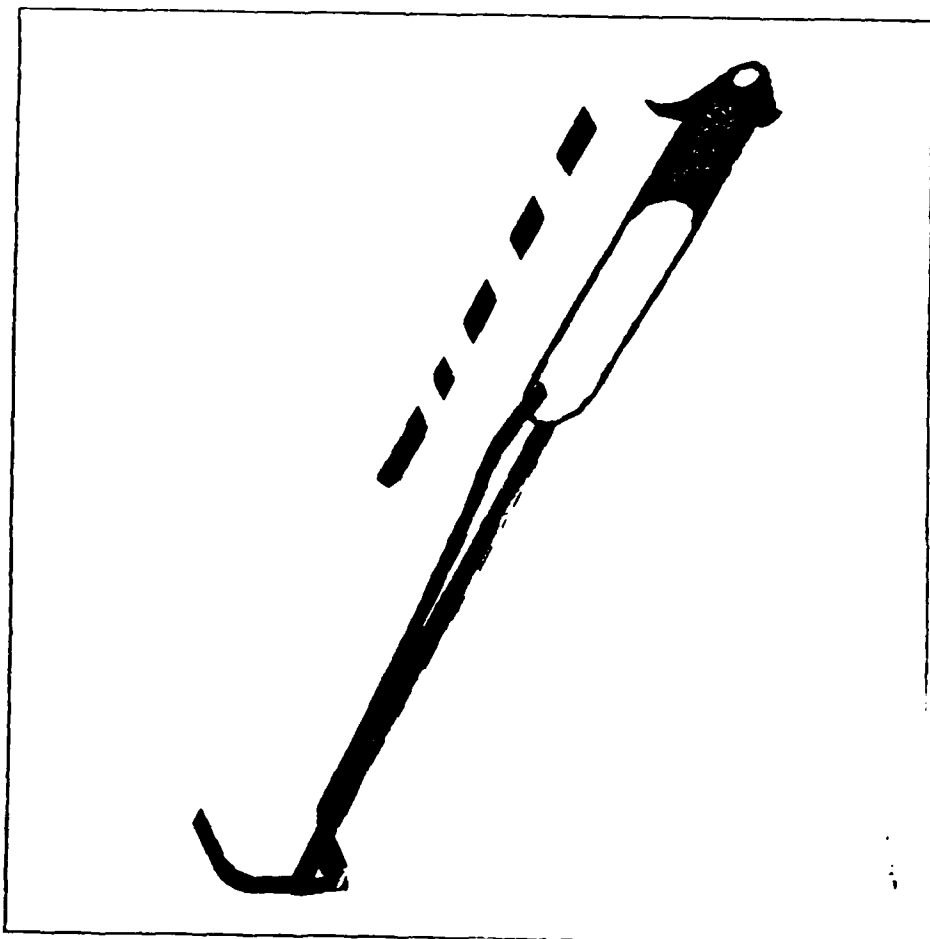
14. 11

1911

4-10-4



ANSYS 4.2R
FEB 27 1987
4:13:59
PLOT NO. 47
POST1 STRESS
STEP=3
ITER=1
SX
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=20465
MN=-20619
-16055
-11490
-6925
-2360
2205



AD-A183 991

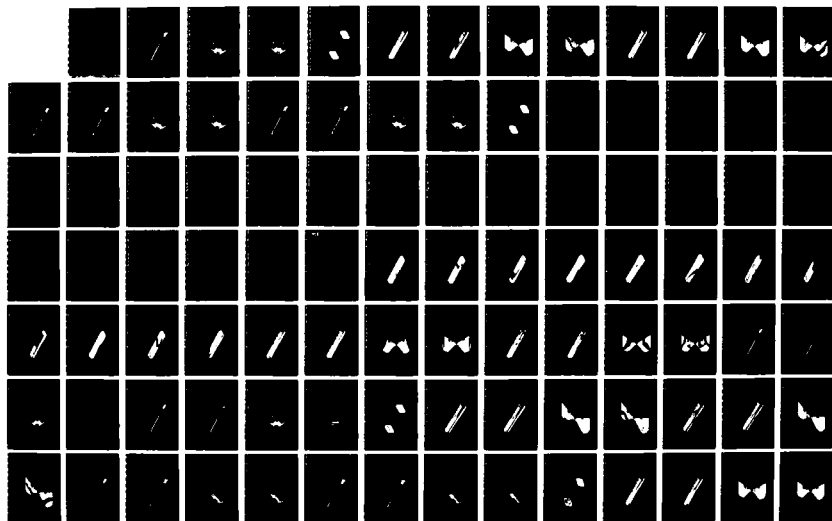
LIGHTWEIGHT TOWED HOWITZER DEMONSTRATOR PHASE 1 AND
PARTIAL PHASE 2 VOLUM (U) FMC CORP MINNEAPOLIS MINN
NORTHERN ORDNANCE DIV R RATHE ET AL APR 87
FMC-E-3041-VOL-D2-PT-3 DARA21-86-C-0047

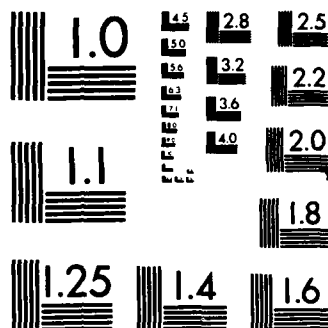
4/5

UNCLASSIFIED

F/G 19/6

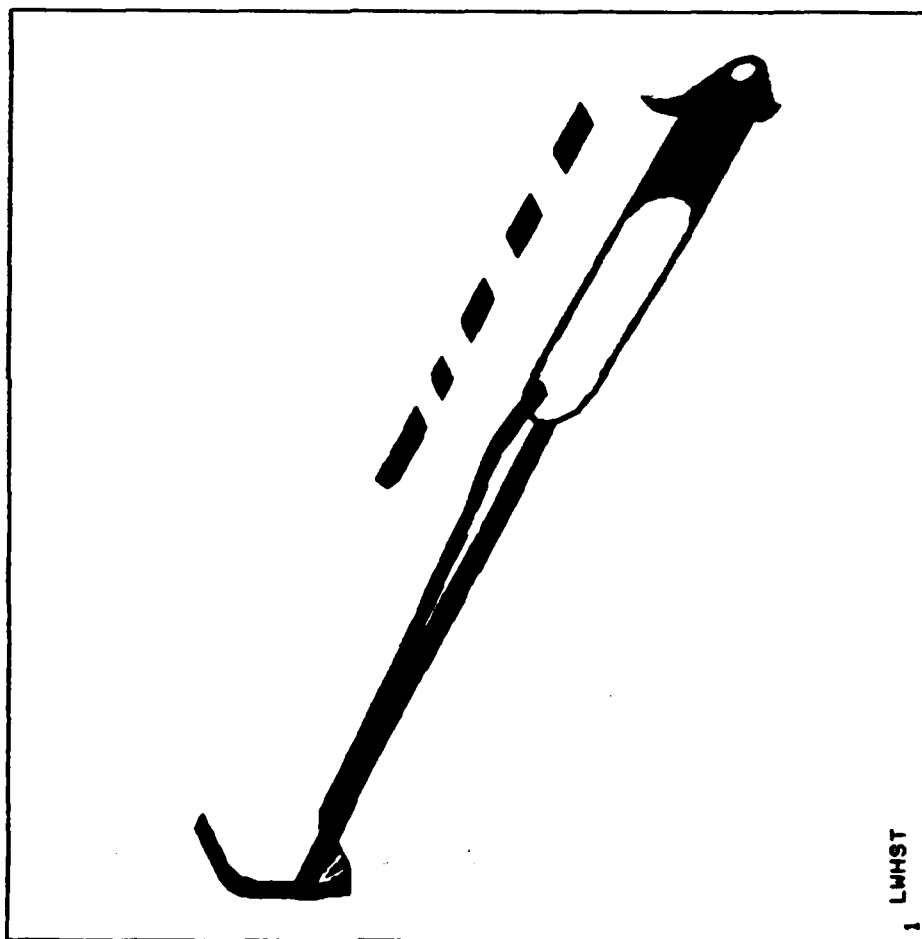
NL



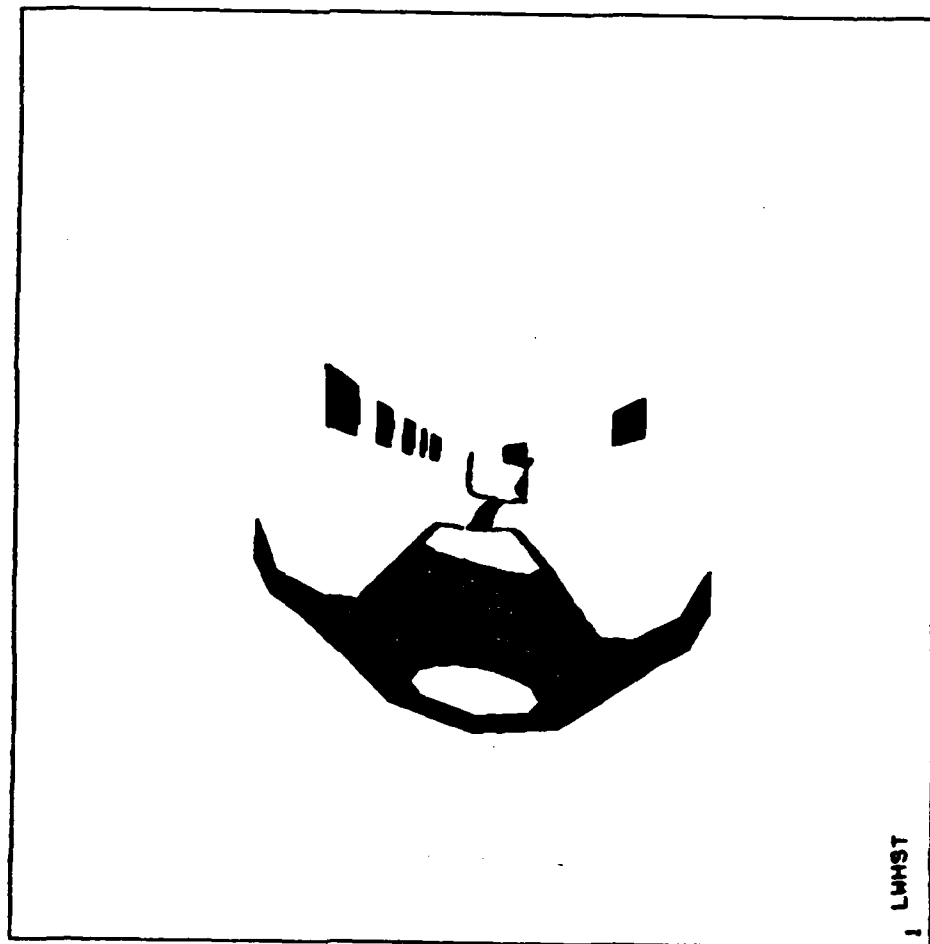


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

ANSYS 4.2B
 FEB 27 1987
 4:14:07
 PLOT NO. 48
 POST1 STRESS
 STEP=3
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=31900
 MN=-21974
 -15988
 -10002
 -4016
 1970
 7956
 17432
 17432



ANSYS 4.2B
 FEB 27 1987
 4:14:14
 PLOT NO. 49
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 2V=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=20465
 MN=-20619
 -16055
 -11490
 -6925
 -2360
 2205
 15900
 20465



ANSYS 4.2B
FEB 27 1987

4:14:24
PLOT NO. 50
POST1 STRESS

STEP=3
ITER=1

SY
BOTTOM

STRESS ELEM CS

ZV=-1

DIST=139

XF=9.5

ZF=-119

CONE=40

HIDDEN

MX=31900

MN=-21974

-15988

-10002

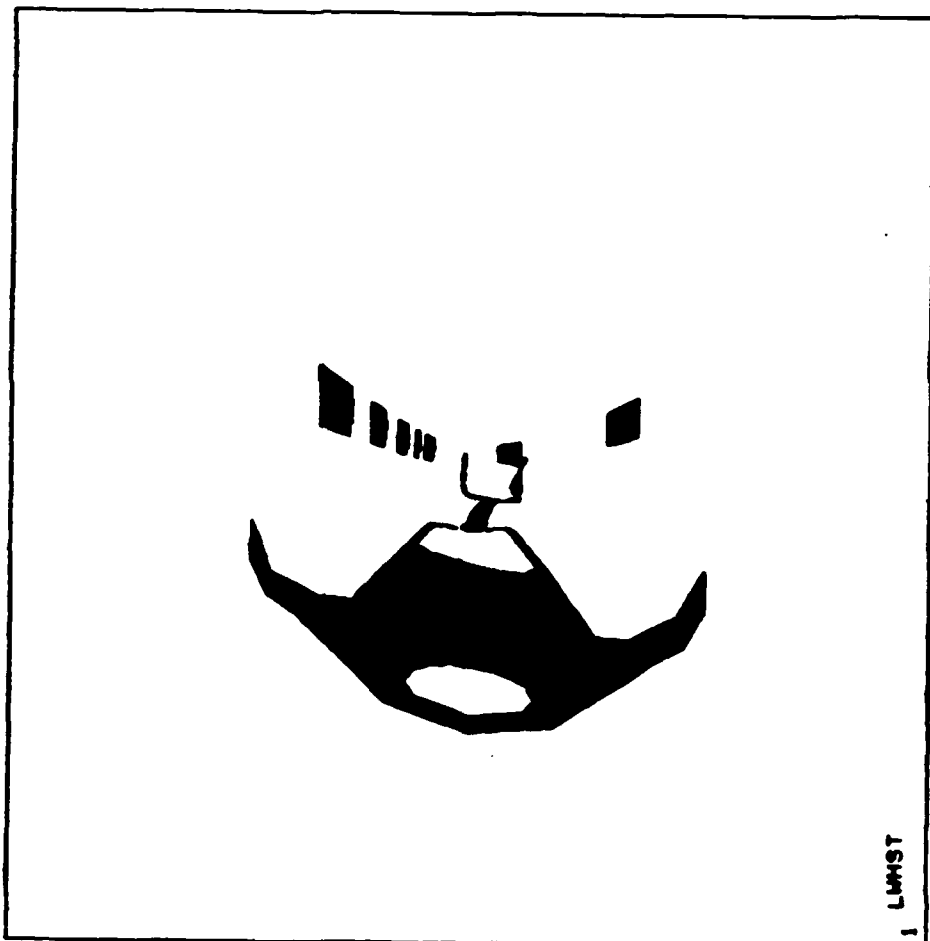
-4016

1970

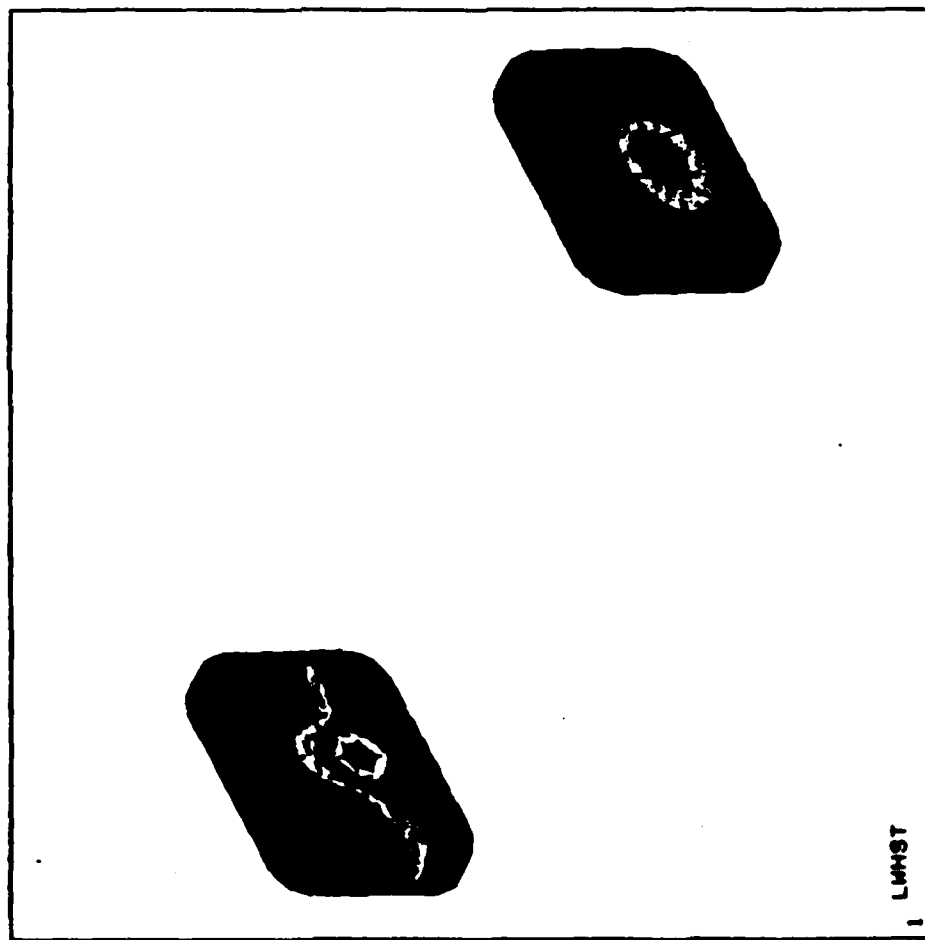
7956

25914

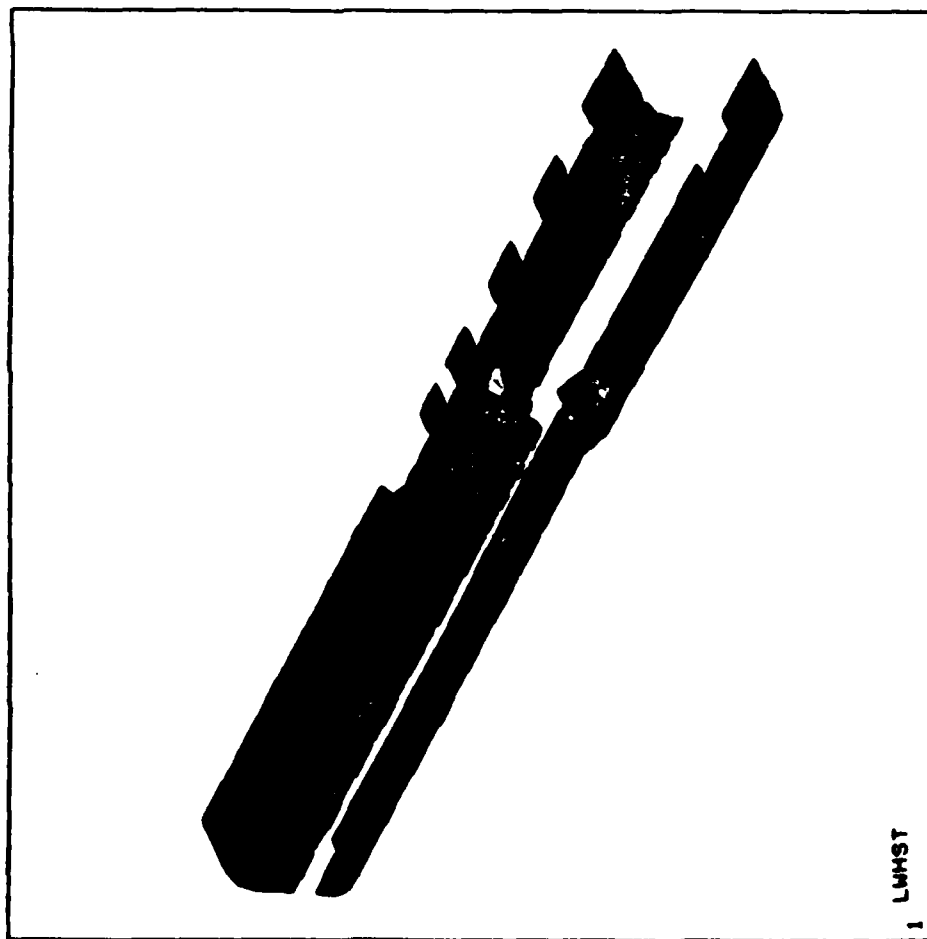
31900



ANSYS 4.20
 FEB 27 1987
 4:14:45
 PLOT NO. 51
 POST1 STRESS
 STEP=3
 ITER=1
 SICE
 BOTTOM
 XV=1
 YV=1
 ZV=-1
 DIST=59.9
 YF=1.63
 ZF=-52
 HIDDEN
 MX=862
 MN=22.3
 113
 207
 301
 395
 489
 771
 865



ANSYS 4.2B
FEB 27 1987
4:16:17
PLOT NO. 52
POST1 STRESS
STEP=4
ITER=1
SX
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=19097
MN=-25019
-20118
-15216
-10314
-5412
-510



1 LHMST

ANSYS 4.2B

FEB 27 1987

4:16:35

PLOT NO. 53

POST1 STRESS

STEP=4

ITER=1

SY

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=15472

MN=-21550

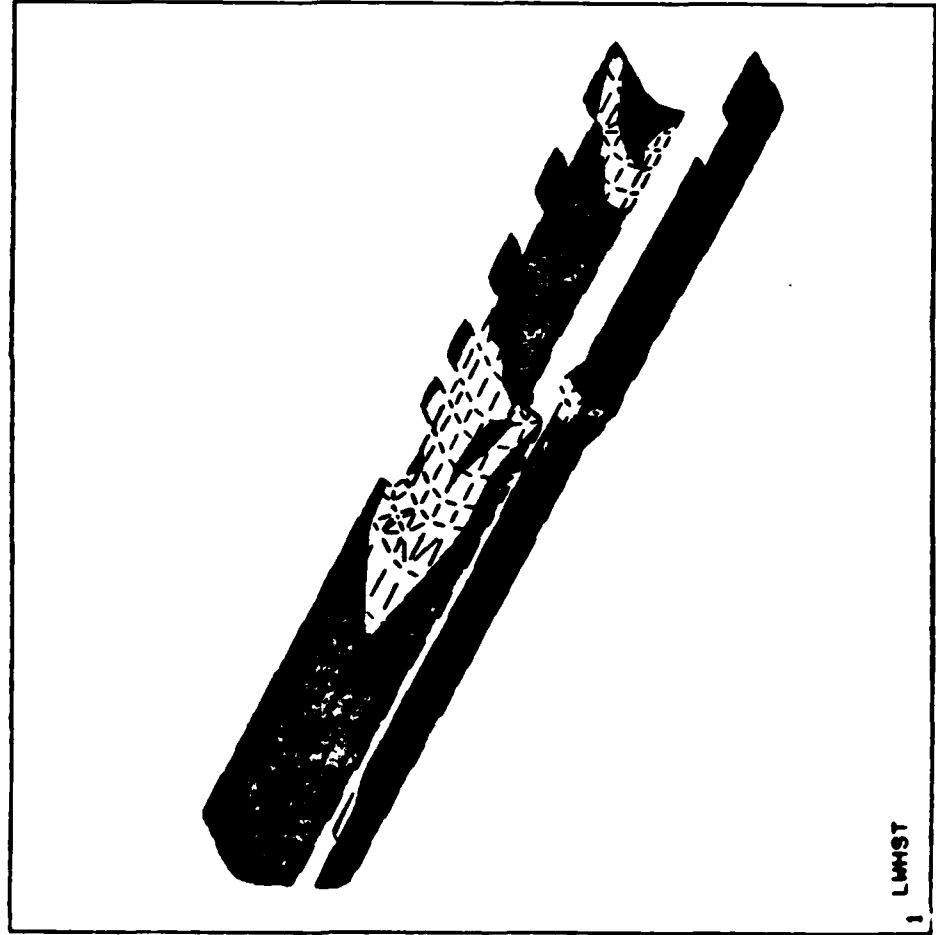
-17438

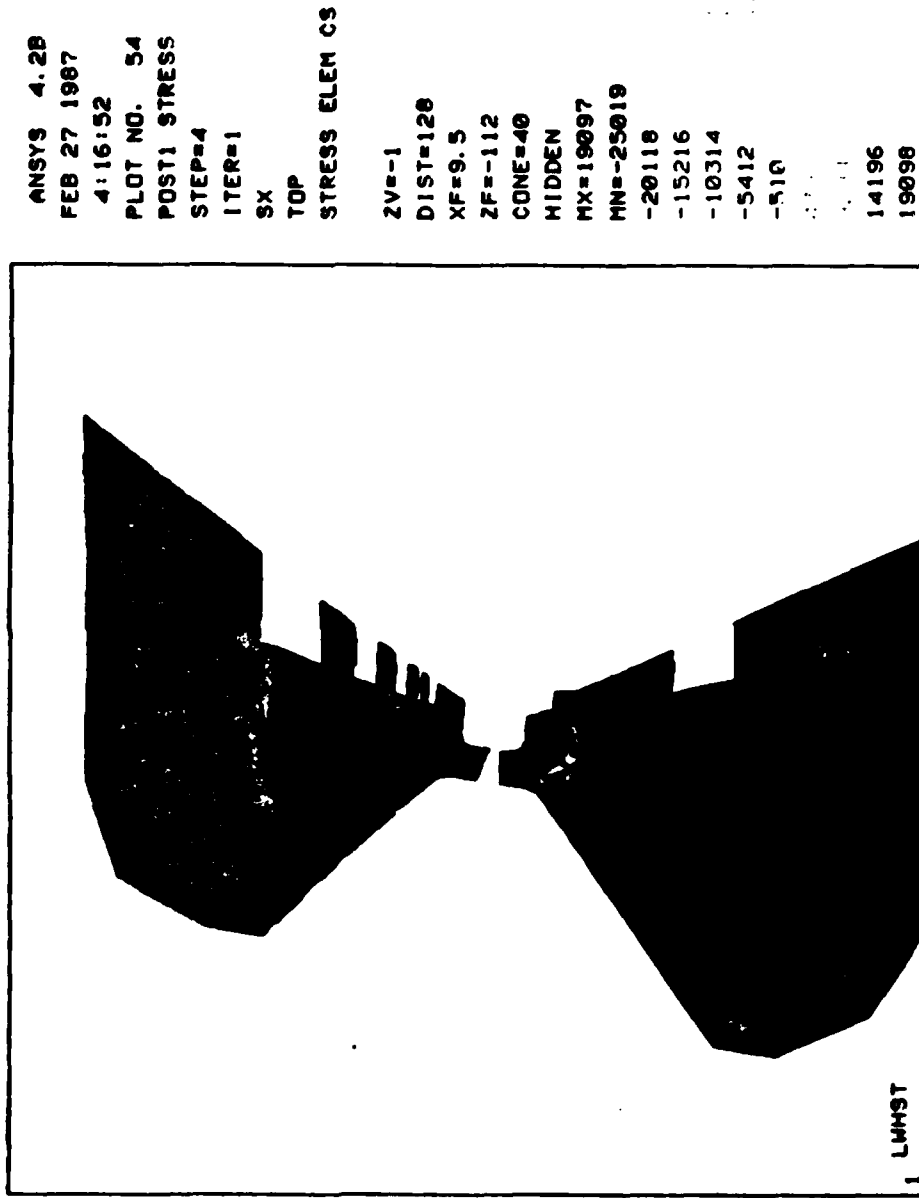
-13324

-9210

-5096

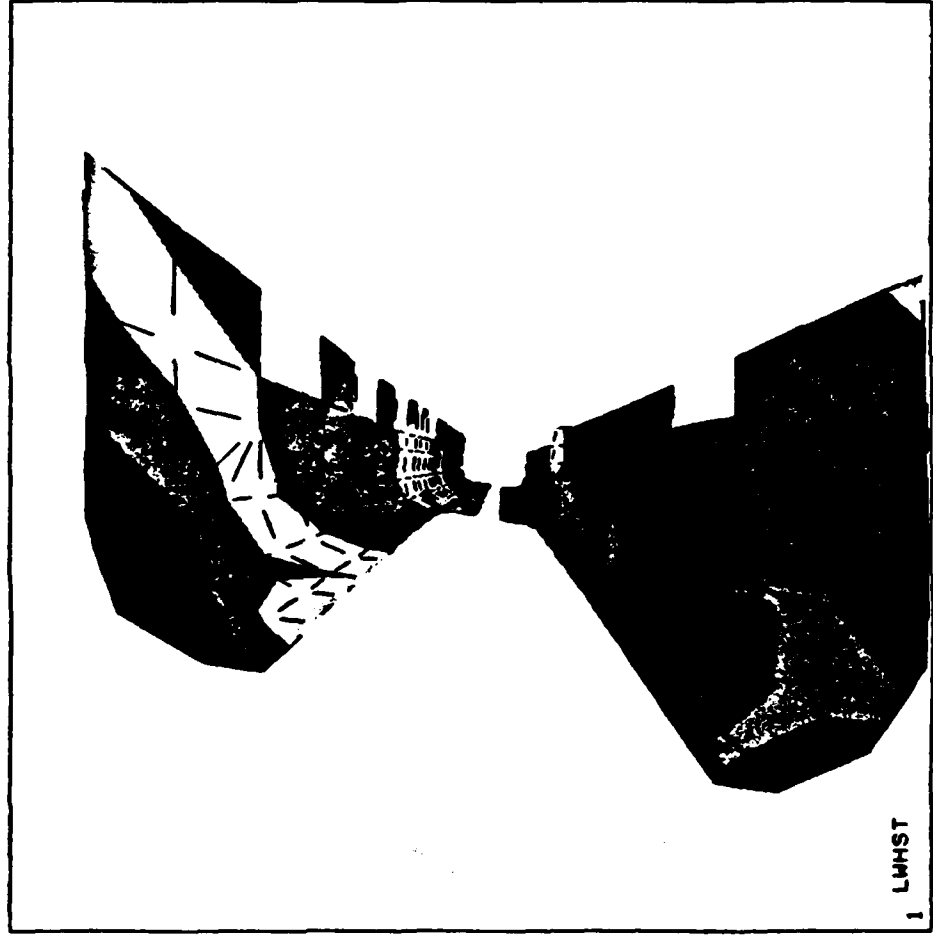
-982



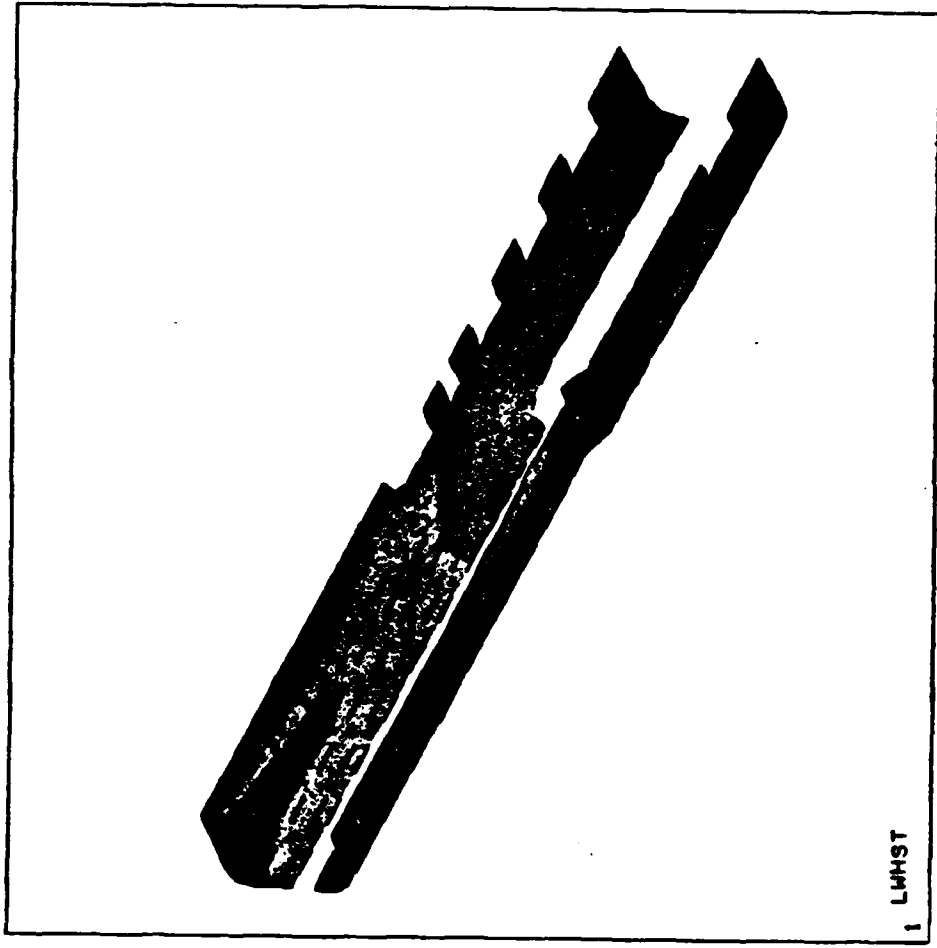


ANSYS 4.2B
 FEB 27 1987
 4:17:07
 PLOT NO. 55
 POST1 STRESS
 STEP=4
 ITER=1
 SY
 TOP
 STRESS ELEM CS

ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=15472
 MN=-21550
 -17438
 -13324
 -9210
 -5096
 -982
 11360
 15474



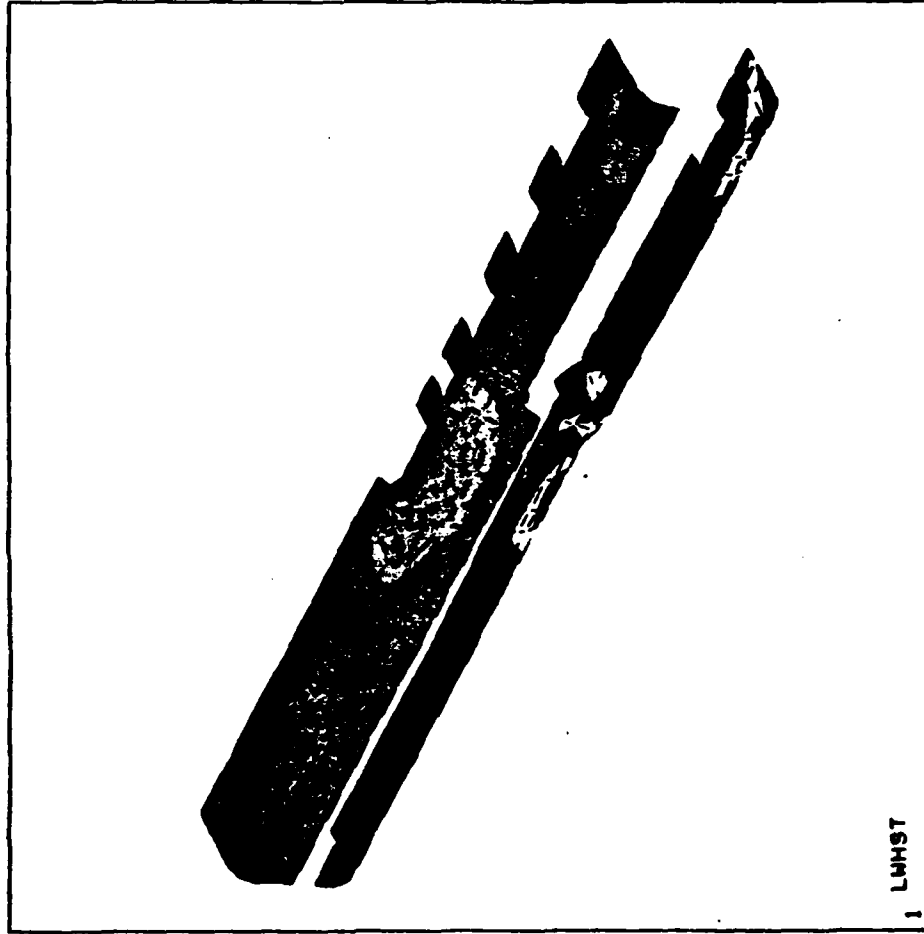
ANSYS 4.2B
FEB 27 1987
4:17:33
PLOT NO. 56
POST1 STRESS
STEP=4
ITER=1
SX
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=26797
MN=-25043
-19283
-13523
-7763
-2003
3757
111
111



1, LHMST

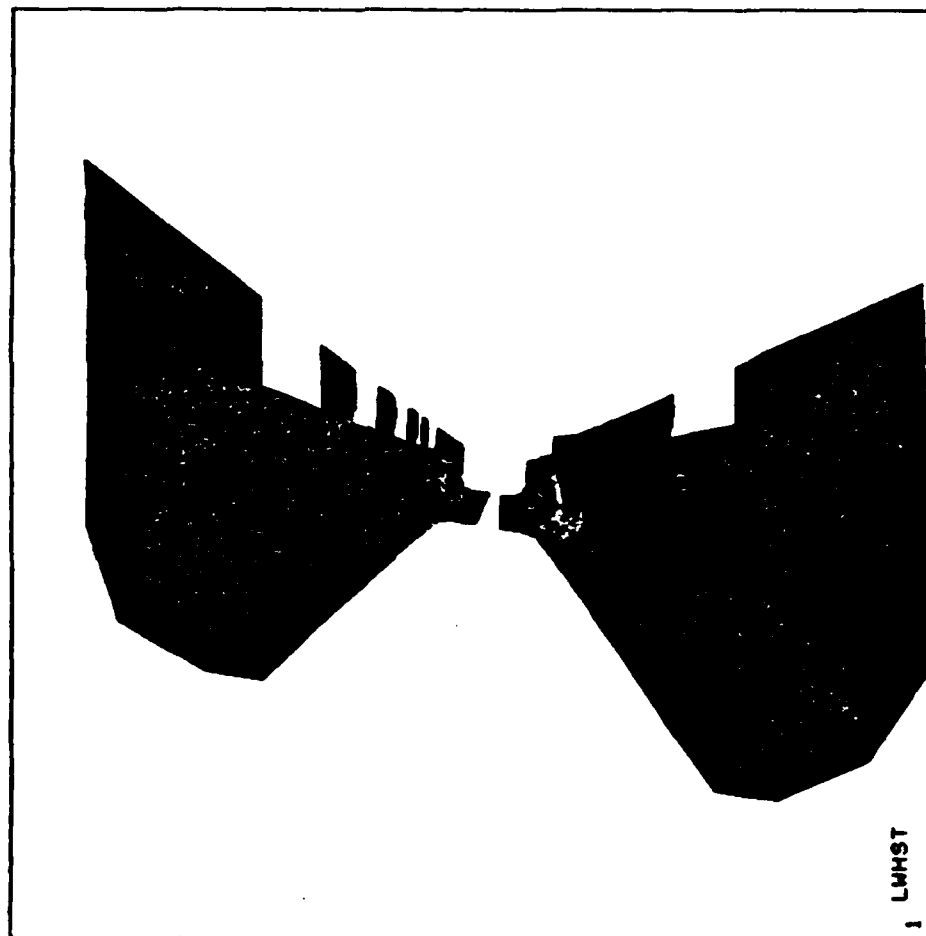
ANSYS 4.2B
 FEB 27 1987
 4:17:49
 PLOT NO. 57
 POST1 STRESS
 STEP=4
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS

XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=13330
 MN=-12270
 -9427
 -6582
 -3737
 -892
 1953
 1953
 1953

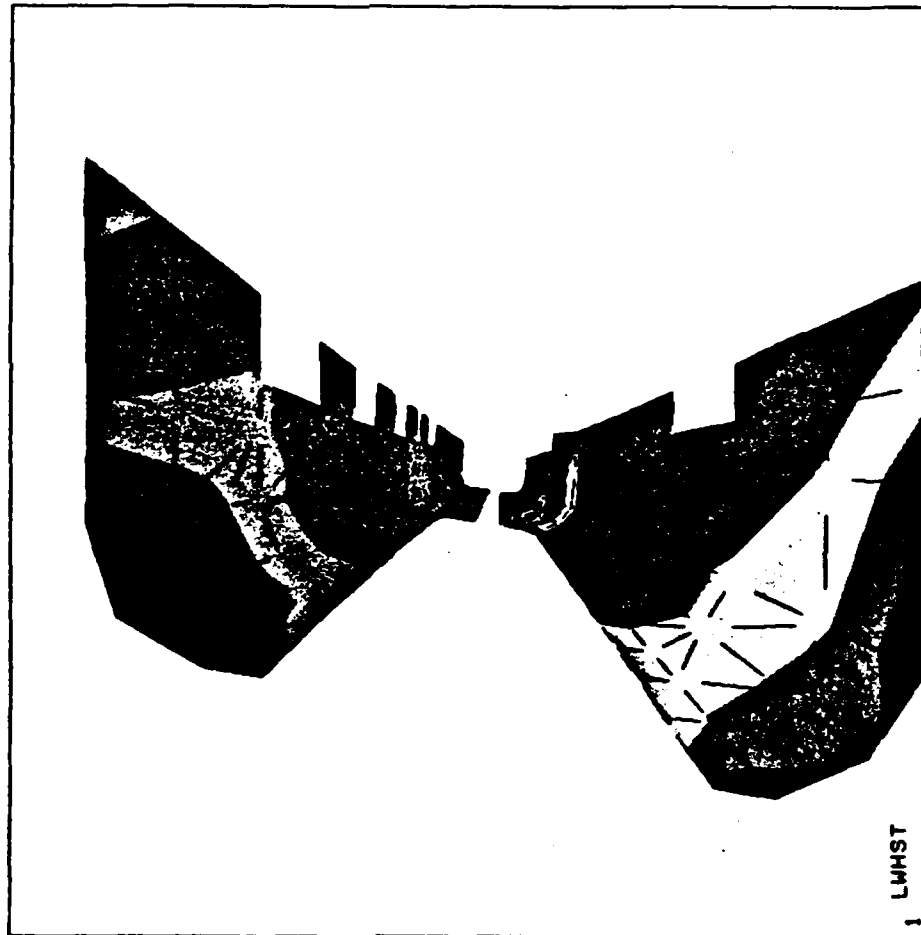


1 LHMST

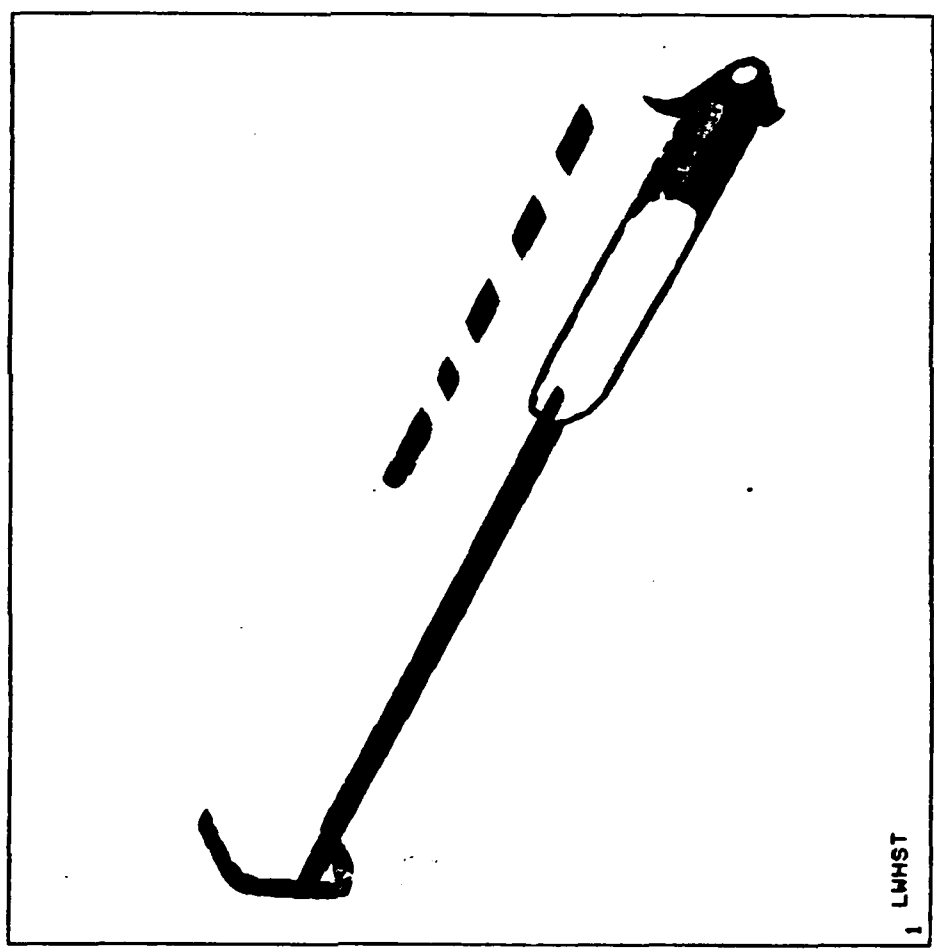
ANSYS 4.2B
 FEB 27 1987
 4:18:03
 PLOT NO. 58
 POST1 STRESS
 STEP=4
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=26797
 MN=-25043
 -19283
 -13523
 -7763
 -2003
 3757
 21037
 26797



ANSYS 4.2B
 FEB 27 1987
 4:18:19
 PLOT NO. 59
 POST1 STRESS
 STEP=4
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=13330
 MN=-12270
 -9427
 -6582
 -3737
 -892
 1953
 10488
 13333



ANSYS 4.2B
FEB 27 1987
4:18:51
PLOT NO. 60
POST1 STRESS
STEP=4
ITER=1
SX
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=74180
MN=-89803
-71585
-53364
-35143
-16922
1299
10000
10000



ANSYS 4.2B

FEB 27 1987

4:18:58

PLOT NO. 61

POST1 STRESS

STEP=4

ITER=1

SY

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=92.2

XF=10.9

YF=1.46

ZF=-110

HIDDEN

MX=107909

MN=-96974

-74210

-51445

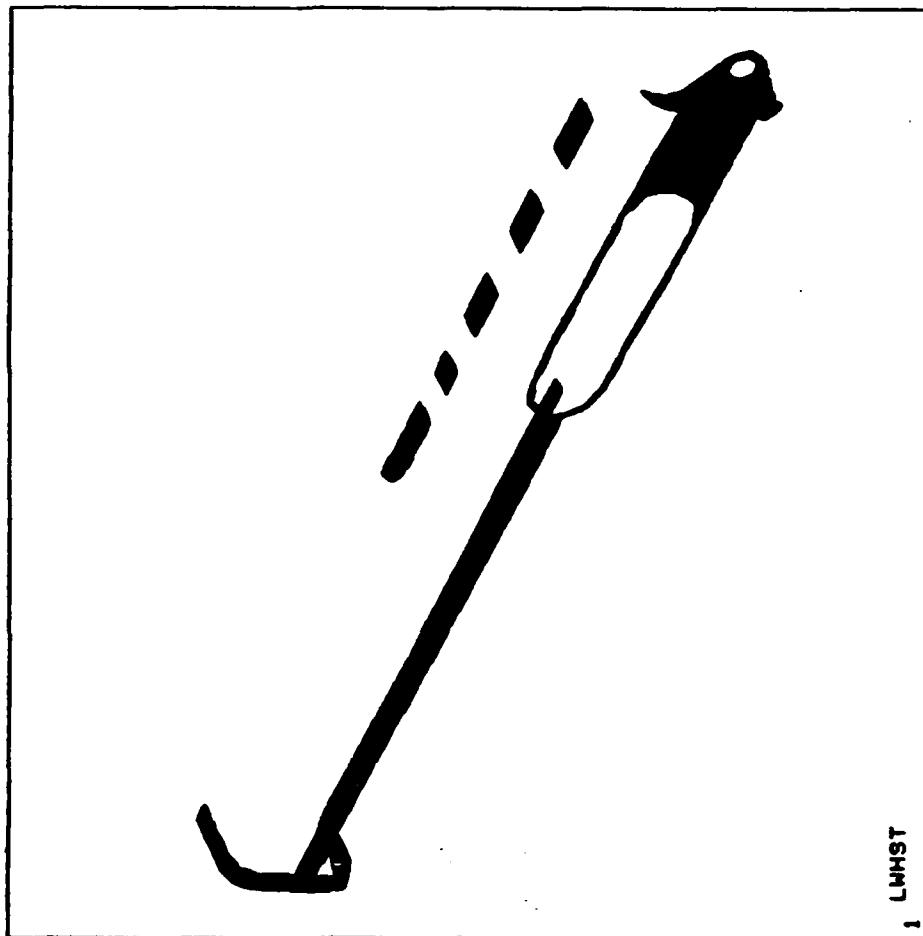
-28680

-5915

16850

32.15

32.15



1 LHMST

ANSYS 4.2B
FEB 27 1987

4:19:08

PLOT NO. 62

POST1 STRESS

STEP=4

ITER=1

SX

TOP

STRESS ELEM CS

ZV=-1

DIST=139

XF=9.5

ZF=-119

CONE=40

HIDDEN

MX=74180

MN=-89803

-71585

-53364

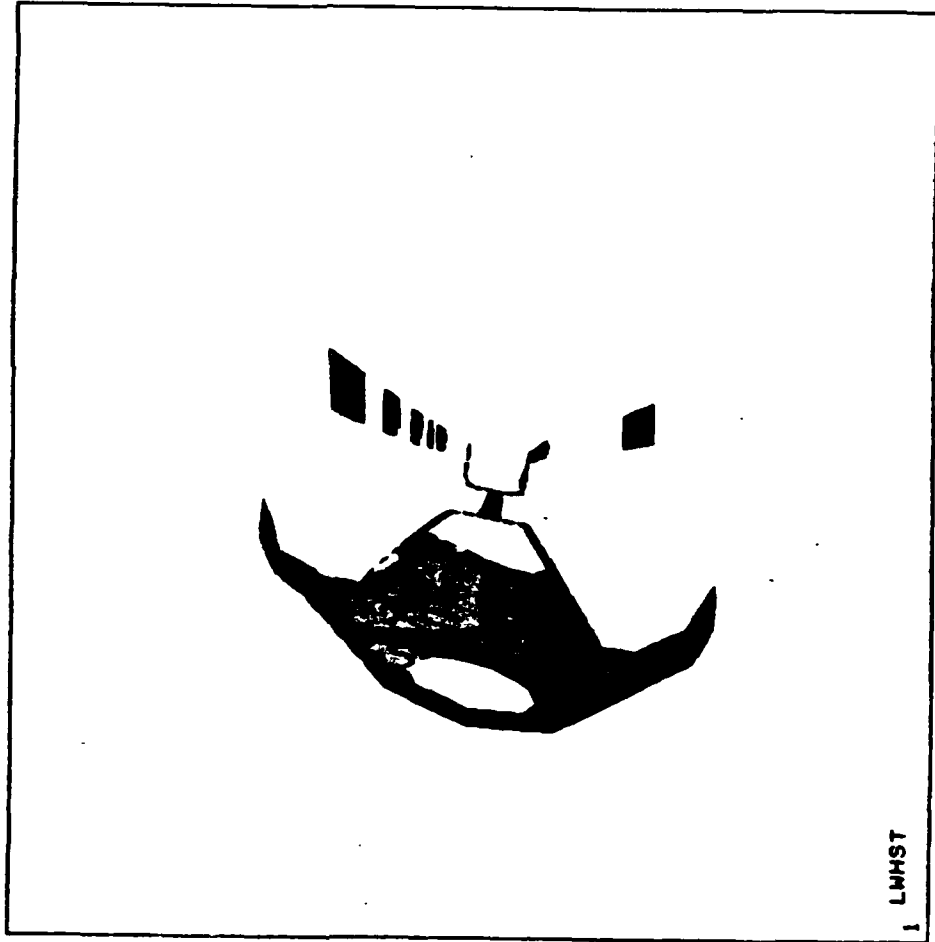
-35143

-16922

1290

55962

74183



ANSYS 4.2B

FEB 27 1987

4:19:15

PLOT NO. 63

POST1 STRESS

STEP=4

ITER=1

SY

TOP

STRESS ELEM CS

ZV=-1

DIST=139

XF=9.5

ZF=-119

CONE=40

HIDDEN

MX=107909

MN=-96974

-74210

-51445

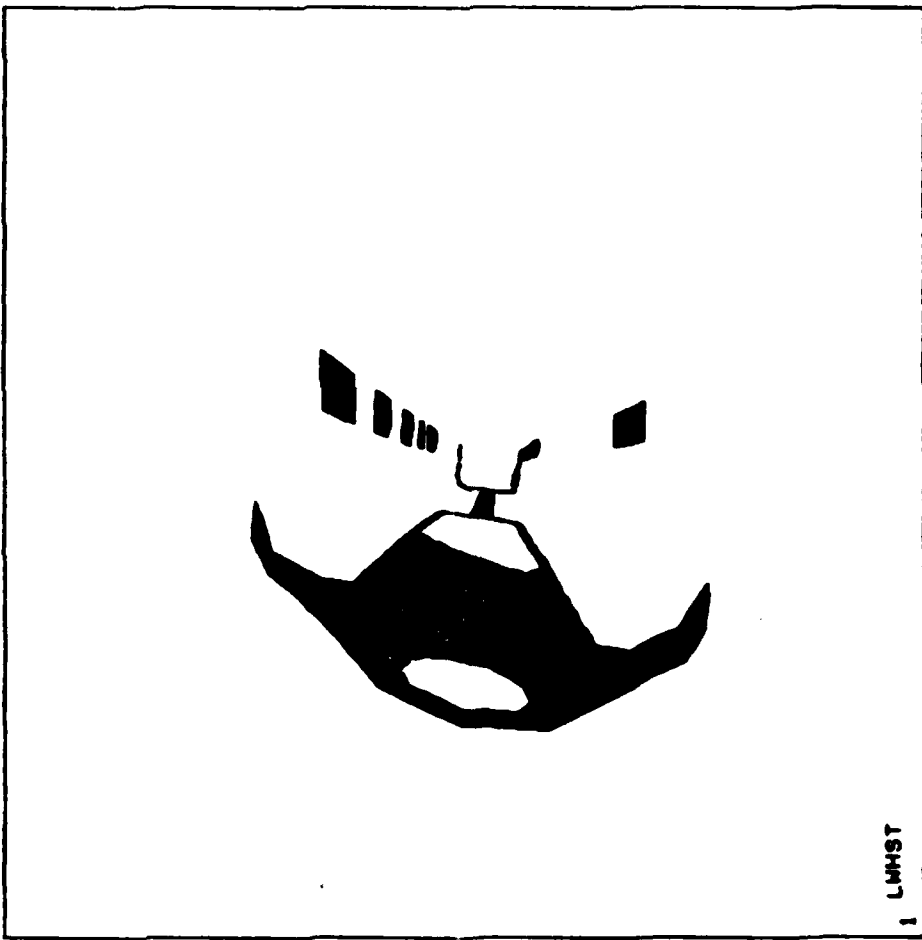
-28680

-5915

16850

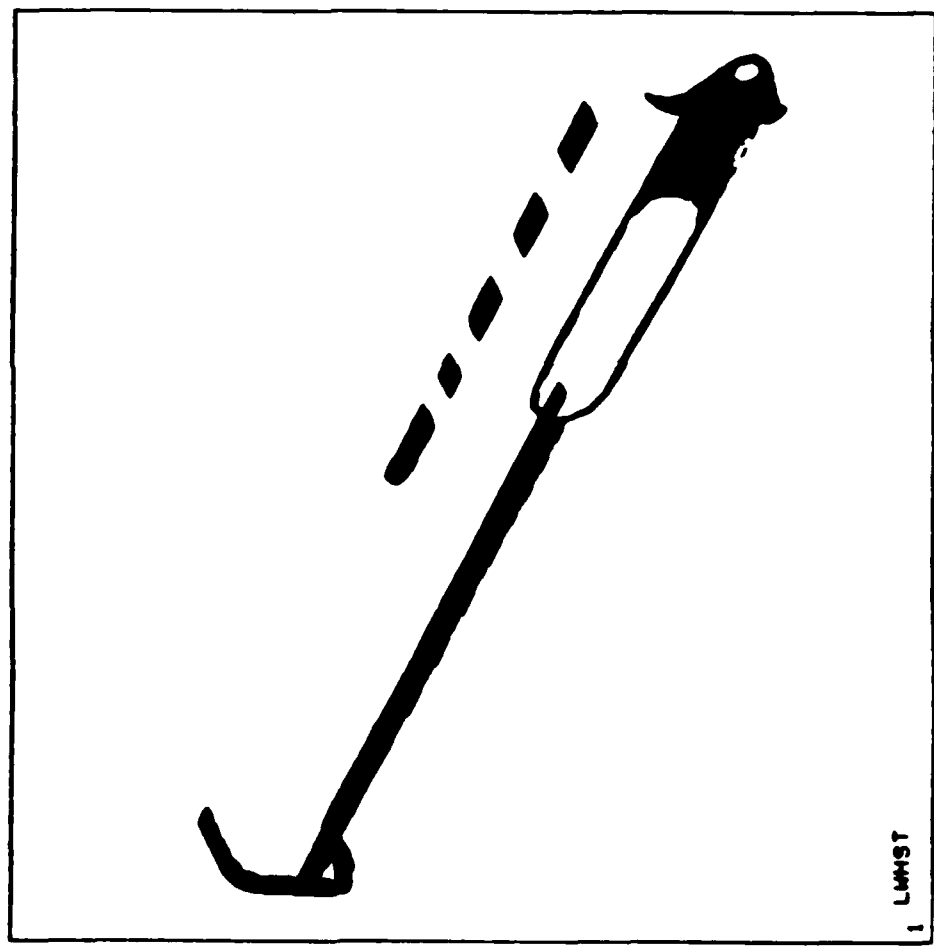
85145

107910



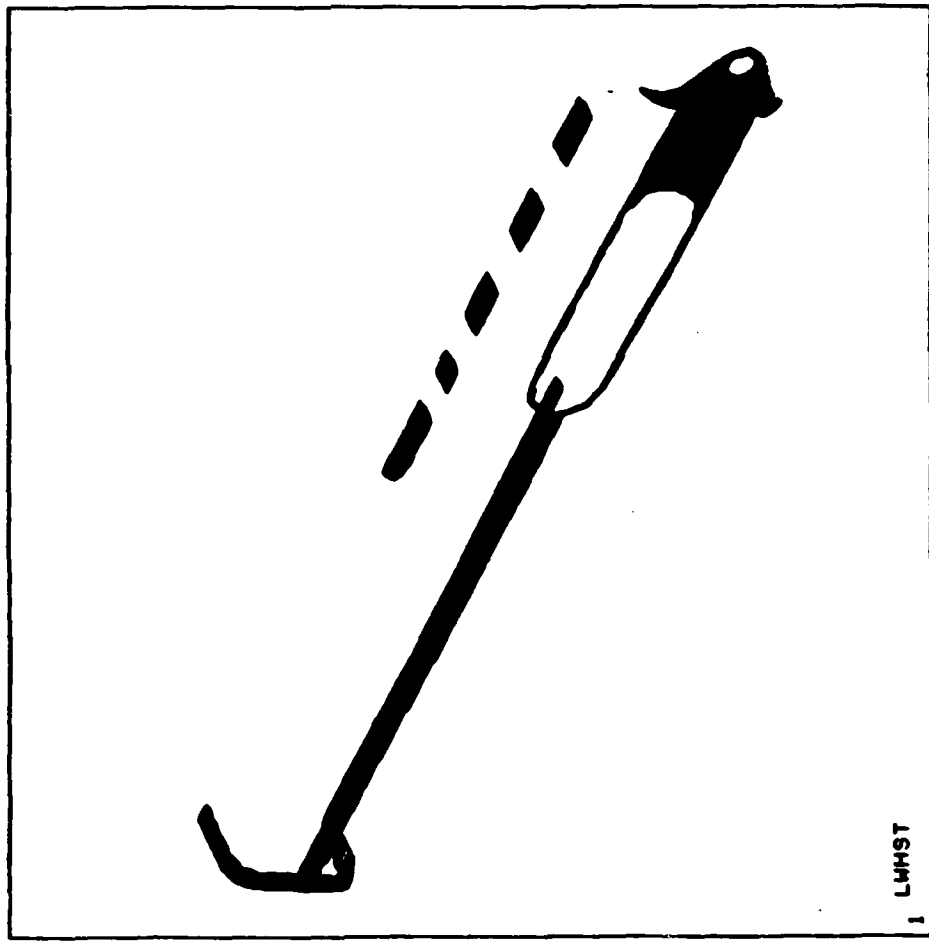
ANSYS 4.28
FEB 27 1987
4:19:32
PLOT NO. 64
POST1 STRESS
STEP=4
ITER=1
SX
BOTTOM
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=50735
MY=-47651
-36720
-25788
-14856
-3924
700R

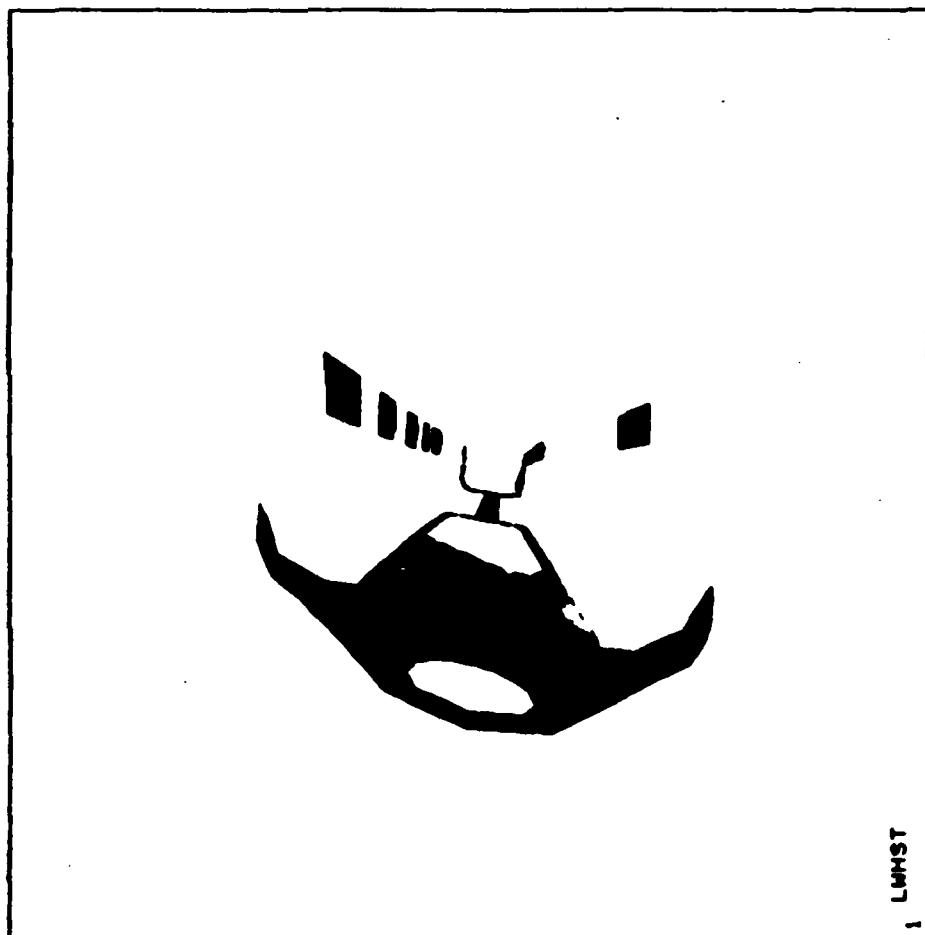


1 LWNST

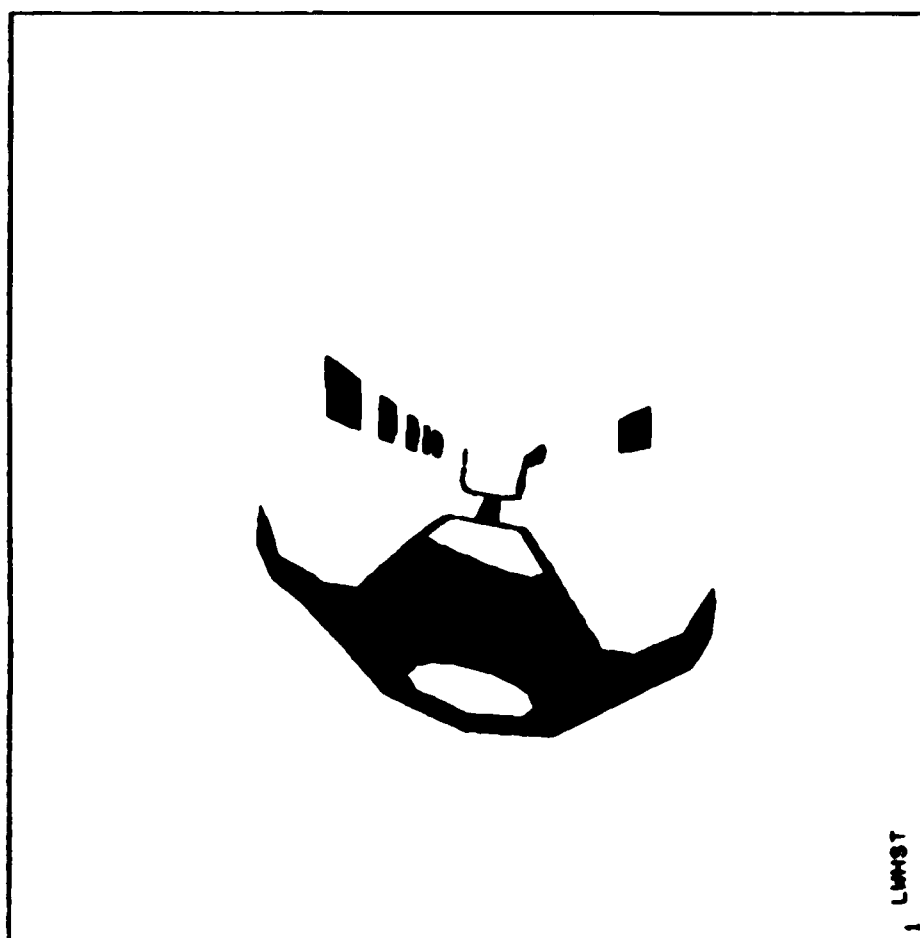
ANSYS 4.28
FEB 27 1987
4:19:40
PLOT NO. 65
POST1 STRESS
STEP=4
ITER=1
SY
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=70696
MN=-55271
-41277
-27280
-13283
714
14711



ANSYS 4.2B
FEB 27 1987
4:19:49
PLOT NO. 66
POST1 STRESS
STEP=4
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=50735
MN=-47651
-36720
-25788
-14856
-3924
T0000
39804
50736



ANSYS 4.28
 FEB 27 1987
 4:19:57
 PLOT NO. 67
 POST1 STRESS
 STEP=4
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=70696
 MN=-55271
 -41277
 -27280
 -13203
 714
 14711
 56782
 70699



ANSYS 4.20

FEB 27 1987

4:20:10

PLOT NO. 60

POST1 STRESS

STEP=4

ITER=1

SIDE

BOTTOM

XV=1

YV=1

ZV=-1

DIST=59.9

YF=1.63

ZF=-52

HIDDEN

MX=2665

MN=15.9

300

603

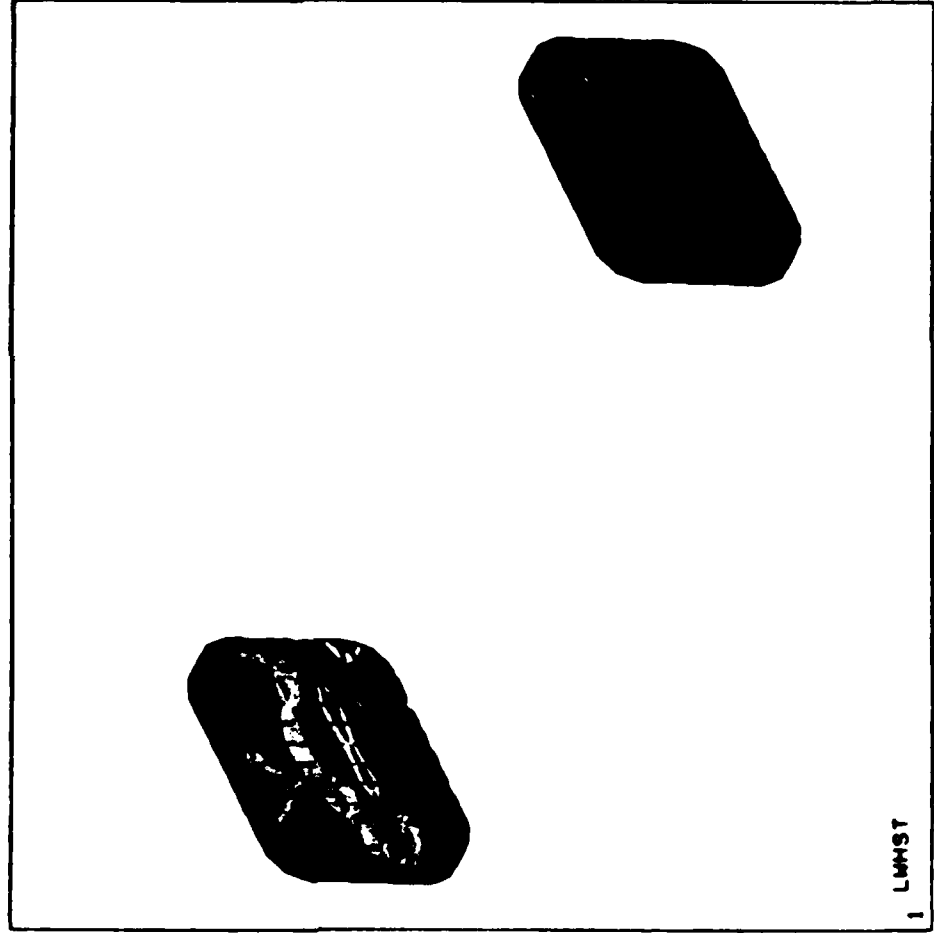
898

1193

1400

2373

2668



D2/330

COMPUTER RESULTS - MODEL 13

PAGE

/DCR/NAAR/PNC/NT3/CUT.PTOD

PTODC3, 377 LINES.

Model 13

3-7-87
LJC

***** ANSYS INPUT DATA .LISTING (FILE12) *****

```

1 /COOR,,,2000000
2 /PLOT,2
3 /CUT1
4 STRISS,PAK,4,1
5 -SET,1,1,1
6 -DEIN,MAC
7 SET,1,1
8 NSEL,,10001,10012
9 PROB
10 ERSE,STIF,4
11 PRET
12 RALL
13 -SNE
14 -DC,MAC,1,3
15 FINI
16 /EOF
  
```

***** REPORT REQUEST PROP /CCRE *****
 MAXIMUM FREQ = C
 MAXIMUM TEMP = C
 MAXIMUM VIRTUAL = 2000000

***** REPORT OBTAINED *****
 FREQ = 0.40000
 TEMP = C
 VIRTUAL = 2000000

PLOTS PUT ON FILE12 FOR PLOT33 (PASTER WCODE)

ANALYSIS - ENGINEERING ANALYSIS SYSTEM, REVISION 4.2 B (HCR)
 (C) SHADRON ANALYSIS SYSTEM, INC. MCUSTON, PENNSYLVANIA 15342
 FOR SUPPORT CALL MARK MCDAWATER PHOEN (402) 734-1636 TUX

JUN 1-1985

10-6011 FEB 27-1987 CPU 2.657

/POST1

***** ANALYSIS RESULTS INTERPRETATION (POST1) *****

STORE FOR ELEMENT TYPE ST1P 4 FROM ITEM 1

PARAMETER= 1 1-CCG 1.00C 0.

BEGIN MACRO PAC

USE LOAD STEP 1 ITERATION 1 SECTION 1 FOR LOAD CASE 1

*** NOTE *** FILE12 CONTAINS STIFFNESS ELEMENTS.
 NO STIFFNESSES ARE NOT AVAILABLE FOR THESE ELEMENTS.
 SELECT TOP OR BOTTOM STIFFNESSES.

GEOMETRY STORED FOR 10014 NODES 1119 ELEMENTS
 TITLE= LHMST

DISPLACEMENT STORED FOR 10014 ACES

STRESSES STORED FOR 1 SELECTED ITEMS

ACDIAL STRESSES AND TEMPS. STORED FOR 10014 ELEMENTS

ITERATION SUPPLY INFORMATION STORED

MODAL FORCES STORED FOR 1119 ELEMENTS

REACTIONS STORED FOR 15 REACTICS

FOR LOAD STEP= 1 ITERATION= 1 SECTION= 1

TIME= C. LEAD CASE= 1

TITLE= LHMST

BASE FOR LABEL= NODE FROM 10001 TO 10012 BY 1

12 MODES (OF 2608 DEFINED) SELECTED BY ANTE COMPARE.

PRINT MODAL DISPLACEMENTS

PARTS - ENGINEERING ANALYSIS SYSTEM, REVISION 4.2.2 (MCR)
 (C) SWANSON ANALYSIS SYSTEMS, INC. HOUSTON, PENNSYLVANIA 15342
 FOR SUPPORT CALL MARK REBARKER PHONE (408) 736-1836 FAX

JUN 1, 1985

LNNST 10.0300 FEB 27, 1987 CP= 46.383

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATIONS 1 SECTIONS 1
 TIME= C. LOAD CASE= 1

Revised mty

THE FOLLOWING X,Y,Z DISPLACEMENTS ARE IN INCHES. COORDINATES

NODE	UX	UY	UZ	ROTX	ROTY	ROTZ
10001	-C.32C43947E-02	-2.6504357	0.	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10002	-C.23403647E-02	-1.6350626	0.	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10003	-C.2257812E-02	-1.7792723	0.	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10004	-C.15C8959E-02	-1.2916438	0.	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10005	-C.1516071E-02	-C.8C136551	0.	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10006	-C.14720433E-02	-C.74488C9C	0.	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10007	0.	0.	0.	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10008	-C.15377427E-01	-C.8C248493	-C.14213323	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10009	-C.12813657E-03	-1.7794470	-C.31639625	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10010	0.	0.	0.	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10011	-C.1749733E-01	-C.8C309126	-C.14333524	0.93136530E-02	-C.72146792E-05	0.18C23608E-04
10012	-C.3199464E-02	-1.7802845	-C.31639625	0.93136530E-02	-C.72146792E-05	0.18C23608E-04

MAXIMUMS

NODE	10C11	10CC1	10C17
VALUE	-C.1749733E-01	-2.6504357	-C.31639625

ERRS FOR LABEL= STEP FROM 4 TO 4 BY 1

4 ELEMENTS (CF 1119 DEFINED) SELECTED BY ERSE COMPAND.

PRINT ELEMENT STRESS STEPS PER ELEMENT

ARISE - ENGINEERING ANALYSIS SYSTEM, REVISION 4.2 B (MCH)
 (C) SWANSON ANALYSIS SYSTEMS, INC. HOUSTON, PENNSYLVANIA 15342
 FOR SUPPORT CALL MARK MCPARKER PHONE (402) 736-1636 TUX

JUN 1, 1985

10.4511 FEB 27, 1987 CP= 47.615

LNHST

***** POST1 ELEMENT STRESS LISTING *****

LOAD STEP 1 ITERATION= 1 SECTION= 1
 TIME= 0. LOAD CASE= 1

ELEM FAX
 1108 1076-0390
 1109 1076-0390
 1110 1103-5C25
 1111 1103-5C25

1119 ELEMENTS (CF 1119 DEFINED) SELECTED BY EALL COMMAND.

END MACRO

EXECUTE MACRO MAC 3 TIMES WITH MULTIPLIER PICK 1 TO 3 IN STEPS OF 1

USE LOAD STEP 2 ITERATION 1 SECTION 1 FOR LOAD CASE 1

DISPLACEMENT STORED FOR 1119A NODES

STRESSES STORED FOR 1 SELECTED ITEMS

LOCAL STRESSES AND TEMPS. STORED FOR 1014 ELEMENTS

ITERATION SUPPORT INFORMATION STORED

LOCAL FORCES STORED FOR 1119 ELEMENTS

REACTIONS STORED FOR 13 REACTIONS

FOR LOAD STEP= 2 ITERATION= 1 SECTION= 1

TIME= C. LOAD CASE= 1

TITLE= LNHST

BASE FOR LABEL= NODE FROM 10001 TO 10012 BY 1

12 NODES (OF 2466 DEFINED) SELECTED BY ARIE COPYRND.

PRINT NORMAL DISPLACEMENTS

ANAL - ENGINEERING ANALYSIS SYSTEMS, REVISION 4.2 B (MCH)
 (C) SWANSON ANALYSIS SYSTEMS, INC. HOUSTON, PENNSYLVANIA 15302
 FOR SUPPORT CALL "APR MCDONALD" PHONE (408) 736-1036 TX

JUN 1, 1985

LW87

10.6750 FEB 27, 1987 CPM 71.153

***** PCSTI NODAL DISPLACEMENT LISTING *****

LOAD STEP 2 ITERATION= 1 SECTION= 1
 TIME= 0.0 CASE CASE= 1

THE FOLLOWING X,Y,Z DISPLACEMENTS ARE IN INCHES. COORDINATES

NODE	UX	UY	UZ	ROTX	ROTY	ROTZ
10001	-1.172C50	-C.7202976E-03	0.	0.1681182E-05	-0.41041755E-02	0.39422348E-04
10002	-C.52366E97	-0.51849130E-03	0.	0.1681182E-05	-0.41041747E-02	0.39422348E-04
10003	-C.5C93463	-C.5C942229E-03	0.	0.16827480E-05	-C.40929834E-02	0.39373901E-04
10004	-C.25189550	-0.42331146E-03	0.	0.16992487E-05	-C.39778561E-02	0.38687114E-04
10005	-C.34730444E-03	-C.33303390E-03	0.	0.16944943E-05	-0.40204333E-02	0.36C00327E-04
10006	-C.46C303C99E-04	-C.32288457E-03	0.	0.16930685E-05	-C.40274389E-02	0.37937968E-04
10007	C.	C.	0.	-0.33782283E-02	0.	0.33C44305E-04
10008	C.12483470E-04	0.6C880642	0.79218339E-04	-0.41C42910E-02	-C.92706947E-02	0.35C35431E-04
10009	-C.2C333803	0.9C899616	0.1C415435	-0.28247938E-03	-0.49519193E-02	0.39393614E-04
10010	C.	0.	0.	0.31828285E-02	C.	0.33C44283E-04
10011	C.15481371E-04	-0.6C941643	-0.79315843E-04	0.41087555E-02	-0.92707C62E-02	0.35C35438E-04
10012	-C.2C3636C4	-C.9C791519	-0.1C413462	0.28581678E-03	-C.49518630E-02	0.39393625E-04

MAXIMUMS

ACOE 100C1

VALUE -1.172C50 100C2

10011

10012

10013

10014

10015

10016

10017

10018

10019

10020

10021

10022

10023

10024

10025

10026

10027

10028

10029

10030

10031

10032

10033

10034

10035

10036

10037

10038

10039

10040

10041

10042

10043

10044

10045

10046

10047

10048

10049

10050

7096 only 42,00 + 0.65

226°

ANSYS - ENGINEERING ANALYSIS SYSTEM, REVISION 4.2 B (MR)
 (C) JMAISON ANALYSIS SYSTEMS, INC. HUNTSVILLE, PENNSYLVANIA 15342
 FOR SUPPORT CALL MARK RODRIGUEZ PHONE (412) 736-1636 FAX

JUN 1, 1985

UNST

10.6761 FEB 27, 1987 CP= 72.371

***** PCST1 ELEMENT STRESS LISTING *****

LOAD STEP 4 ITERATION= 1 SECTION= 1
 TIME= C. LOAD CASE= 1

ELEM FAX
 1108 9382-5435
 1109 9382-5435
 1110 -9381-8327
 1111 -9381-8327

1119 ELEMENTS (CF 1119 DEFINED) SELECTED BY EALL COMMAND.

USE LOAD STEP 3 ITERATION= 1 SECTION 1 FOR LOAD CASE 1

DISPLACEMENT STORED FOR1119 NODES

STRESSES STORED FOR 1 SELECTED ITEMS

ACTUAL STRESSES AND TEMPS. STORED FOR 1014 ELEMENTS

ITERATION SUMMARY INFORMATION STORED

ACTUAL FORCES STORED FOR 1119 ELEMENTS

REACTIONS STORED FOR 15 REACTIONS

FOR LOAD STEP= 3 ITERATION= 1 SECTION= 1
 TIME= C. LOAD CASE= 1
 TITLE= UNST

BASE FOR LABEL= AC03 FROM 1001 TO 1012 BY 1

12 NODES (CF 1266 DEFINED) SELECTED BY ARIE COMMAND.

PRINT NODAL DISPLACEMENTS

ANYS - ENGINEERING ANALYSIS SYSTEMS' REVISION 4.2 B (MCR)
(C) SWANSON ANALYSIS SYSTEMS, INC. HOUSTON, PENNSYLVANIA 15342
FOR SUPPORT CALL PARK MCNAMARA PHONE (402) 736-1036 TX

JUN 1, 1985

10.6994 FEB 27, 1987 CPM 95.925

***** POST1 ACDL DISPLACEMENT LISTING *****

LOAD STEP 3 ITERATION= 1 SECTIONS 1
TIME= 0. LOAD CASE= 1

THE FOLLOWING X,Y,Z DISPLACEMENTS ARE IN MM. COORDINATES

Dead wt. only

NODE	UX	UY	UZ	ROTX	ROTY	ROTZ
10001	-0.11803282	-1.7076741	0.	0.75790981E-02	-0.47467479E-03	0.46830186E-02
10002	-0.00494501E-01	-0.74173390	0.	0.74558984E-02	-0.47467479E-03	0.46230186E-02
10003	-0.32045235E-01	-0.71043731	0.	0.74329587E-02	-0.47467479E-03	0.46830186E-02
10004	-0.33930441E-01	-0.31326673	0.	0.78977322E-02	-0.45645803E-03	0.47231222E-02
10005	-0.10175072E-01	-0.10035214	0.	0.78704430E-02	-0.46458134E-03	0.47231222E-02
10006	-0.71659321E-02	0.14716494	0.	0.76488433E-02	-0.46581450E-03	0.47659949E-02
10007	0.	0.	0.	0.43989764E-02	0.	0.37229177E-02
10008	-0.11280530E-01	-0.34844108	-0.51817439E-01	0.87057289E-03	-0.11653468E-02	0.40224410E-02
10009	-0.2243641E-01	-0.60957729	-0.28314826E-01	0.72752344E-02	-0.18377311E-03	0.46559154E-02
10010	0.	0.	0.	0.5811170E-02	0.	0.41049607E-02
10011	-0.14060711E-01	-0.49340135	-0.70014107E-01	0.17839467E-02	-0.10180446E-02	0.42736442E-02
10012	-0.22376018E-01	-0.62415735	-0.1133055C	0.73222737E-02	-0.98413318E-03	0.46248575E-02

PAIPLAS

NODE	10CC1	10CC2	10CC3	10009	10006
VALUE	-0.11803282	-1.7076741	-0.1133055C	0.75790981E-02	-0.11653468E-02

8888 FOR LABEL STEP FROM 4 TO 4 BY 1

6 ELEMENTS (CP 119 DEFINED) SELECTED BY BRGE COMPAND.

PAINT ELEMENT STRESS ITEMS PER ELEMENT

SAVING - ENGINEERING ANALYSIS SYSTEMS, DIVISION 4.2.0 (MCH)
 (C) SWANSON ANALYSIS SYSTEMS, INC. HOLLISTON, PENNSYLVANIA 15342
 FOR SUPPORT CALL MADE RODAPPER PHONE (412) 738-1826 TUE

JUN 1, 1983

LMOST

10.7000 PER 27.1087 CPM 97.167

***** PCST1 ELEMENT STRESS LISTING *****

LOAD STEP 3 ITERATION= 1 SECTION= 1
 TIME= 0. LOAD CASE= 1

ELAP FAX
 1100 -3079.4343
 1109 -3077.0802
 1110 -3348.3427
 1111 -3346.1844

1119 ELEMENTS (CF 1119 DEFINED) SELECTED BY CALL COMMAND.

FOR LOAD STEP 4 ITERATION 1 SECTION 1 FOR LOAD CASE 1

DISPLACEMENT STORED FOR SELECTED MODES

STRESSES STORED FOR 1 SELECTED ITEMS

MODAL STRESSES AND TEMPS. STORED FOR 1014 ELEMENTS

ITERATION SUPPORT INFORMATION STORED

ACTUAL FORCES STORED FOR 1119 ELEMENTS

REACTIONS STORED FOR 15 REACTIONS

FOR LOAD STEP 4 ITERATION= 1 SECTION= 1
 TIME= 0. LOAD CASE= 1
 TITLE= LMOST

MODE FOR LOCAL MODE FROM 1001 TO 10012 BY 1

12 MODES (CF 2808 DEFINED) SELECTED BY MODE COMMAND.

PRINT MODAL DISPLACEMENTS

DMSYS - ENGINEERING ANALYSIS SYSTEM, REVISED 4.2.0 (MCR)
 (C) SHADON ANALYSIS SYSTEM, INC.
 HOUSTON, PENNSYLVANIA 15342
 FOR SUPPORT CALL PAUL MCNAMARA PHONE (408) 736-1636 TX

JUN 1, 1985

10.7225 FEB 27, 1987 CP= 120.655
 10.7225

combined: pencil, torque, and
 Read wt. 457

***** POST1 NODAL DISPLACEMENT LISTING *****
 LOAD STEP 4 ITERATIONS 1 SECTIONS 1
 TIME 0.0 LOAD CASE 1

THE FOLLOWING N+1/2 DISPLACEMENTS ARE IN MM. COORDINATES

NODE	UX	UY	ROT	ROT	ROT
10001	-1.521392	-3.531637	0.	0.17500421E-01	0.39447504E-01
10002	-0.52892756	-3.4536237	0.	0.17460222E-01	0.39447504E-01
10003	-0.52411349	-3.3501723	0.	0.17415028E-01	0.39447504E-01
10004	-0.2745644	-2.4806639	0.	0.17310419E-01	0.39380933E-01
10005	-0.6849128E-01	-1.5836468	0.	0.17359332E-01	0.39380933E-01
10006	-0.62542874E-01	-1.4592582	0.	0.17349377E-01	0.39380933E-01
10007	0.	0.	0.	0.17349377E-01	0.39380933E-01
10008	-0.24249398E-01	-1.1586435	-0.12311335	0.17349377E-01	0.39380933E-01
10009	-0.24249398E-01	-2.4400658	-0.38015773	0.17349377E-01	0.39380933E-01
10010	0.	0.	0.	0.17349377E-01	0.39380933E-01
10011	-0.2324049E-01	-2.7779440	-0.34216144	0.17349377E-01	0.39380933E-01
10012	-0.2324049E-01	-2.7779440	-0.34216144	0.17349377E-01	0.39380933E-01

PARAM	10001	10002	10003	10004	10005
ACR	10001	10002	10003	10004	10005
VAL	-1.521392	-3.531637	-0.52892756	-0.52411349	-0.2745644

4 ELEMENTS (CF 1119 DEFORMED) SELECTED BY SPSE COMPANY.

PRINT ELEMENT STRESS STEPS PER ELEMENT

ASST - ENGINEERING ANALYSIS SYSTEMS, DIVISION 4.2.0 (MCO)
(C) SWANSON ANALYSIS SYSTEMS, INC. MCUSTON, PENNSYLVANIA 19342
FOR SUPPORT CALL NAME RECORDED PHONE (C) 736-1036 TUE
JUN 1, 1985

10.7230 100 27,1967 CPO 121.007

LAST

***** POSTS ELEMENT STATUS LISTING *****

LOAD STEP 4 ITERATION 1 ELEMENT 1
TIME C. LOAD CASE 1

ALSO FOR
1100 -0423.1789
1100 -0423.8306
1110 -23100.301
1110 -23176.643

1110 ELEMENTS (CP 1110 DEFINED) SELECTED BY ELL COMMAND.

***** SOLUTION COMPLETED ***** CP 122.120

7007 UNCOUNTED ON FILE10

***** RUN COMPLETED ***** CPO 122.3310 TIME 10.7244

D2/331

COMPUTER RESULTS - MODEL 13

ANALYSIS - ENGINEERING ANALYSIS SYSTEM, SECTION 4.7.4 (PER)
 (C) ANALYSIS ANALYSIS SYSTEM, INC. HUNTSVILLE, ALABAMA 35894
 FOR SUPPORT CALL WARE RECORDING PAGE 0000 0000 0000 0000

JUN 1, 1965

13.1346 PAR 3.1907 CPM 2.231

PAGE 11

***** ANALYSIS RESULTS INTERPRETATION (0.001) *****

STORE PAR FOR ELEMENT TYPE STEP 4 PRCP STE, 1

PARAMETER 1 1.000 1.000 0.

BEGIN MACRO PAC

USE LOAD STEP 1 ITERATION 1 SECTION 1 FOR LOAD CASE 1

*** NOTE *** FILE 12 CONTAINS STEP 1 ELEMENTS.
 P10 STRESSES ARE NOT AVAILABLE FOR THESE ELEMENTS.
 SELECT FOR CA SECTION STRESSES.

GEOMETRY STORED FOR 10016 NODES 1110 ELEMENTS
 TITLE= LUNET

DISPLACEMENT STORED FOR 10016 NODES.

STRESSER STORED FOR 1 SELECTED STEPS

LOCAL STRESSES AND TEMPS. STORED FOR 1016 ELEMENTS

ITERATION SUMMARY INFORMATION STORED

LOCAL FORCES STORED FOR 1110 ELEMENTS

REACTIONS STORED FOR 12 REACTION

FOR LOAD STEP 1 ITERATION 1 SECTION 1
 TIME= 0.000
 TITLE= LUNET

BASE FOR LABELS NODE FROM 10016 TO 10016 BY 1

12 NODES (OF 1000 DEFINED) SELECTED BY ANALYSIS COMPASS.

PRINT LOCAL DISPLACEMENTS

SAVING - ENGINEERING ANALYSIS SYSTEM, REVISED 4.2 R (PCB)
100 SHADON ANALYSIS SYSTEMS, INC. ROOSTER, PENNSYLVANIA 15362
FOR SUPPORT CALL 748 ACBAREA PHONY 725-1336 TUN

JUN 1, 1969

END

13.1772 MAR 3, 1967 CPO 45.870

***** PCST1 LOCAL DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION 1 SECTION 1
TIME C. LOAD CASE 1

THE FOLLOWING A, B, C DISPLACEMENTS ARE IN MM. COORDINATES

NODE	UX	UY	U	ROTX	ROTY	ROTZ
1001	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1002	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1003	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1004	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1005	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1006	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1007	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1008	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1009	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1010	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1011	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00
1012	-0.00000000E+00	-0.00000000E+00	0.	0.00000000E+00	0.00000000E+00	0.00000000E+00

PCST1P001 1001 1001
VALUE -0.00000000E+00 -0.00000000E+00 -0.00000000E+00
BASE FOR LABELS STEP 1001 4 TO 4 BY 1

* ELEMENTS OF THE DEFINED SELECTIVE BY THE COMMAND.

PRINT ELEMENT STRESS 1001 PER ELEMENT

ADVIS - ELEMENTARY ANALYSIS - VETER, DIVISION 6.2 F (PCD)
 (C) SHANNON ANALYSIS SYSTEMS INC. HUNTSVILLE, ALABAMA 35892
 FOR SUPPORT CALL MARK MCDONALD PHONE (205) 939-1030 FAX

JUN 1-1985

13.1776 MAR 3-1987 CPU 47.603

***** POST ELEMENT STRESS LISTING *****

LOAD STEP 1 ITERATION 1 SECTION 1
 TIME 0.0 LOAD CASE 1

ELEM FAX
 1108 -5.15200E2
 1109 -5.138200E
 1110 9.0317421
 1111 7.0397562

1119 ELEMENTS (CF 1119 DEFINED) SELECTED BY BALL COMMAND.

END PAGE

EXECUTE PAGE MAC 2 TIPS WITH MULTIPLIER FCF 1 TO 2 IN STEPS OF 1

USE LOAD STEP 2 ITERATION 1 SECTION 1 FOR LOAD CASE 1

DISPLACEMENT STORED FOR 1119 NODES

STRESSES STORED FOR 1 SELECTED STEPS

NODAL STRESSES AND TEMPS. STORED FOR 1119 ELEMENTS

ITERATION SUMMARY INFORMATION STORED

NODAL FORCES STORED FOR 1119 ELEMENTS

REACTIONS STORED FOR 15 REACTIONS

FOR LOAD STEP 2 ITERATION 1 SECTION 1
 TIME 0.0
 TITLE *****

BASE FOR LABEL NODE FROM 1001 TO 1002 BY 1

12 NODES (CF 1000 DEFINED) SELECTED BY NAME COMMAND.

PRINT NODAL DISPLACEMENTS

ANALYSIS - ENGINEERING ANALYSIS SYSTEM, VERSION 4.2.0 (1980)
 FOR ANALYSIS OF STRUCTURES AND MECHANICAL SYSTEMS
 FOR SUPPORT CALL DATA ACQUISITION (1980) 720-1670

JUN 1, 1985

13.1634 MAR 3, 1937 CP# 70.324

***** POSTI NODES DISPLACEMENT LISTING *****

LOAD STEP 1 ITERATION# 1 SECTION# 1
 TIME# 0.0 LOAD CASE# 1

THE FOLLOWING NODES DISPLACEMENTS ARE IN INCH, COORDINATES

NODE	UX	UY	UZ	ROT	ROT	ROT
10001	-1.019072	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10002	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10003	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10004	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10005	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10006	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10007	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10008	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10009	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10010	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10011	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000
10012	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000	-0.000000

PREPARE 10001 10012 10011 10001
 VALUE -1.019072 -0.000000 -0.000000 -0.000000 -0.000000 -0.000000

888 FOR LABELS STIFFNESS 4 30 4 30 1
 4 ELEMENTS OF 1115 (CONTINUED) SELECTED BY 8888 COMMAND.
 PRINT ELEMENT STIFFNESS STIFFNESS PER ELEMENT

ANSYS - ENGINEERING ANALYSIS SYSTEM, REVISION 4.2 P (GCP)
(C) SHASTON ANALYSIS SYSTEMS, INC. HIGHTON, PENNSYLVANIA 15342
FOR SUPPORT CALL ASK ACAD-PAK FAX (412) 724-1070 FAX

JUN 1/1985

13.1942 MAP 3/1067 CPO 71.535

Unit

***** POST1 ELEMENT STRESS LISTING *****

LOAD STEP 2 ITERATION 1 SECTION 1
TIME C. LOAD CASE 1

ELEM PAX
1104 938.9125
1107 238.9145
1110 -238.9125
1111 -938.9127

1119 ELEMENTS (CF 1119 DEFINED) SELECTED BY EALL COMMAND.

USE LOAD STEP 3 ITERATION 1 SECTION 1 FOR LOAD CASE 1

DISPLACEMENT STORED FOR 1014 ELEMENTS

STRESSES STORED FOR 1 SELECTED ITEMS

ACUAL STRESSES AND TEMPS. STORED FOR 1014 ELEMENTS

ITERATION SUPPLY INFORMATION STORED

ACUAL FORCES STORED FOR 1119 ELEMENTS

REACTIONS STORED FOR 15 REACTIONS

FOR LOAD STEP 3 ITERATION 1 SECTION 1

TIME C. LOAD CASE 1

TITLE UNIT

NOTE FOR LABEL= NODE FROM 1001 TO 1012 BY 1

12 NODES (CF 1069 DEFINED) SELECTED BY ANLE COMMAND.

PRINT NODAL DISPLACEMENTS

ANALYSIS - FINANCIAL ANALYSIS STATE, SECTION 4.2.0 (MCP)
 (C) SECTION ANALYSIS TESTS AND MONITORING PENNSYLVANIA 15342
 PER SUPPORT CELL WITH AGREEMENTS BONE (MCP) 755-1570 TAY

JUN 1 1995

LAST 13.2131 MAR 3 1987 CPM 96.735

***** POSTI MODEL DISPLACEMENT LISTING *****

LOAD STEP 3 ITERATIONS 1 SECTION 1
 TENSE C. LOAD CASE 1

THE FOLLOWING TABLE DISPLACEMENTS ARE IN INCHES, COORDINATES

NODE	UX	UY	UZ	ROTX	ROTY	ROTZ
10001	-0.1173464	-1.616300	C.	C.39479121E-02	-0.7340571E-03	C.46832732E-02
10002	-0.6554332E-01	-0.3454414	C.	C.31078232E-02	-0.47340571E-03	C.46832732E-02
10003	-0.378721E-01	-0.133722	C.	C.34925233E-02	-0.47140571E-03	C.44840079E-02
10004	-0.3261312E-01	-0.35777749	C.	C.36966404E-02	-0.4513671E-03	C.47224824E-02
10005	-0.1247127E-01	C.7470594E-01	C.	C.34845914E-02	-0.4607326E-03	C.47605969E-02
10006	-0.7487604E-02	C.17505356	C.	C.3468684E-02	-0.4521213E-03	C.47644100E-02
10007	C.	C.	C.	C.4460323E-02	C.	C.37001154E-02
10008	-0.1034527E-01	-0.37447318	-0.5311948E-01	C.19431434E-02	-0.11760803E-02	C.40132151E-02
10009	-0.32394514E-01	-0.70591070	-0.3951270E-01	C.59244460E-02	-0.10487382E-03	C.47122499E-02
10010	C.	C.	C.	C.5927384E-02	C.	C.47122499E-02
10011	-0.1096457E-01	-0.51937312	-0.71810472E-01	C.21163733E-02	-0.10019023E-02	C.42423094E-02
10012	-0.22629672E-01	-0.69210073	-0.10330804	C.53126706E-02	-0.10380475E-02	C.46022177E-02

MAXIMUMS

NODE	10001	10001	10001	10006	10006
VALUE	-0.1173464	-1.616300	-0.1210264	0.39479121E-02	-0.11760803E-02

BASE FOR LABELS STEP FROM 4 TO 4 BY 1

4 ELEMENTS (OF 1112 DEFINED) SELECTED BY ERSE COMMAND.

PAINT ELEMENT STRESS STEPS PER ELEMENT

PAVE - ENGINEERING ANALYSIS SYSTEM, REVISED 6.2 P (MCP)
 (C) 1980, ANALYSIS SYSTEMS, INC. MCLETON, PENNSYLVANIA 15342
 FOR SUPPORT CALL VISA RELEASER PHONE (402) 733-1636 FAX

JUN 1, 1985

13.2136 VAR 3.01967 CP= 93.932

END

***** PRINT ELEMENT STRESS LISTING *****

LOAD STEP 3 ITERATION= 1 SECTION= 1
 TIME= 0. LOAD CASE= 1

ELDP PAX
 1100 -6210.5594
 1105 -4452.0112
 1110 -0456.4317
 1111 -5434.1024

1119 ELEMENTS (CF 1119 DEFINED) SELECTED BY EALL COMPAND.

USE LOAD STEP 4 ITERATION 1 SECTION 1 FOR LOAD CASE 1

DISPLACEMENT STORED FOR EACH NODE

STRESSES STORED FOR 1 SELECTED ITEMS

LOCAL STRESSES AND TEMPS. STORED FOR 1014 ELEMENTS

ITERATION SUPPORT INFORMATION STORED

LOCAL FORCES STORED FOR 1119 ELEMENTS

REACTIONS STORED FOR 15 REACTIONS

FOR LOAD STEP 4 ITERATION= 1 SECTION= 1
 TIME= 0. LOAD CASE= 1
 TITLE= LADJET

ANSI FOR LABEL= NCSE FROM 10001 TO 12012 BY 1

12 NODES (CF 2408 DEFINED) SELECTED BY NFE COMPAND.

PRINT LOCAL DISPLACEMENTS

ANALYSIS - ENGINEERING ANALYSIS SYSTEM, REVISION 4.2.0 (MCR)
 (C) SHARON ALANIS SYSTEMS INC. HUNTSVILLE, PENNSYLVANIA 15342
 FOR SUPPORT CALL WPAH HUNTSVILLE PHONE (412) 734-1474 FAX

JUN 1, 1995

12.2419 YAP 3.1927 CP= 119.301

LIST

***** POST1 NODAL DISPLACEMENT LISTING *****

LOAD STEP 4 ITERATIONS 1 SECTION: 1
 TIME: 0.0 LOAD CASE: 1

THE FOLLOWING NODAL DISPLACEMENTS ARE IN NODAL COORDINATES

NODE	UX	UY	L	ROT1	ROT2
10001	-1.021127E	-1.021127E	0.0	0.0	0.0
10002	-1.021127E	-1.021127E	0.0	0.0	0.0
10003	-1.021127E	-1.021127E	0.0	0.0	0.0
10004	-1.021127E	-1.021127E	0.0	0.0	0.0
10005	-1.021127E	-1.021127E	0.0	0.0	0.0
10006	-1.021127E	-1.021127E	0.0	0.0	0.0
10007	-1.021127E	-1.021127E	0.0	0.0	0.0
10008	-1.021127E	-1.021127E	0.0	0.0	0.0
10009	-1.021127E	-1.021127E	0.0	0.0	0.0
10010	-1.021127E	-1.021127E	0.0	0.0	0.0
10011	-1.021127E	-1.021127E	0.0	0.0	0.0
10012	-1.021127E	-1.021127E	0.0	0.0	0.0

PARAMETERS
 NODE 10001 10001 10001 10001 10001 10001
 VALUE -1.021127E -1.021127E -1.021127E -1.021127E -1.021127E -1.021127E

BASE FOR ELEMENT STEP FROM 4 TO 4 BY 1

* ELEMENTS (OF 1110 DEFINED) SELECTED BY CASE COMPAND.

PRINT ELEMENT STRESS STEPS PER ELEMENT

ANALYSIS - ENGINEERING ANALYSIS SYSTEM, REVISION 6.7 - (MCP)
(C) ADAMSON ANALYTICAL SYSTEMS INC. HUNTSVILLE, ALABAMA 35894
FOR SUPPORT CALL VANCE ADAMSON PHON# (205) 726-9150 FAX

JUN 1, 1985

13.2439 MAP 3.1937 CPU 126.964

***** ELEMENT STRESS LISTING *****

LCAS STOP 4 ITERATIONS 1 SECTION :
TIME C. LOAD CASE 1

ELCP FAX
1109 -3824.3111
1103 -1885.9622
1110 -2752.735
1111 -27890.402

1119 ELEMENTS (CF 1119 DEFINED) SELECTED BY BALL COMPAND.

***** ROUTINE COMPLETED ***** CPU = 126.964

NOCP ENCOUNTERED ON FILETS

***** RUN COMPLETED ***** CPU 126.964 TIME 13.2439

D2/340

MCR MEMO: MARCH 3, 1987

March 3, 1987

Larry Libhardt
FMC CORPORATION
3989 Central Ave NE
Minneapolis, Minn 55421

Dear Larry,

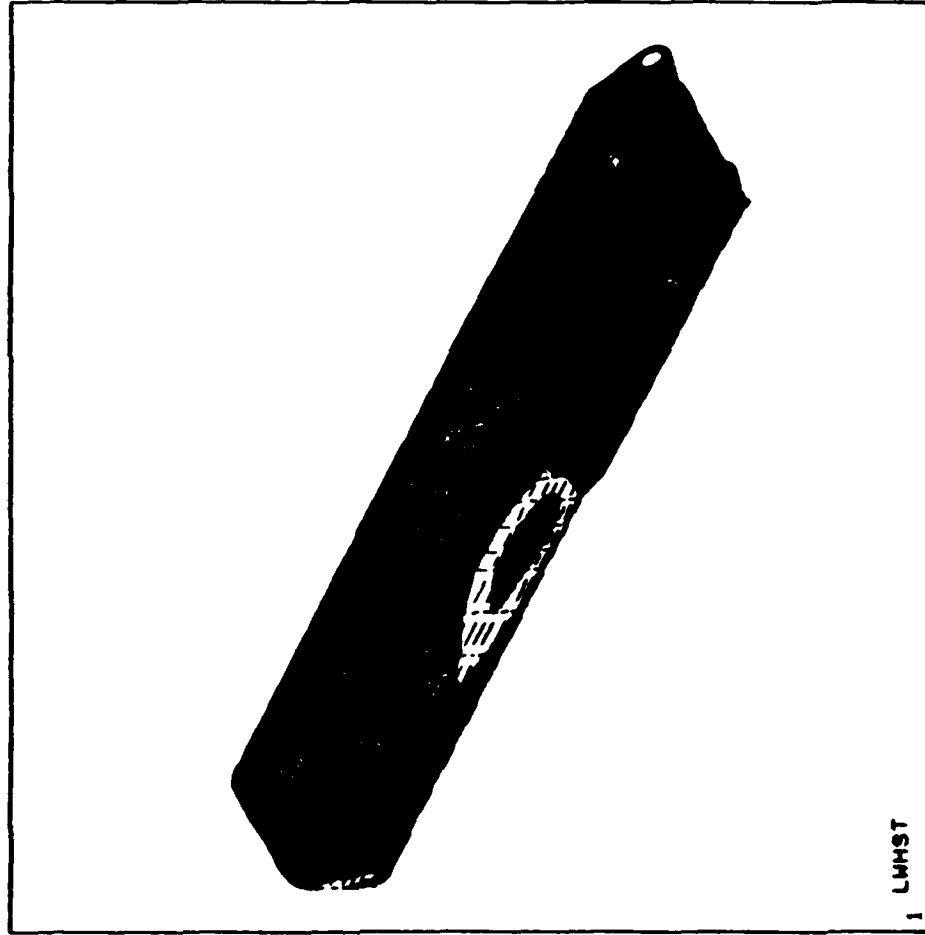
I found one slight error in the coupling equations that were used in the previous run. One of the nodes around the periphery should have been listed as 1322 and was actually coded as 1332. This would explain the high stresses noted around the periphery of the front of the shell. Enclosed are the stress contour plots with distorted geometry contour plots for this last case. The actual printout will follow later. I would expect the results 6 to 8 inches behind the shell would be fairly close to reality. The printout for this case will follow in a few days.

Best regards,

Mark C. Rodamaker

Mark C. Rodamaker

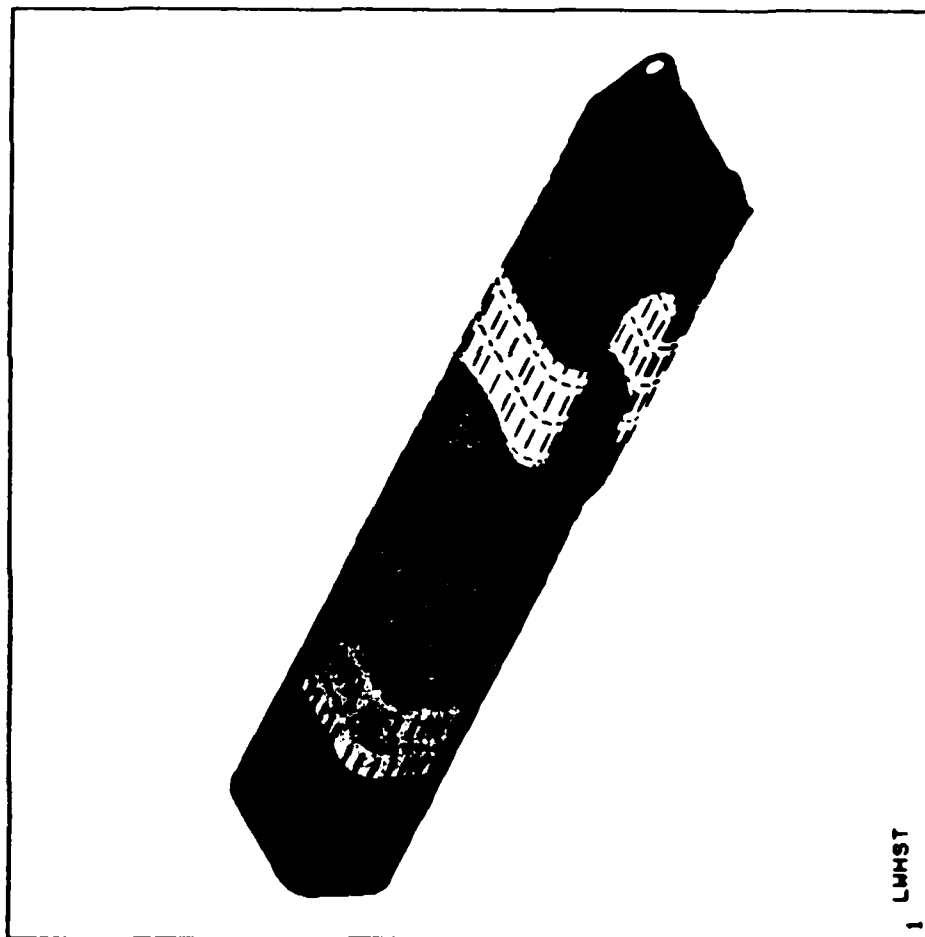
ANSYS 4.2B
 MAR 3 1987
 11:34:35
 PLOT NO. 1
 POST1 STRESS
 STEP=1
 ITER=1
 UX
 DISPL NODAL
 XV=1
 YV=1
 ZV=-1
 DIST=107
 XF=-2.54
 YF=1.22
 ZF=-116
 HIDDEN
 MX=.0968
 MN=-.102
 -.0829
 -.0599
 -.0369
 -.0139
 .0091
 .0781



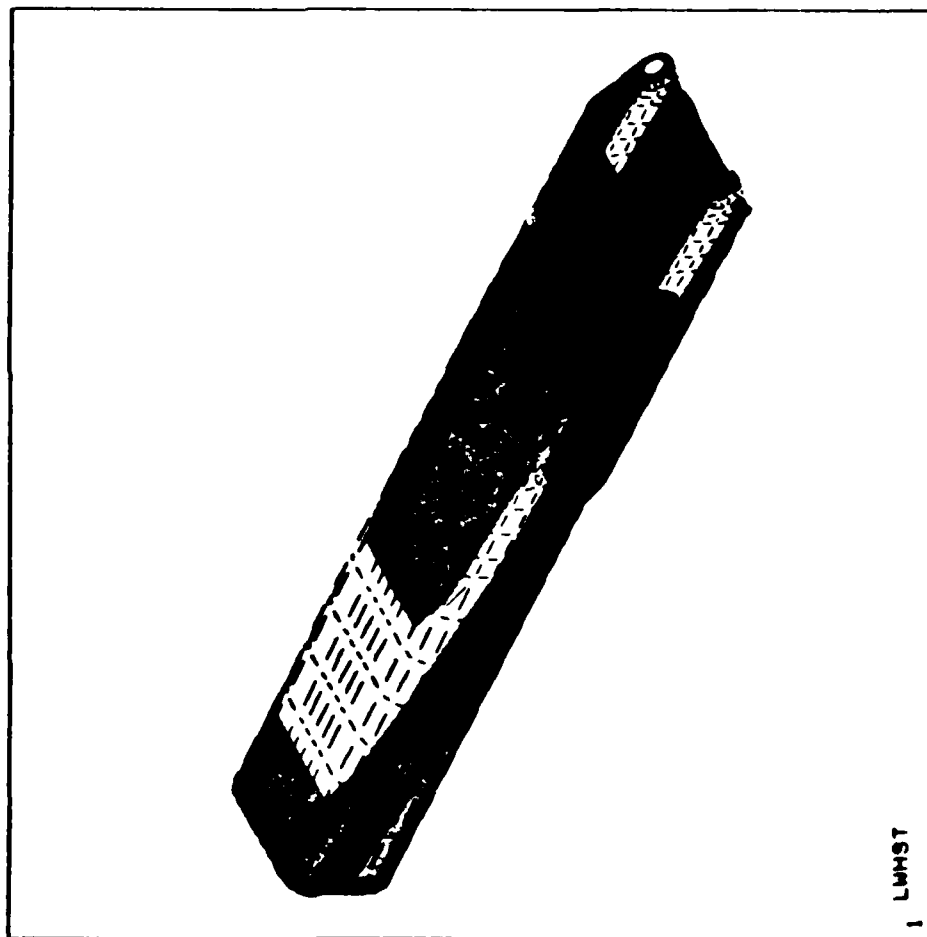
ANSYS 4.2B
 MAR 3 1987
 11:35:57
 PLOT NO. 2
 POST1 STRESS
 STEP=1
 ITER=1
 UY
 DISPL NODAL

XV=1
 YV=1
 ZV=-1
 DIST=107
 XF=-2.54
 YF=1.22
 ZF=-116
 HIDDEN
 MX=.0312
 MN=-1.9
 -1.7
 -1.48
 -1.26
 -1.04
 -.022

-.162

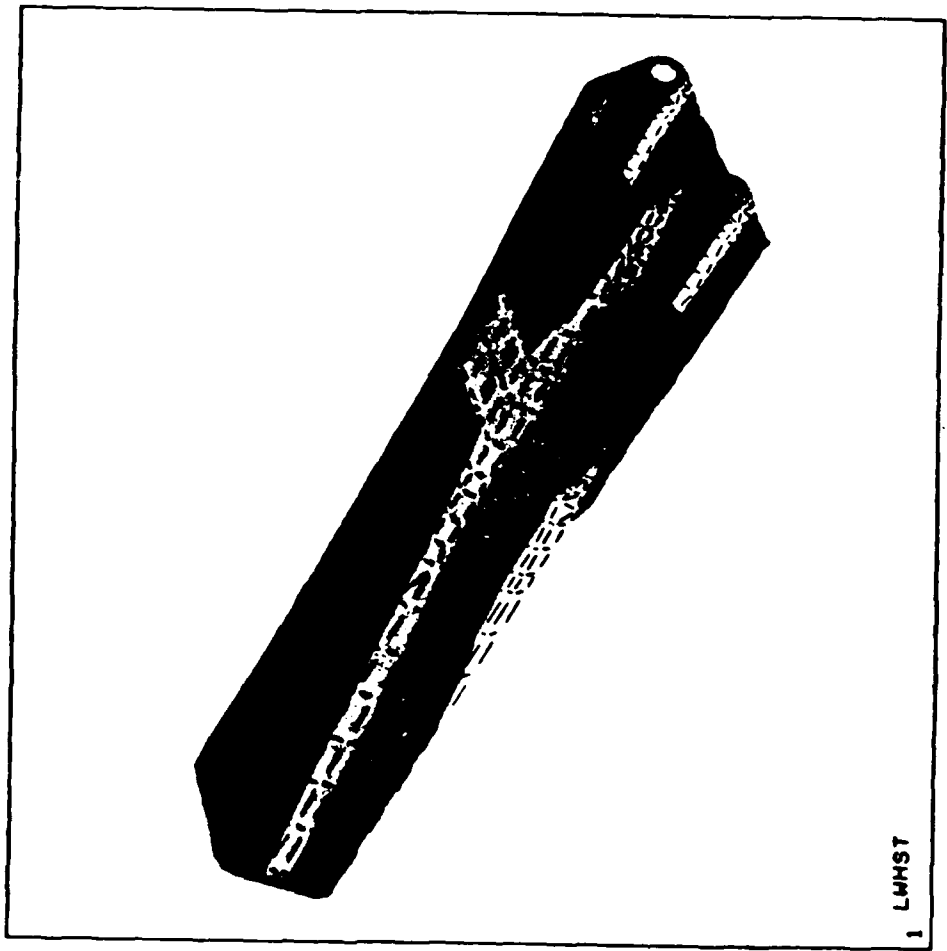


ANSYS 4.2B
 MAR 3 1987
 11:36:52
 PLOT NO. 3
 POST1 STRESS
 STEP=1
 ITER=1
 UZ
 DISPL NODAL
 XV=1
 YV=1
 ZV=-1
 DIST=107
 XF=-2.54
 YF=1.22
 ZF=-116
 HIDDEN
 MX=.0875
 MY=-.376
 MZ=.354
 M1=.294
 M2=.234
 M3=.174
 M4=.114
 .0655

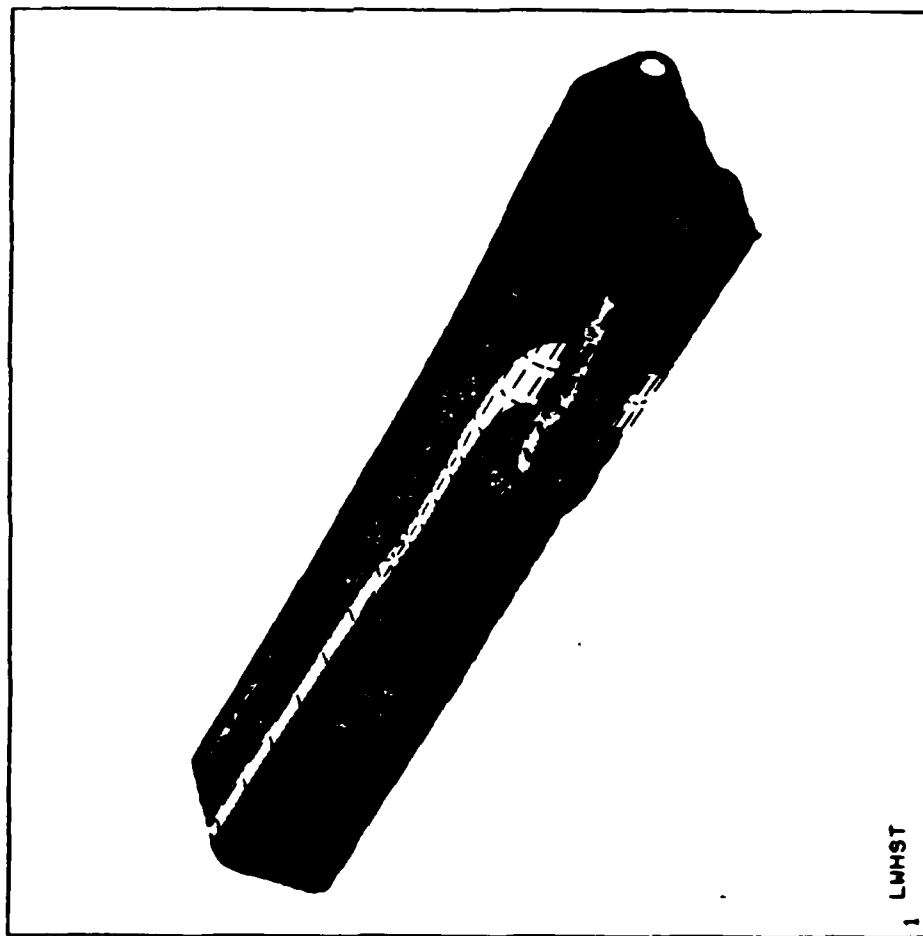


ANSYS 4.2B
MAR 3 1987
11:39:08
PLOT NO. 4
POST1 STRESS
STEP=2
ITER=1
UX
DISPL NODAL

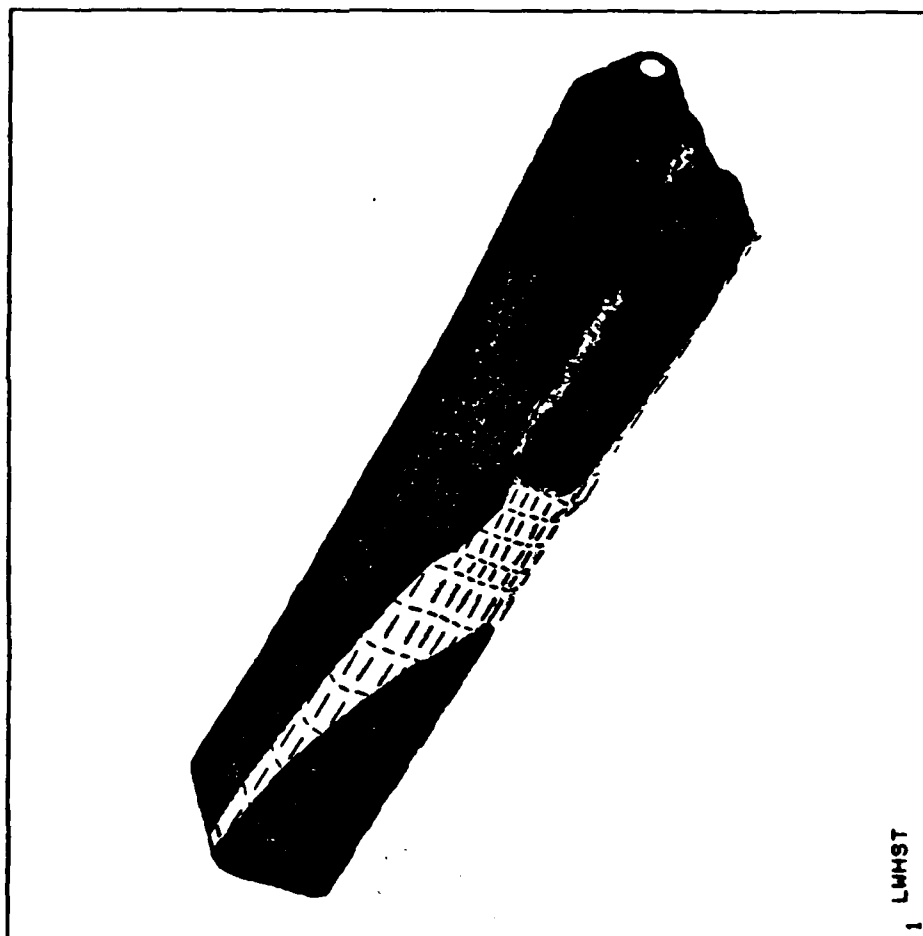
XV=1
YV=1
ZV=-1
DIST=107
XF=-2.54
YF=1.22
ZF=-116
HIDDEN
MX=.693
MY=-.913
-.81
-.61
-.41
-.21
-.0101
1 LHMST
.59



ANSYS 4.2B
 MAR 3 1987
 11:40:14
 PLOT NO. 5
 POST1 STRESS
 STEP=2
 ITER=1
 UY
 DISPL NODAL
 XV=1
 YV=1
 ZV=-1
 DIST=107
 XF=-2.54
 YF=1.22
 ZF=-116
 HIDDEN
 MX=.51
 MN=-.509
 -.419
 -.299
 -.179
 -.0593
 .0607
 1
 .421

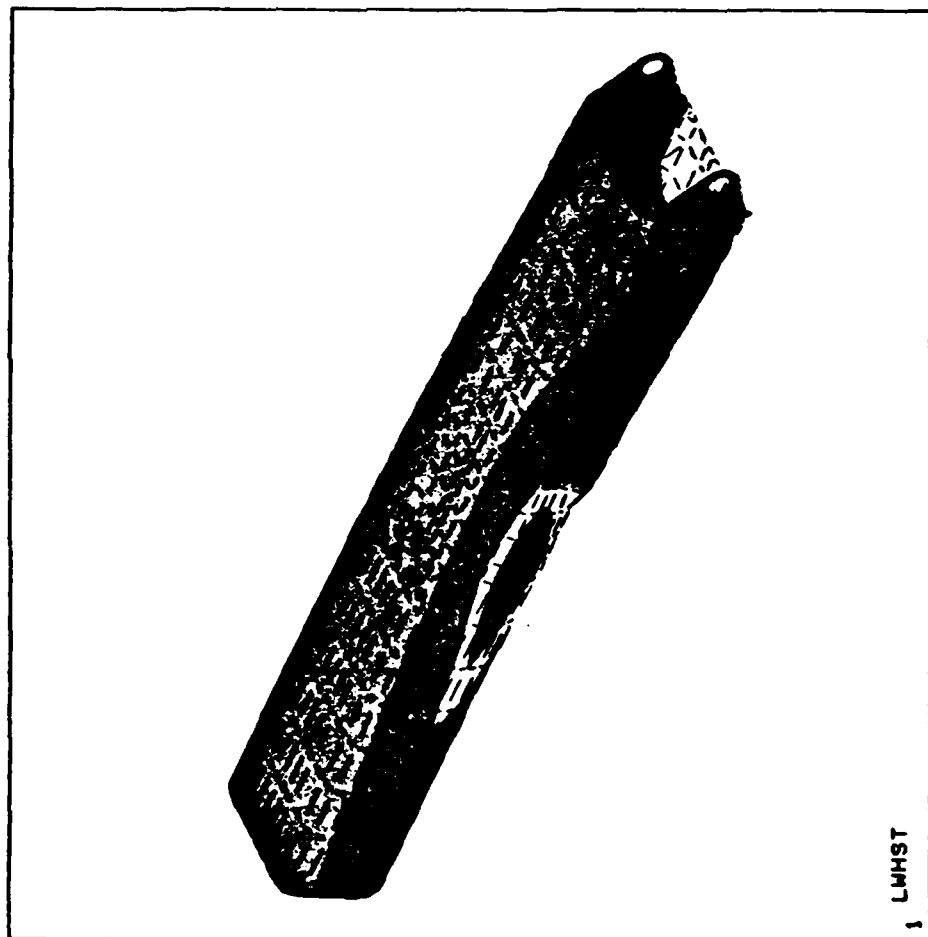


ANSYS 4.2B
 MAR 3 1987
 11:41:08
 PLOT NO. 6
 POST1 STRESS
 STEP=2
 ITER=1
 UZ
 DISPL NODAL
 XV=1
 YV=1
 ZV=-1
 DIST=107
 XF=-2.54
 YF=1.22
 ZF=-116
 HIDDEN
 MX=.0838
 MN=-.0838
 -.0701
 -.0501
 -.0301
 -.0101
 .00995
 .00995
 .0699



ANSYS 4.2B
MAR 3 1987
11:42:28
PLOT NO. 7
POST1 STRESS
STEP=3
ITER=1
UX
DISPL NODAL

XV=1
YV=1
ZV=-1
DIST=107
XF=-2.54
YF=1.22
ZF=-116
HIDDEN
MX=.188
MN=-.176
-.169
-.119
-.0689
-.0189
.0311
-.181



ANSYS 4.2B

MAR 3 1987

11:43:10

PLOT NO. 8

POST1 STRESS

STEP=3

ITER=1

UY

DISPL NODAL

XV=1

YV=1

ZV=-1

DIST=107

XF=-2.54

YF=1.22

ZF=-116

HIDDEN

MX=.288

MN=-.879

-.751

-.621

-.491

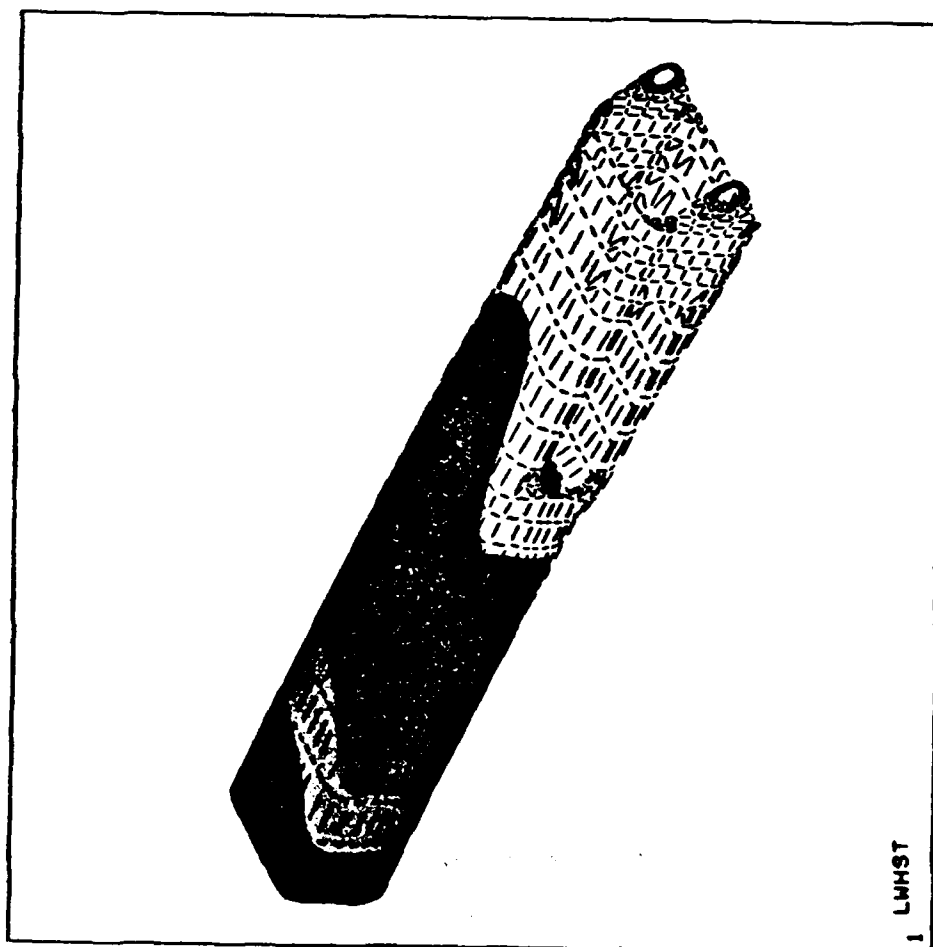
-.361

-.231

-.101

-.001

.159



1, LHMST

ANSYS 4.28

MAR 3 1987

11:43:56

PLOT NO. 9

POST1 STRESS

STEP=3

ITER=1

UZ

DISPL NODAL

XV=1

YV=1

ZV=-1

DIST=107

XF=-2.54

YF=1.22

ZF=-116

HIDDEN

MX=.0885

MN=-.155

-.138

-.108

-.0782

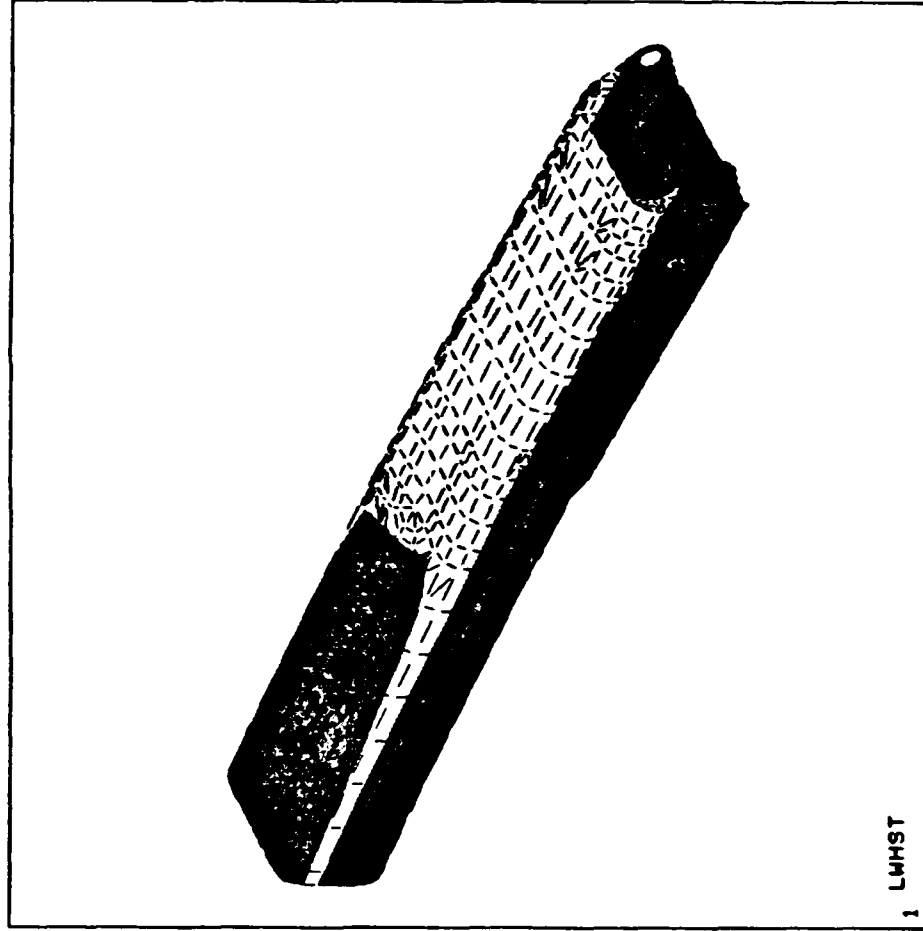
-.0482

-.0182

0.011

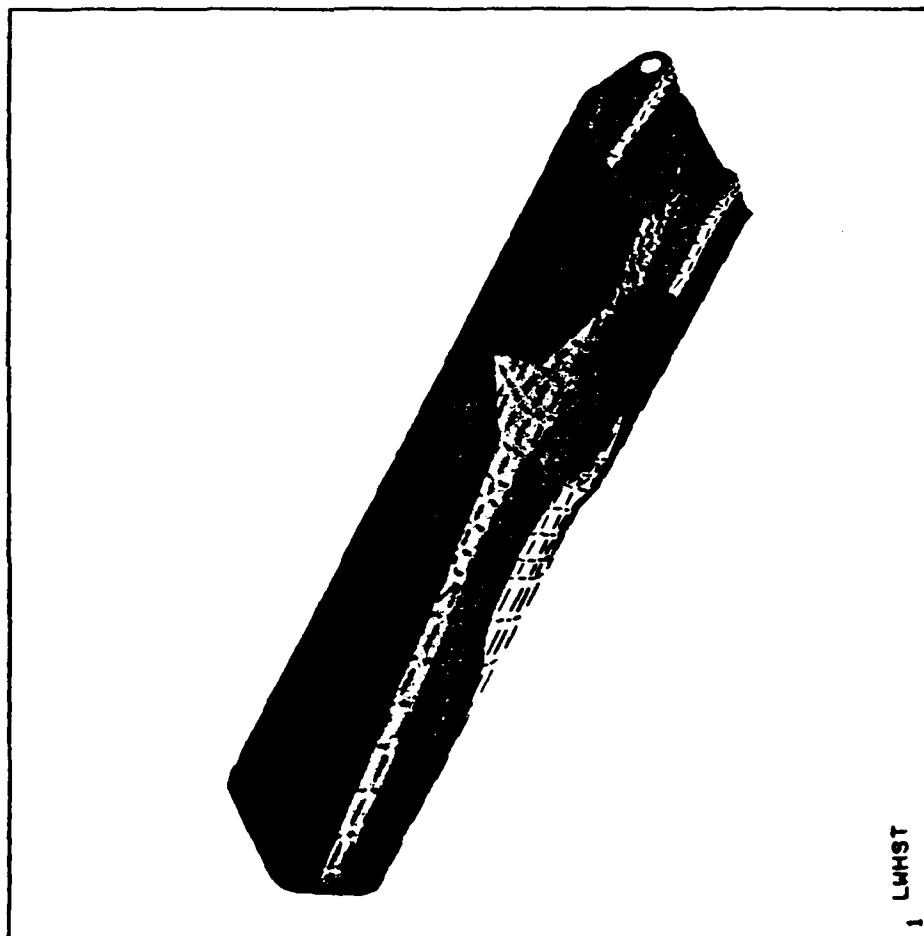
0.011

.0718



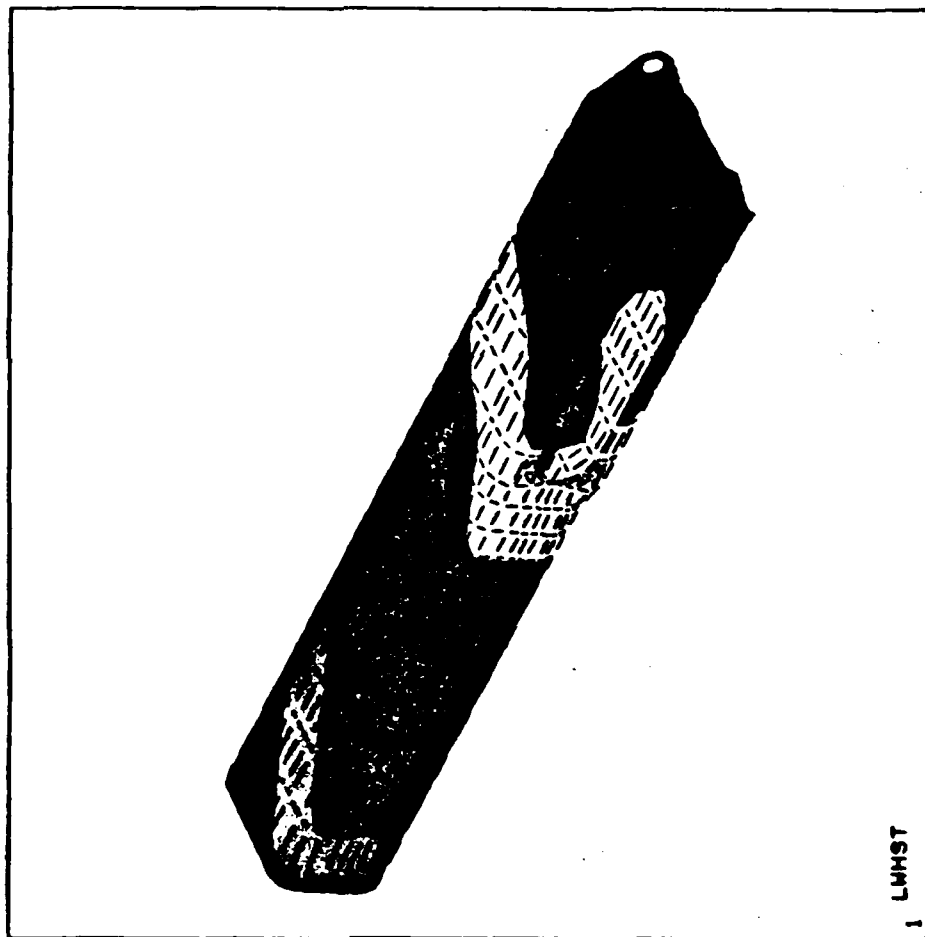
ANSYS 4.2B
MAR 3 1987
11:45:08
PLOT NO. 10
POST1 STRESS
STEP=4
ITER=1
UX
DISPL NODAL

XV=1
YV=1
ZV=-1
DIST=107
XF=-2.54
YF=1.22
ZF=-116
HIDDEN
MX=.711
MN=-.925
-.807
-.607
-.407
-.207
-.00696
1.17
1.17
.593

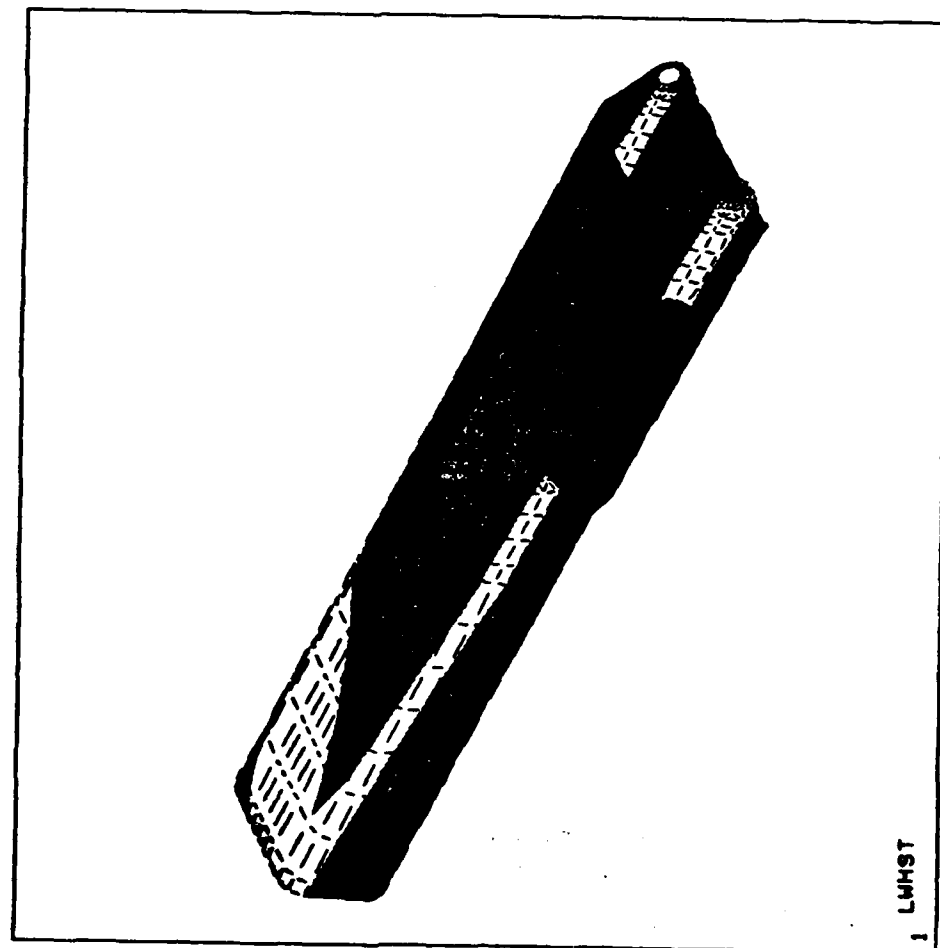


ANSYS 4.2B
MAR 3 1987
11:45:58
PLOT NO. 11
POST1 STRESS
STEP=4
ITER=1
UY
DISPL NODAL

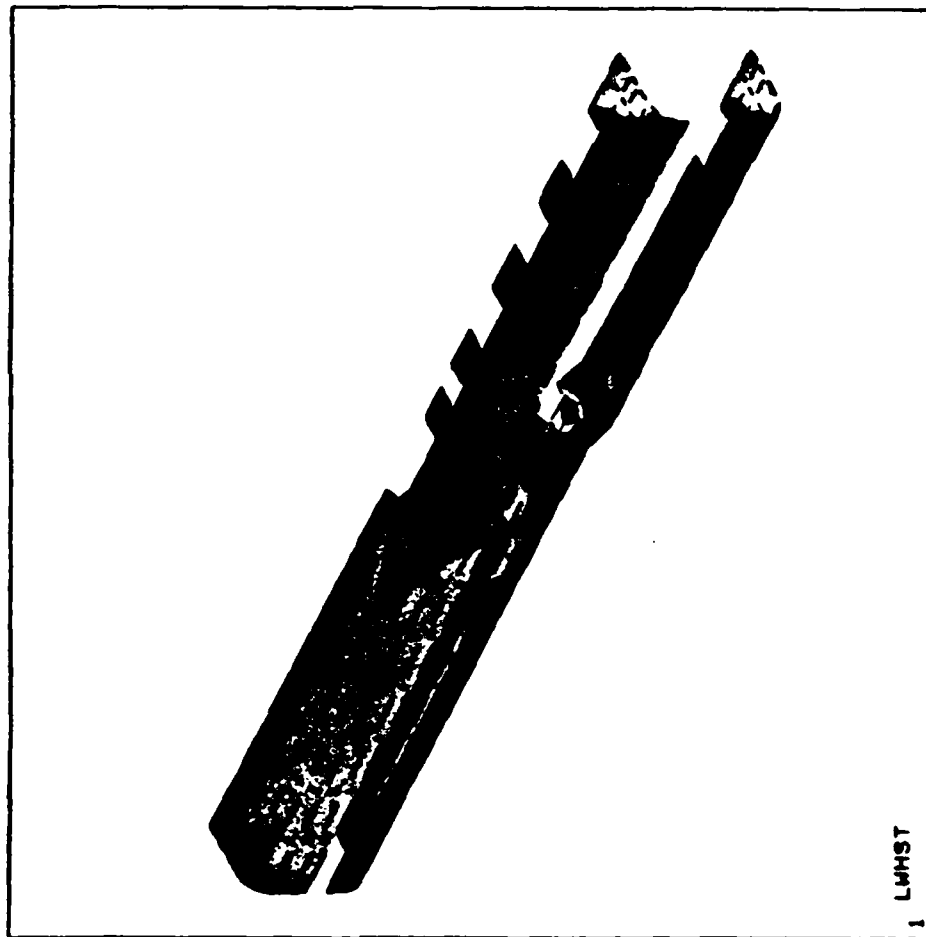
XV=1
YV=1
ZV=-1
DIST=107
XF=-2.54
YF=1.22
ZF=-116
HIDDEN
MX=.0735
MN=-4.13
-3.78
-3.28
-2.78
-2.28
-1.78
-1.28
-.28



ANSYS 4.2B
 MAR 3 1987
 11:46:43
 PLOT NO. 12
 POST1 STRESS
 STEP=4
 ITER=1
 UZ
 DISPL NODAL
 XV=1
 YV=1
 ZV=-1
 DIST=107
 XF=-2.54
 YF=1.22
 ZF=-116
 HIDDEN
 MX=.212
 MN=-.657
 -.572
 -.472
 -.372
 -.272
 -.172
 .128

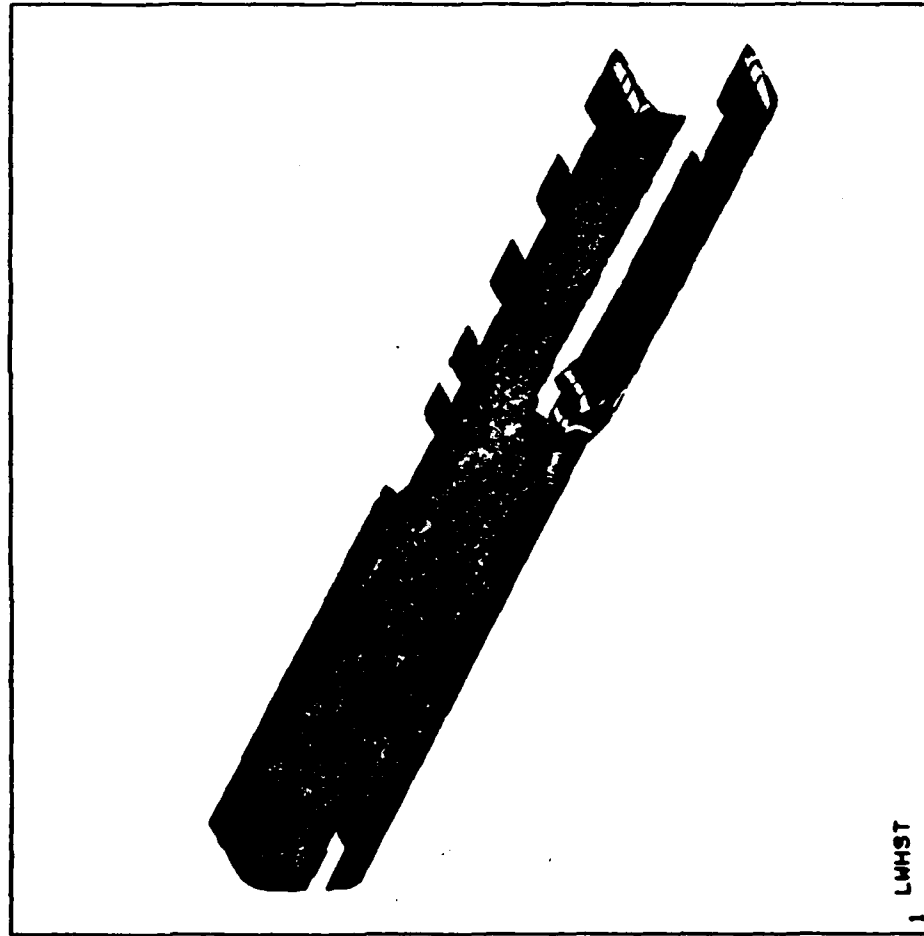


ANSYS 4.2B
MAR 3 1987
7:24:08
PLOT NO. 1
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=6210
MN=-13704
-11493
-9280
-7067
-4854
-2641
1700



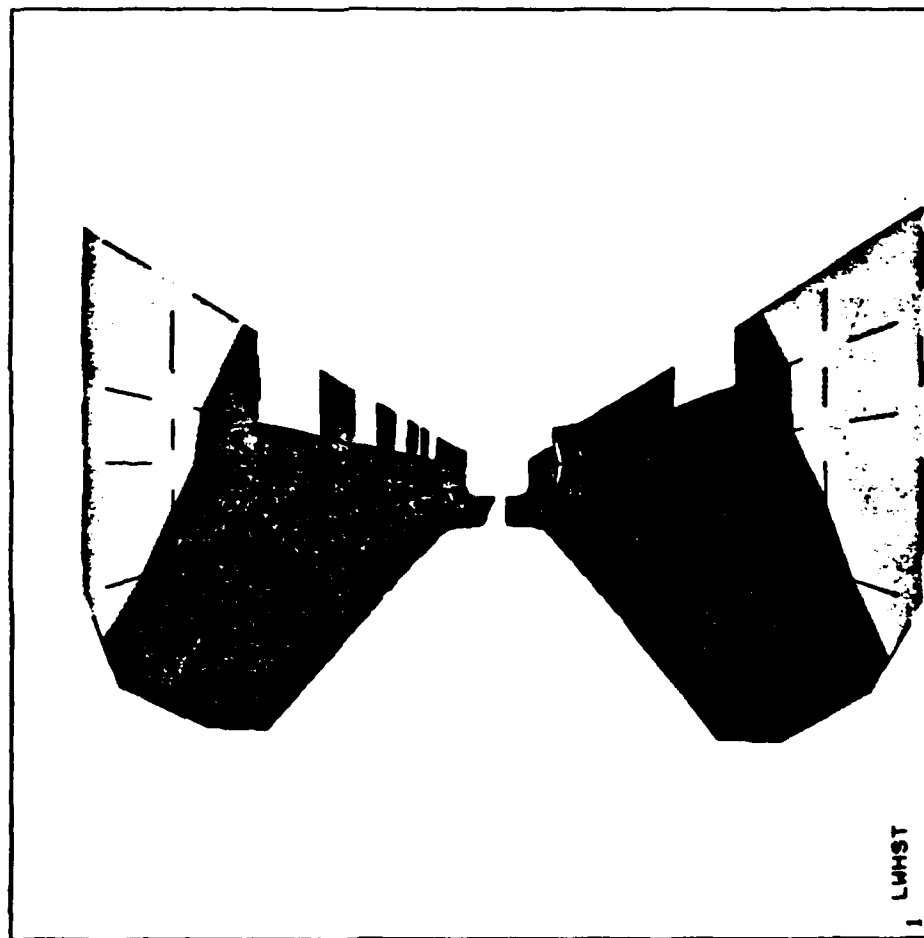
ANSYS 4.2B
 MAR 3 1987
 7:24:29
 PLOT NO. 2
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 TOP
 STRESS ELEM CS

XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=6110
 MN=-6476
 -5080
 -3681
 -2282
 -883
 516
 1315
 1314



1 LWHST

ANSYS 4.2B
 MAR 3 1987
 7:26:42
 PLOT NO. 3
 POST1 STRESS
 STEP=1
 ITER=1
 SX
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=6210
 MN=-13784
 -11493
 -9280
 -7067
 -4854
 -2641
 3998
 6211



ANSYS 4.2B

MAR 3 1987

7:27:00

PLOT NO. 4

POST1 STRESS

STEP=1

ITER=1

SY

TOP

STRESS ELEM C3

ZV=-1

DIST=128

XF=9.5

ZF=-112

CONE=40

HIDDEN

MX=6110

MN=-6476

-5080

-3681

-2282

-883

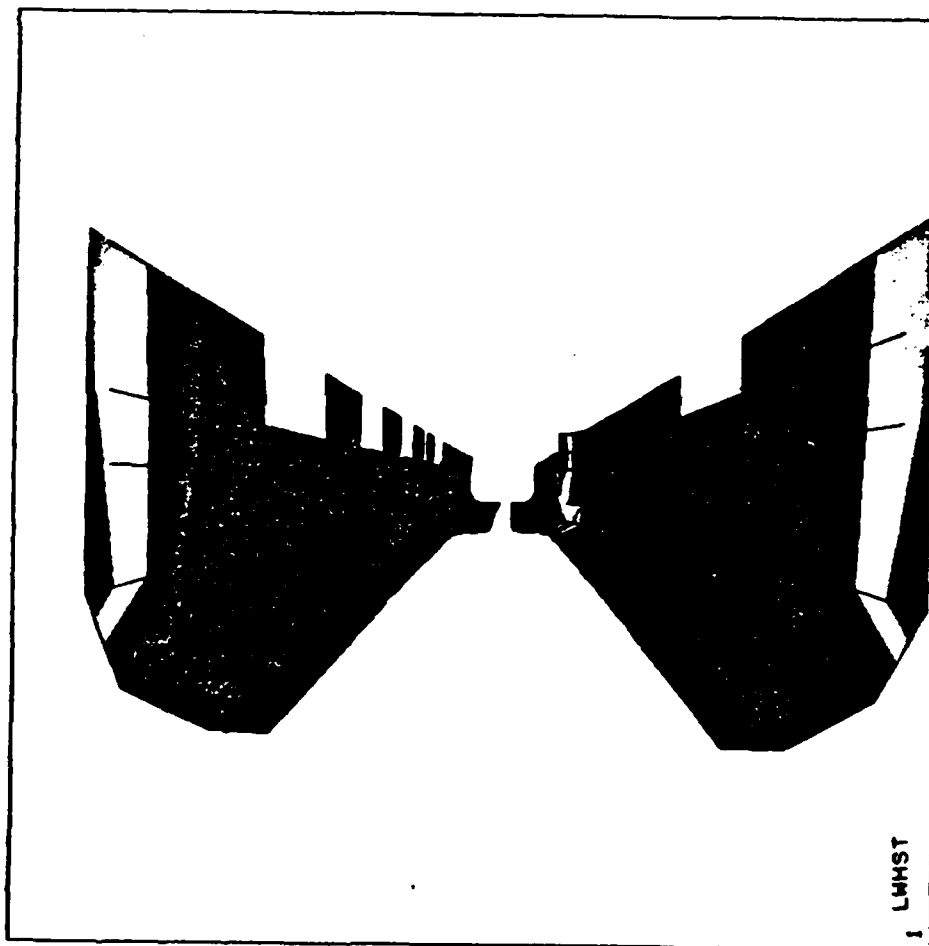
516

1117

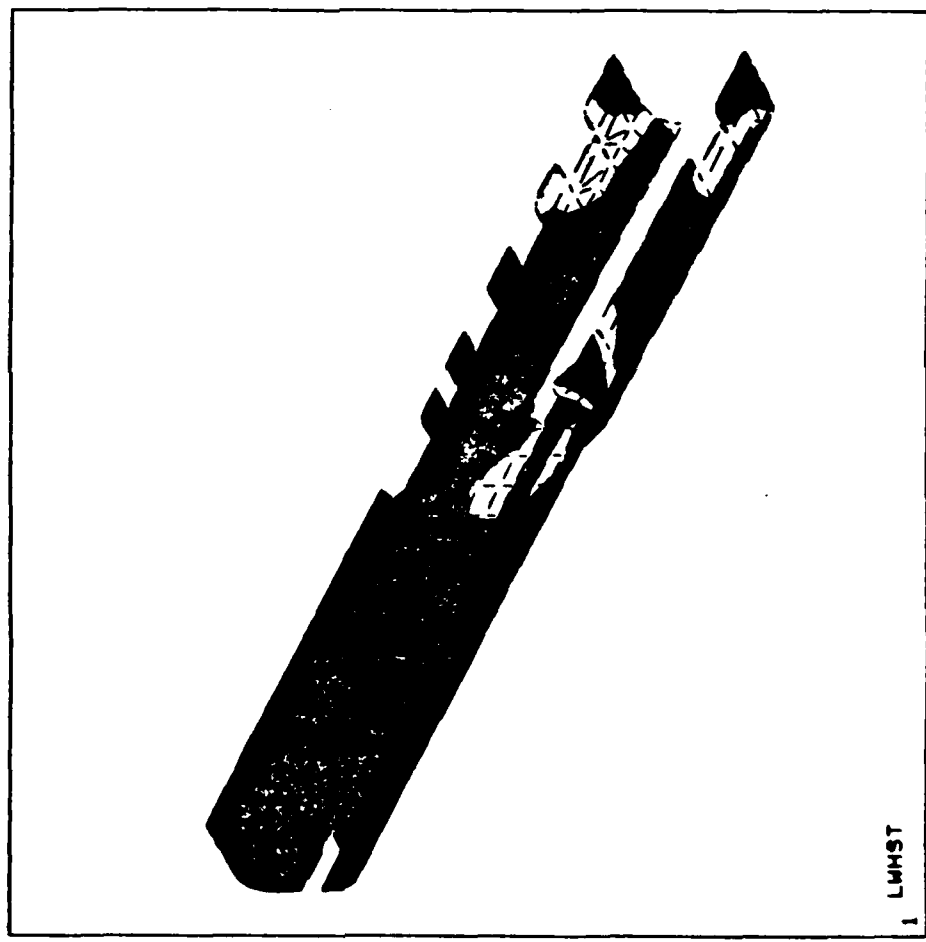
2714

4713

6112

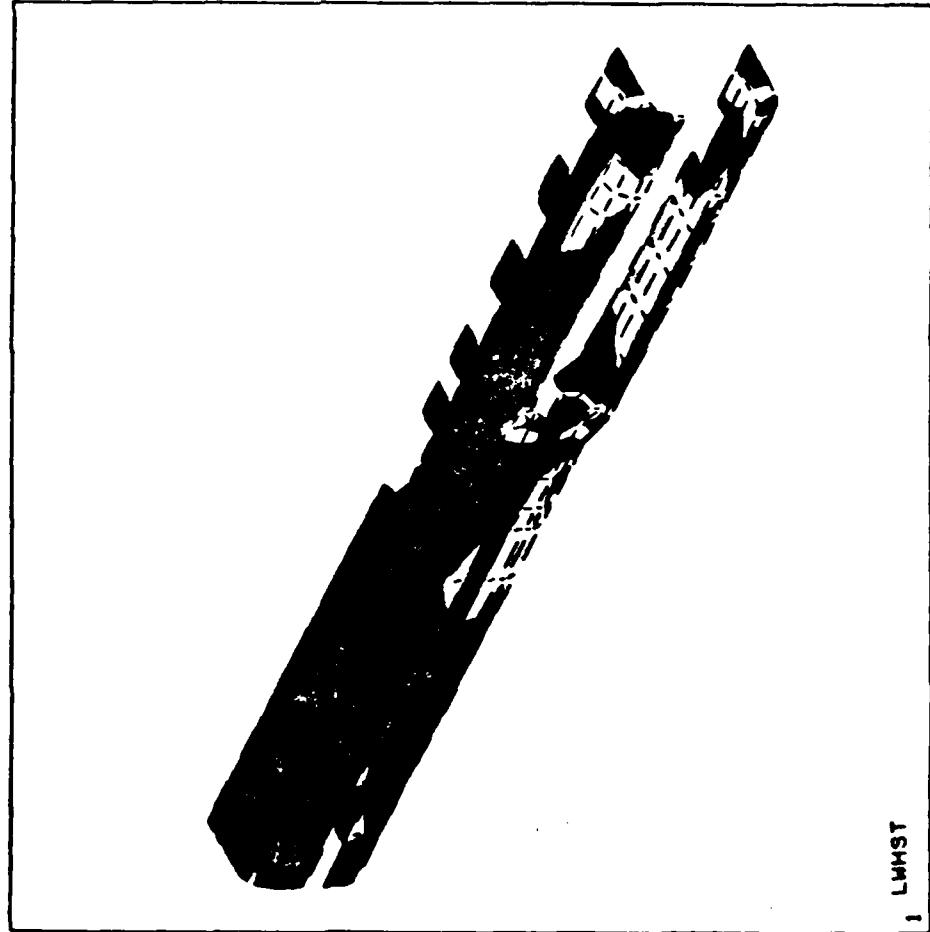


ANSYS 4.2B
MAR 3 1987
7:27:26
PLOT NO. 5
POST1 STRESS
STEP=1
ITER=1
SX
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=4931
MN=-18939
-16290
-13637
-10984
-8331
-5678

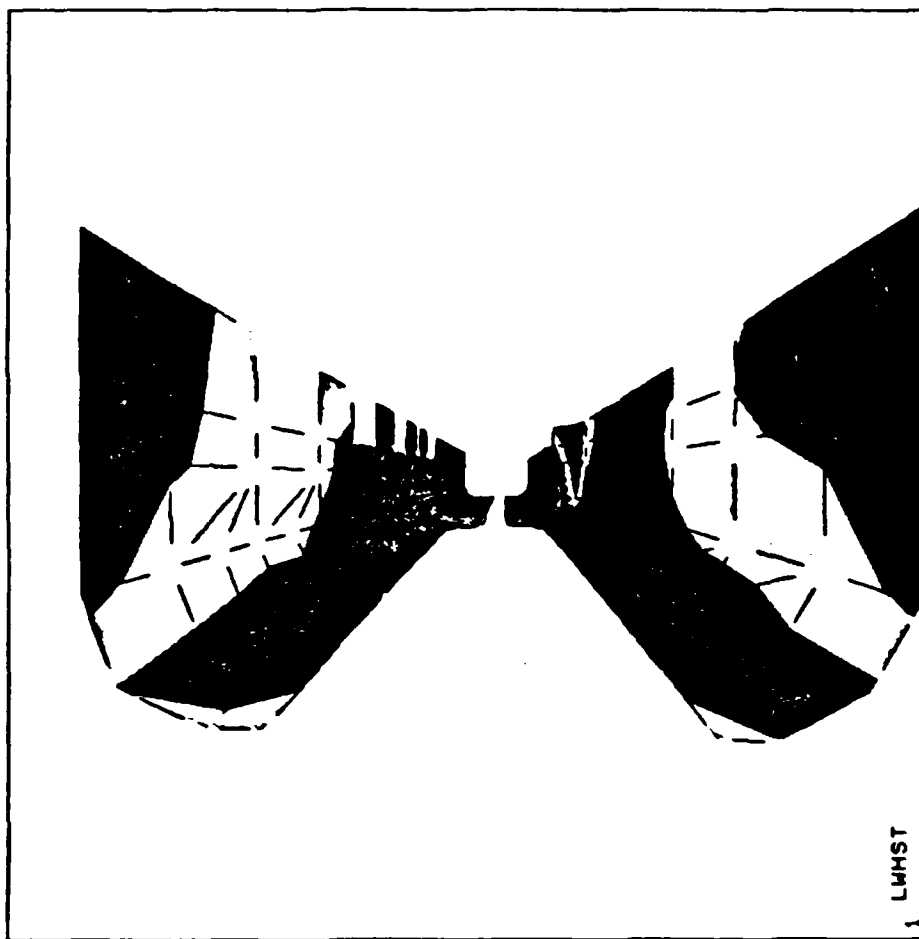


1 LHMST

ANSYS 4.2B
 MAR 3 1987
 7:27:42
 PLOT NO. 6
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=3772
 MN=-6844
 -5666
 -4486
 -3306
 -2126
 -946
 1.00
 1.00



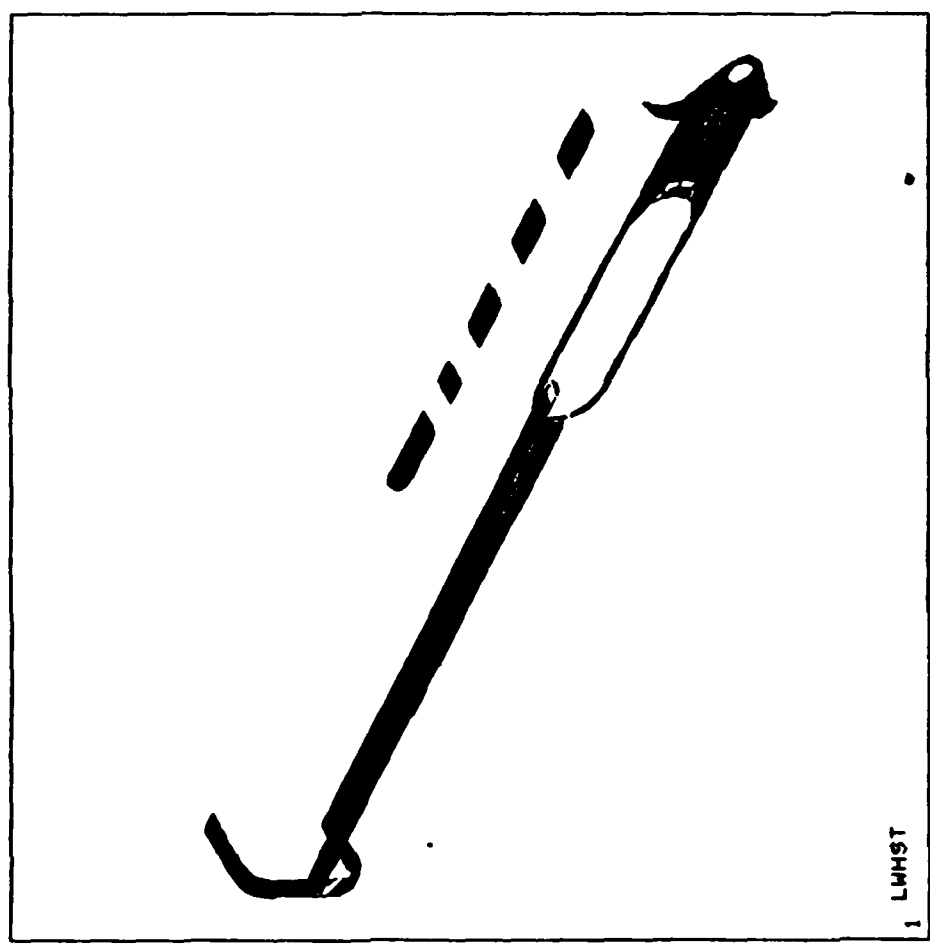
ANSYS 4.2B
 MAR 3 1987
 7:27:58
 PLOT NO. 7
 POST1 STRESS
 STEP=1
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=120
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=4931
 MN=-18938
 -16290
 -13637
 -10984
 -8331
 -5678
 2281
 4934



ANSYS 4.2B
MAR 3 1987
7:28:13
PLOT NO. 8
POST1 STRESS
STEP=1
ITER=1
SY
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=3772
MN=-6844
-5666
-4486
-3306
-2126
-946
1 1
2594
3774

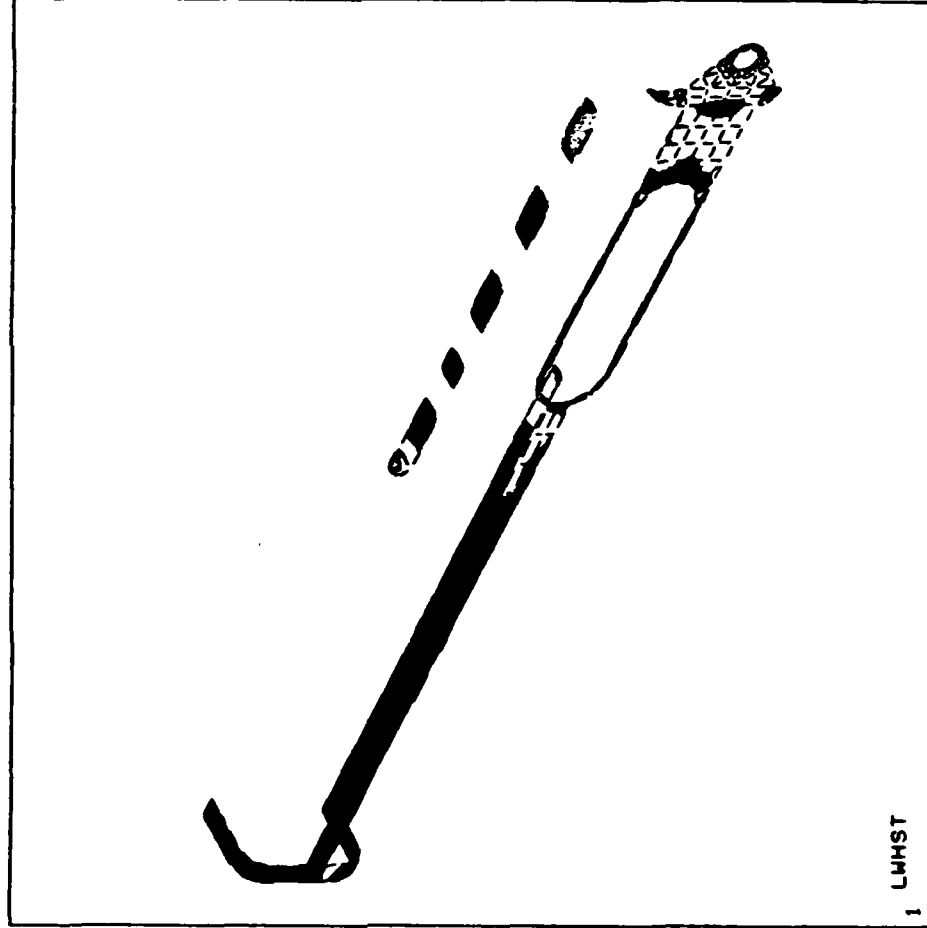


ANSYS 4.2B
MAR 3 1987
7:28:45
PLOT NO. 9
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=7377
MN=-6446
-4911
-3375
-1839
-303
1233

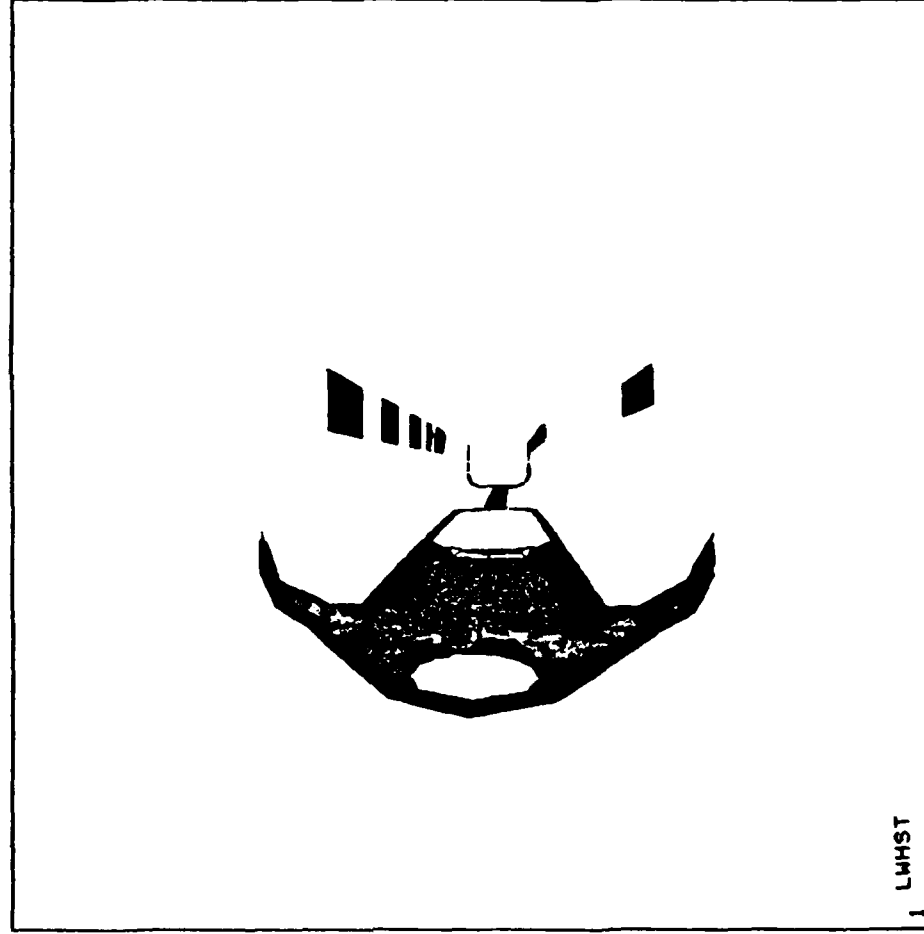


ANSYS 4.2B
MAR 3 1987
7:28:53
PLOT NO. 10
POST1 STRESS
STEP=1
ITER=1
SY
TOP
STRESS ELEM CS

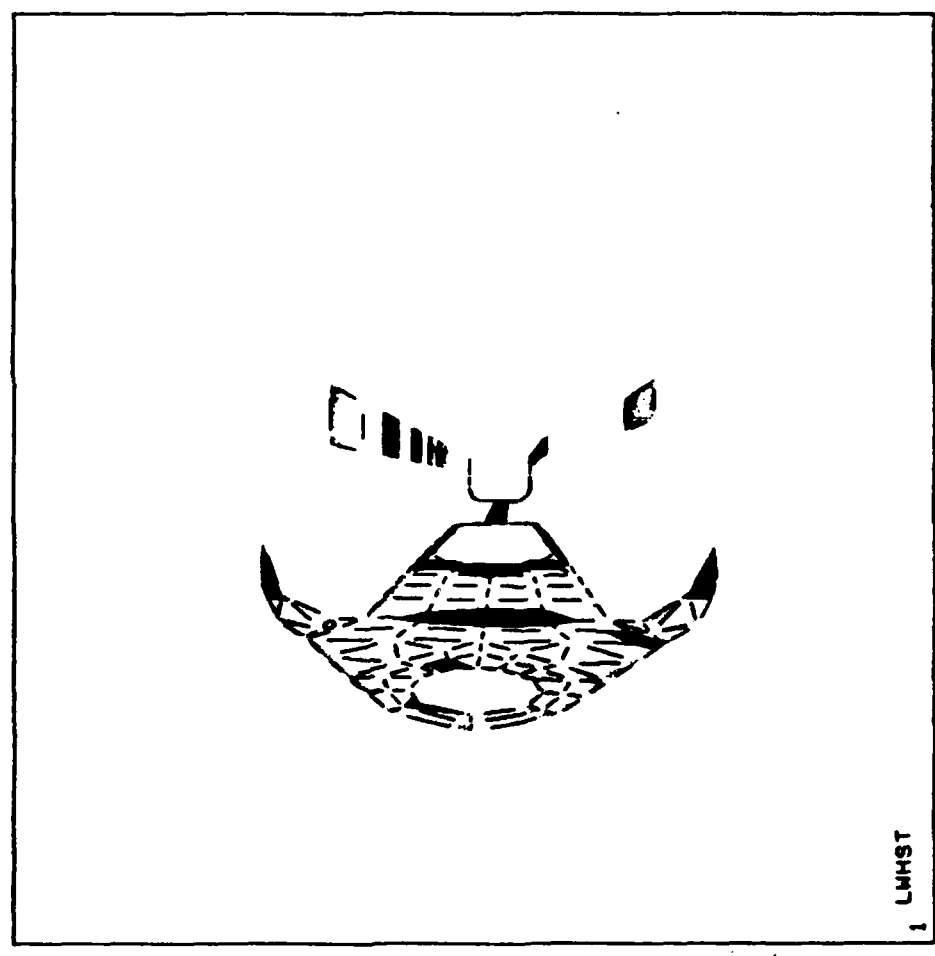
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=7863
MN=-25964
-22206
-18447
-14688
-10929
-7170



ANSYS 4.2B
MAR 3 1987
7:29:03
PLOT NO. 11
POST1 STRESS
STEP=1
ITER=1
SX
TOP
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=7377
MN=-6446
-4911
-3375
-1839
-303
1233
5841
7377

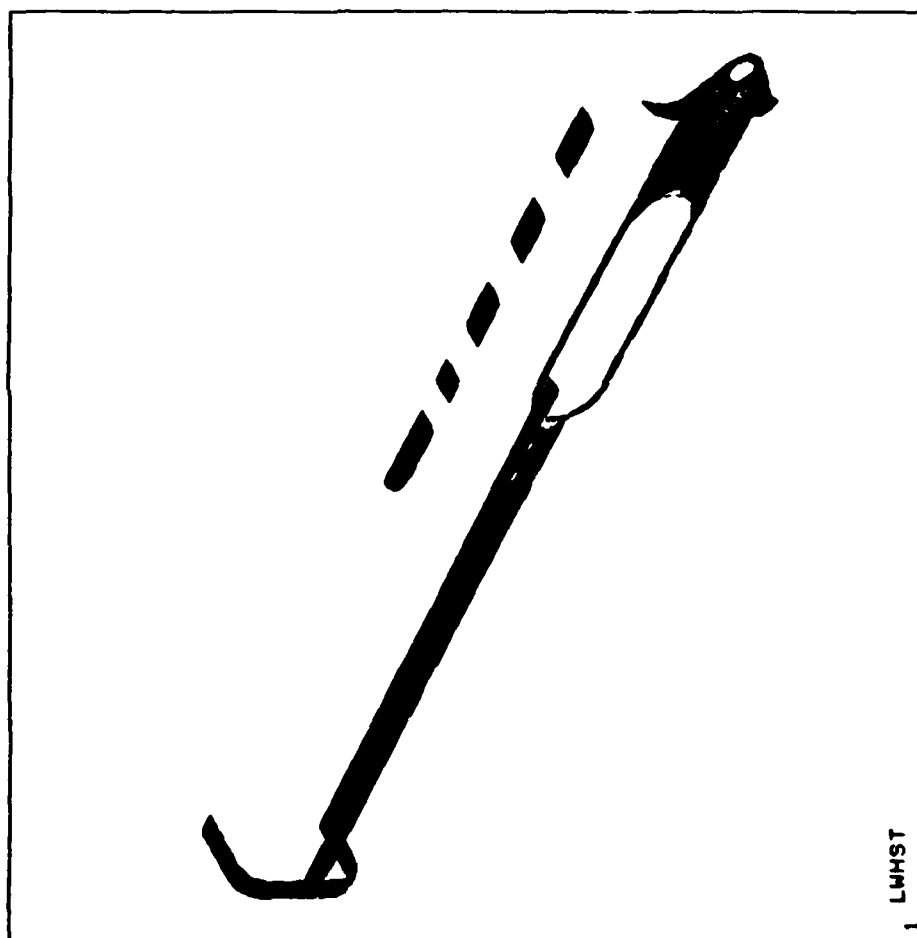


ANSYS 4.2B
 MAR 3 1987
 7:29:11
 PLOT NO. 12
 POST1 STRESS
 STEP=1
 ITER=1
 SY
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=7865
 MN=-25964
 -22206
 -18447
 -14688
 -10929
 -7170
 4107
 7866



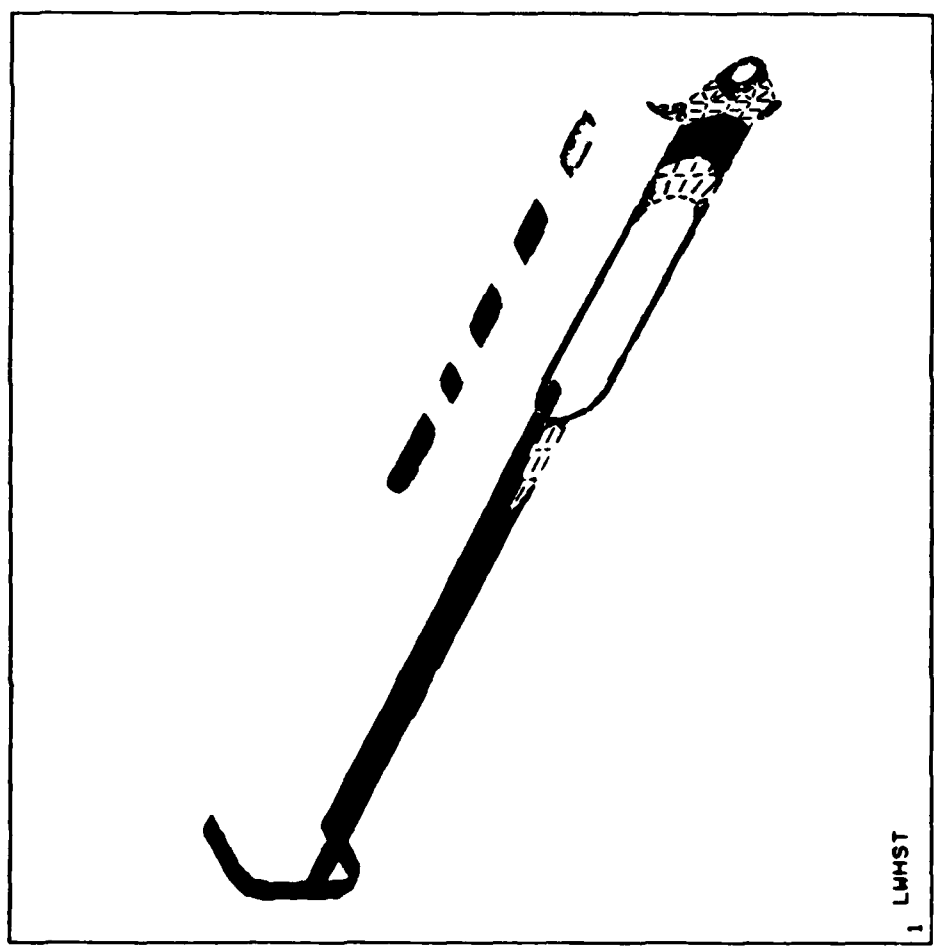
ANSYS 4.2B
 MAR 3 1987
 7:29:28
 PLOT NO. 13
 POST1 STRESS
 STEP=1
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS

XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=9526
 MN=-6205
 -4457
 -2709
 -961
 787
 2535



1 LHMST

ANSYS 4.2B
MAR 3 1987
7:29:36
PLOT NO. 14
POST1 STRESS
STEP=1
ITER=1
SY
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=6780
MN=-19777
-16827
-13876
-10925
-7974
-5023



ANSYS 4.2B

MAR 3 1987

7:29:45

PLOT NO. 15

POST1 STRESS

STEP=1

ITER=1

SX

BOTTOM

STRESS ELEM CS

ZV=-1

DIST=139

XF=9.5

ZF=-119

CONE=48

HIDDEN

MX=9526

MN=-6285

-4457

-2709

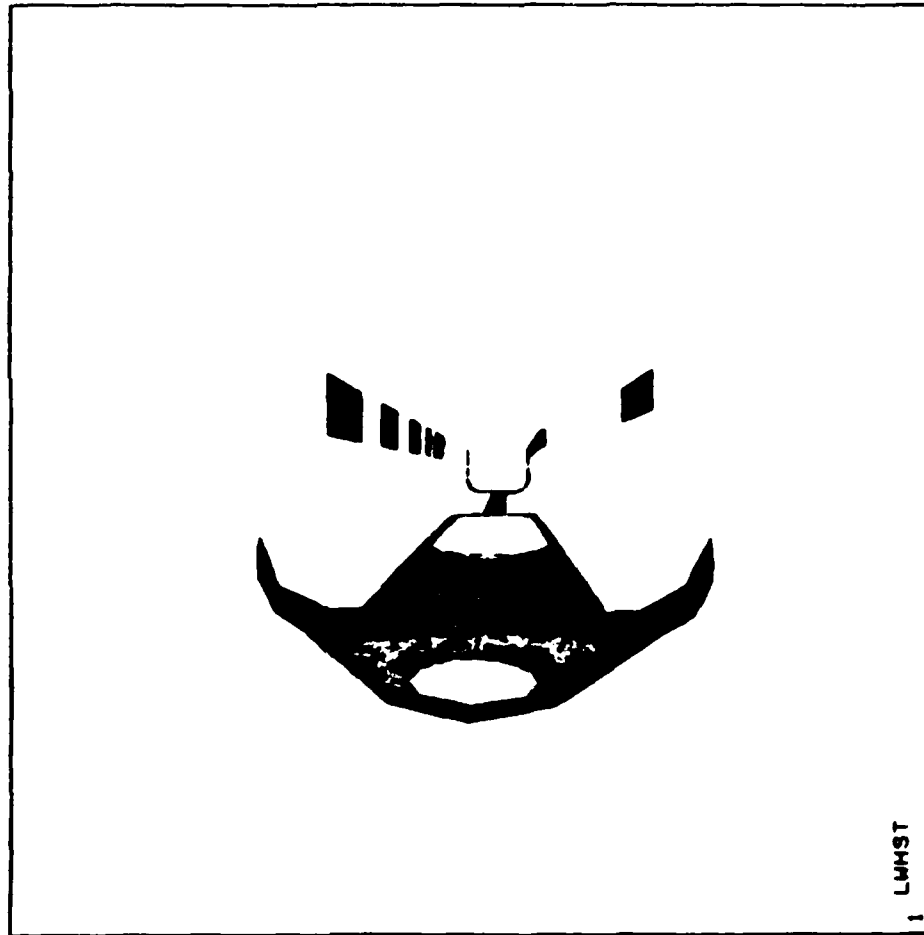
-961

787

2535

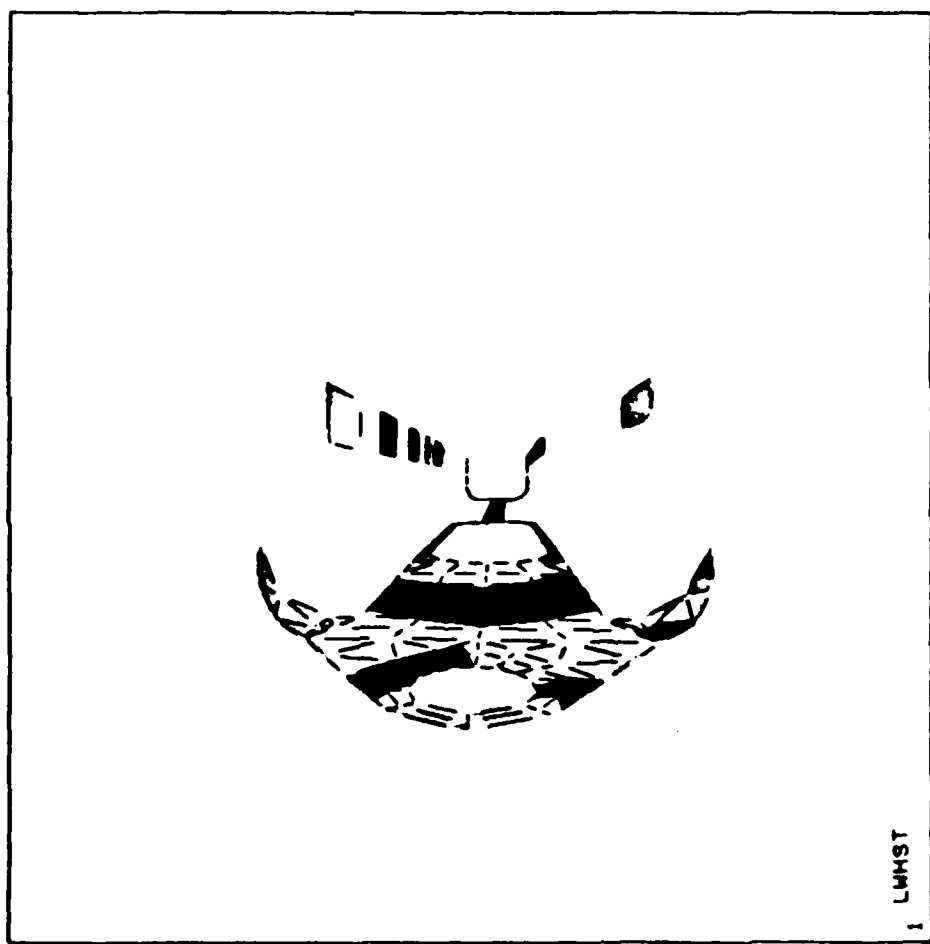
7779

9527

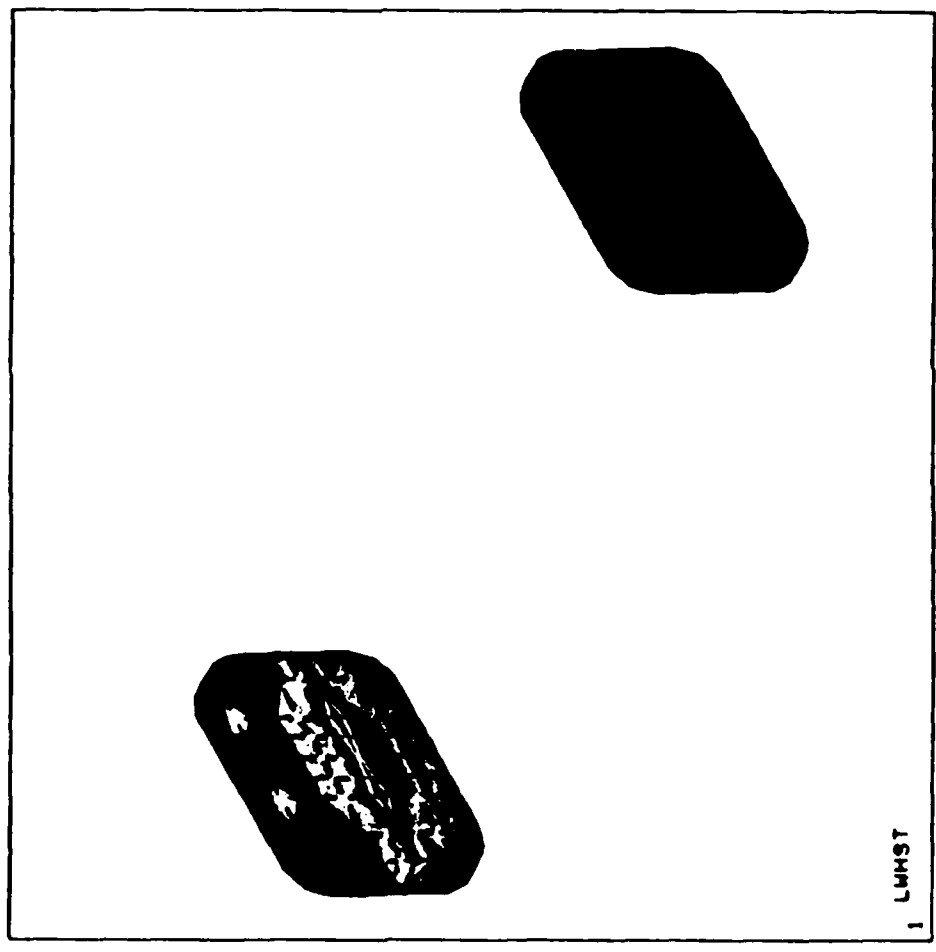


ANSYS 4.2B
MAR 3 1987
7:29:53
PLOT NO. 16
POST1 STRESS
STEP=1
ITER=1
SY
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=6780
MN=-19777
-16827
-13876
-10925
-7974
-5023

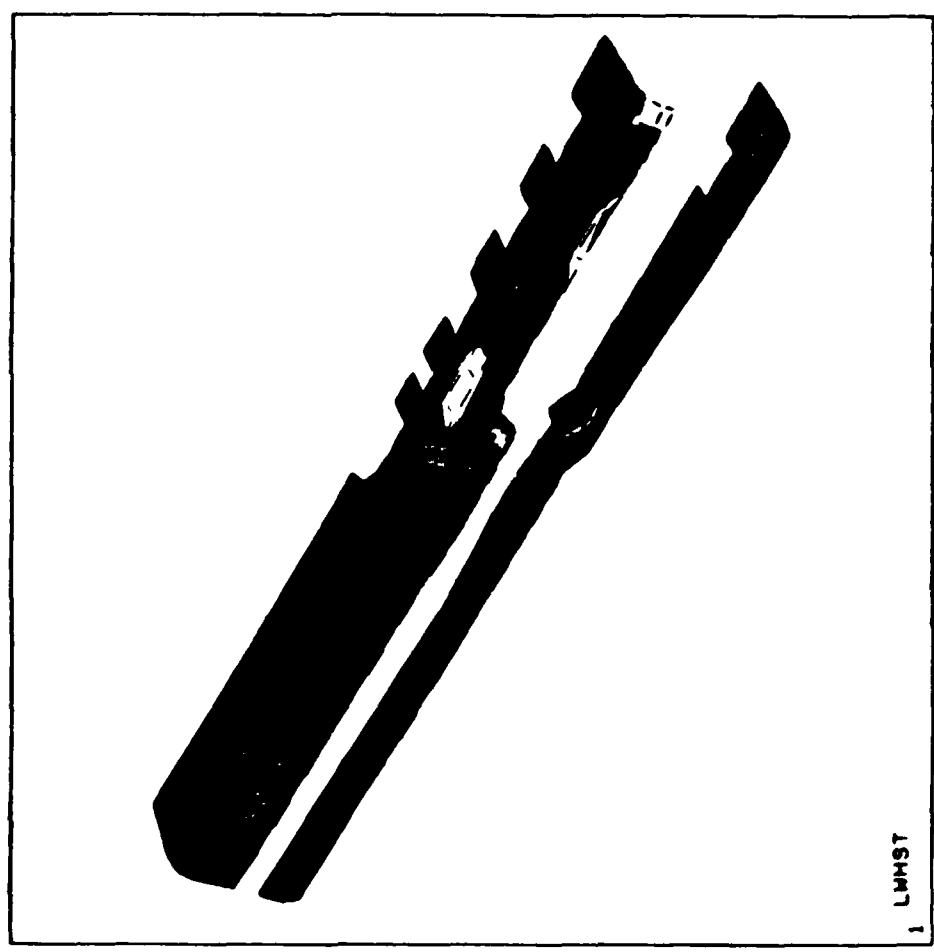
3830
6781



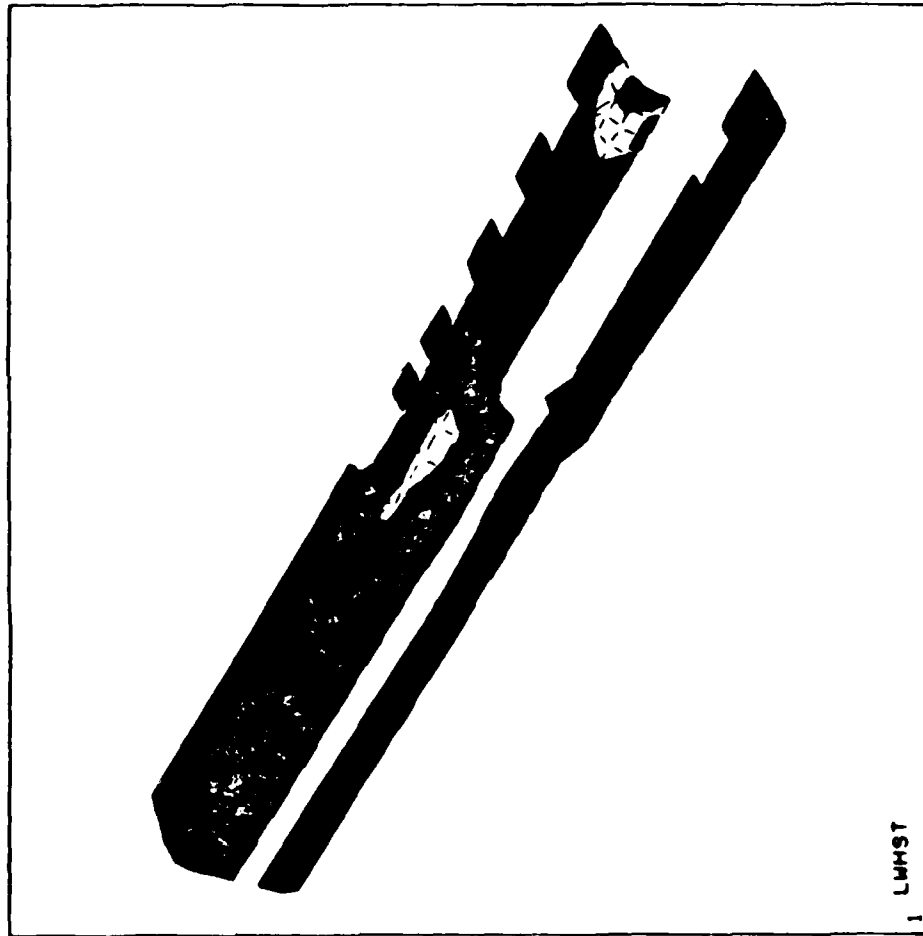
ANSYS 4.2B
MAR 3 1987
7:30:15
PLOT NO. 17
POST1 STRESS
STEP=1
ITER=1
SIDE
BOTTOM
XV=1
YV=1
ZV=-1
DIST=59.9
YF=1.63
ZF=-52
HIDDEN
MX=2418
MN=5.74
270
539
808
1077
1346
2153
2422



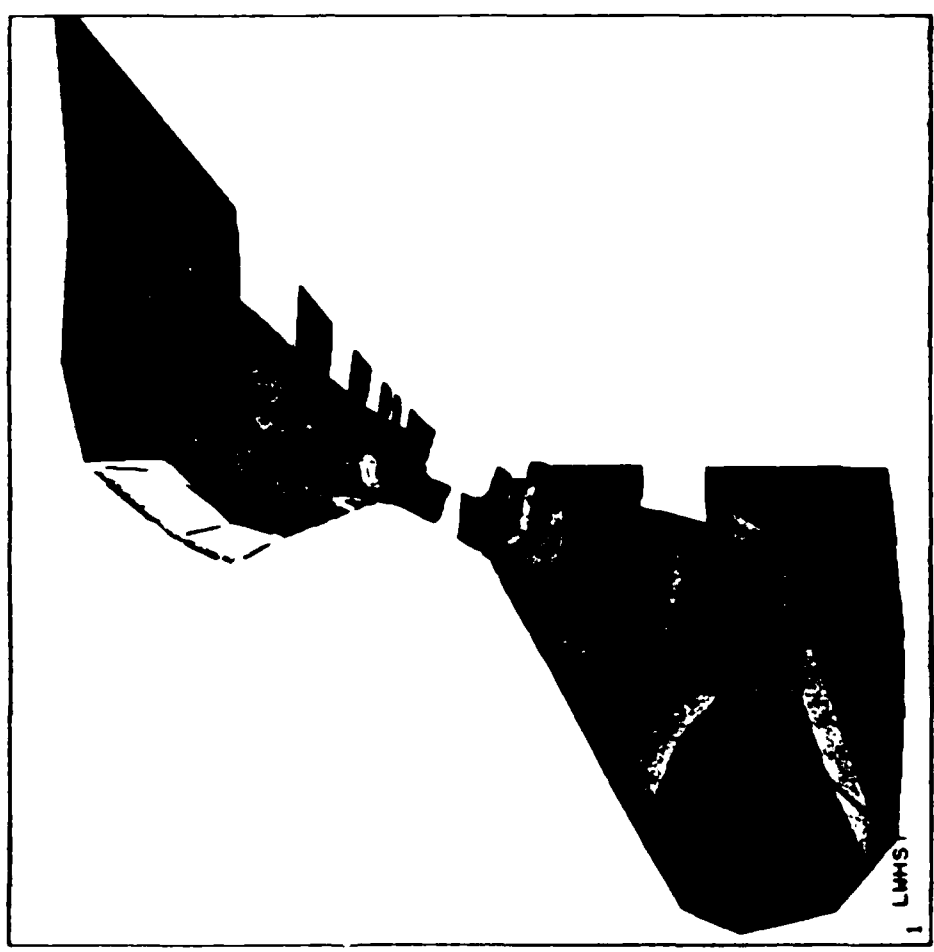
ANSYS 4.2B
MAR 3 1987
7:31:52
PLOT NO. 18
POST1 STRESS
STEP=2
ITER=1
SX
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=11591
MN=-6560
-4544
-2527
-510
1507
3524



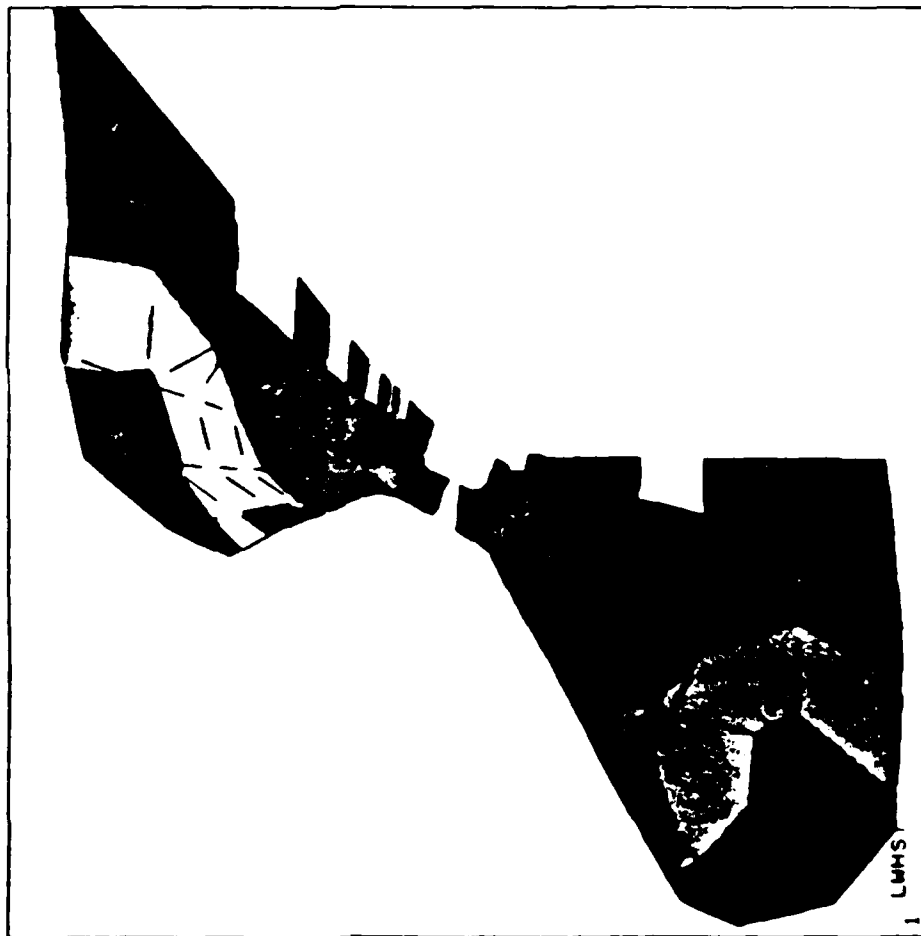
ANSYS 4.2B
MAR 3 1987
7:32:11
PLOT NO. 19
POST1 STRESS
STEP=2
ITER=1
SY
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=18055
MN=-17971
-13968
-9965
-5962
-1959
2044



ANSYS 4.2B
MAR 3 1987
7:32:26
PLOT NO. 20
POST1 STRESS
STEP=2
ITER=1
SX
TOP
STRESS ELEM CS
ZV=-1
DIST=120
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=11591
MN=-6560
-4544
-2527
-510
1507
3524
9575
11592

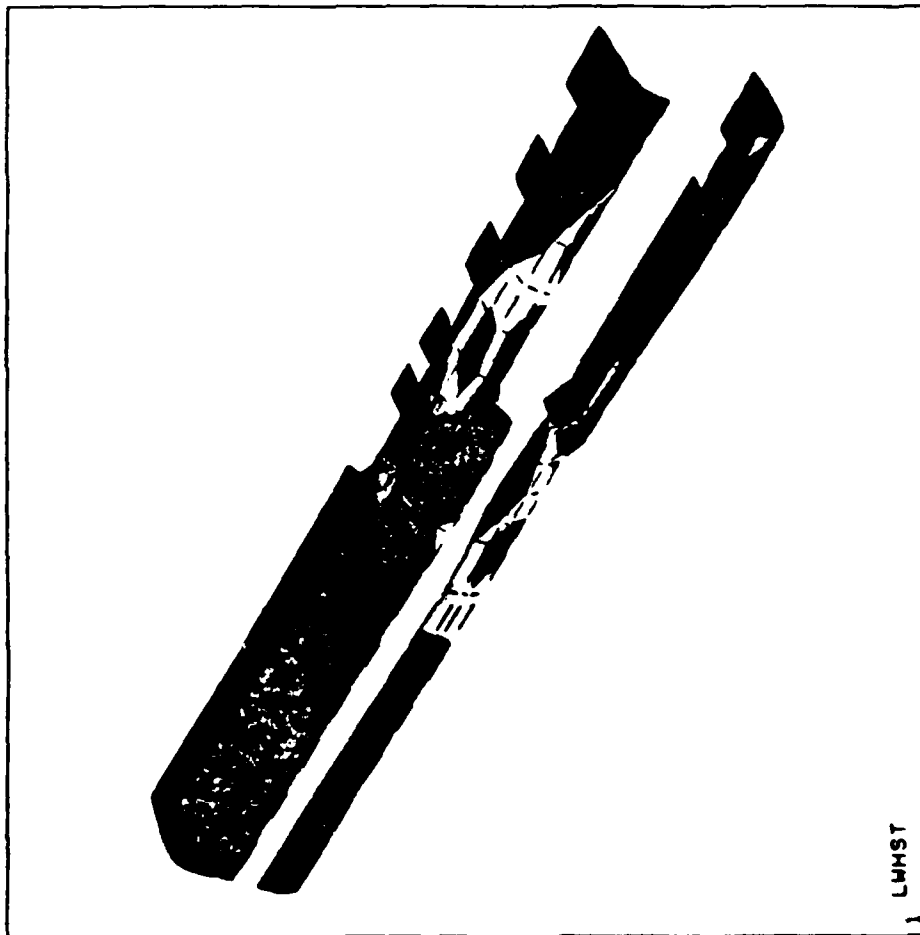


ANSYS 4.2B
 MAR 3 1987
 7:32:41
 PLOT NO. 21
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=120
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=18055
 MN=-17971
 -13968
 -9965
 -5962
 -1959
 2044
 14053
 18056

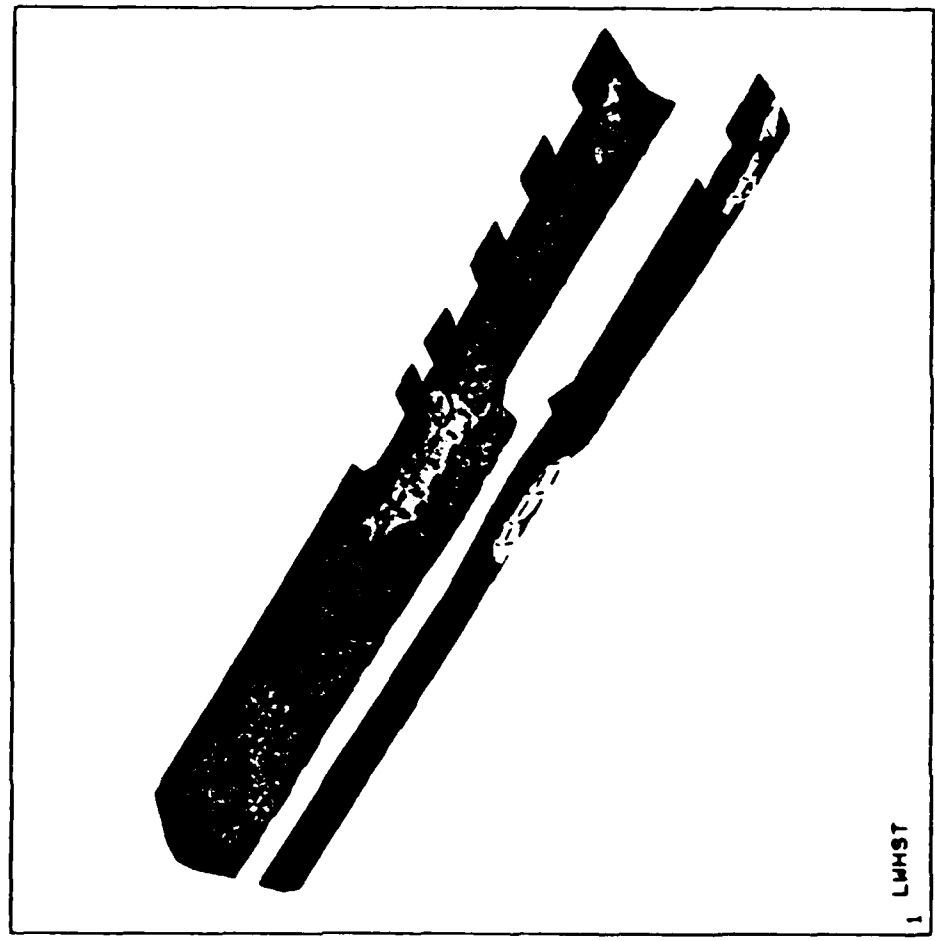


ANSYS 4.2B
 MAR 3 1987
 7:33:08
 PLOT NO. 22
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS

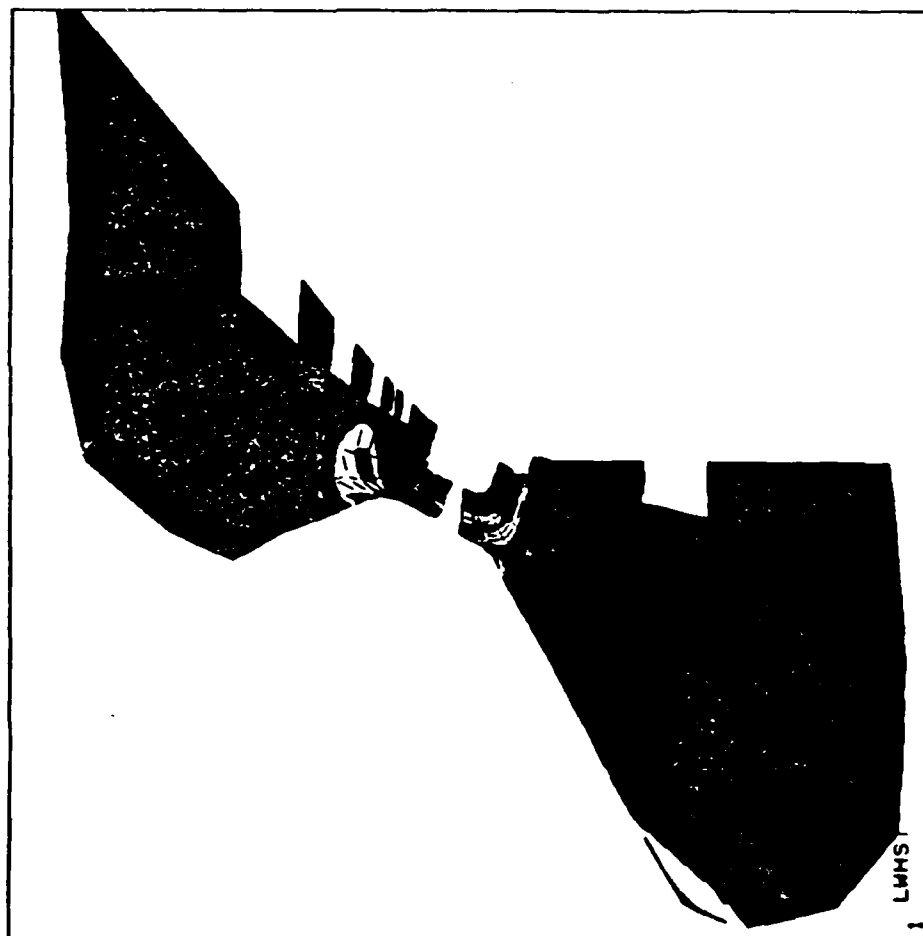
XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=8569
 MN=-7160
 -5414
 -3666
 -1918
 -170
 1578

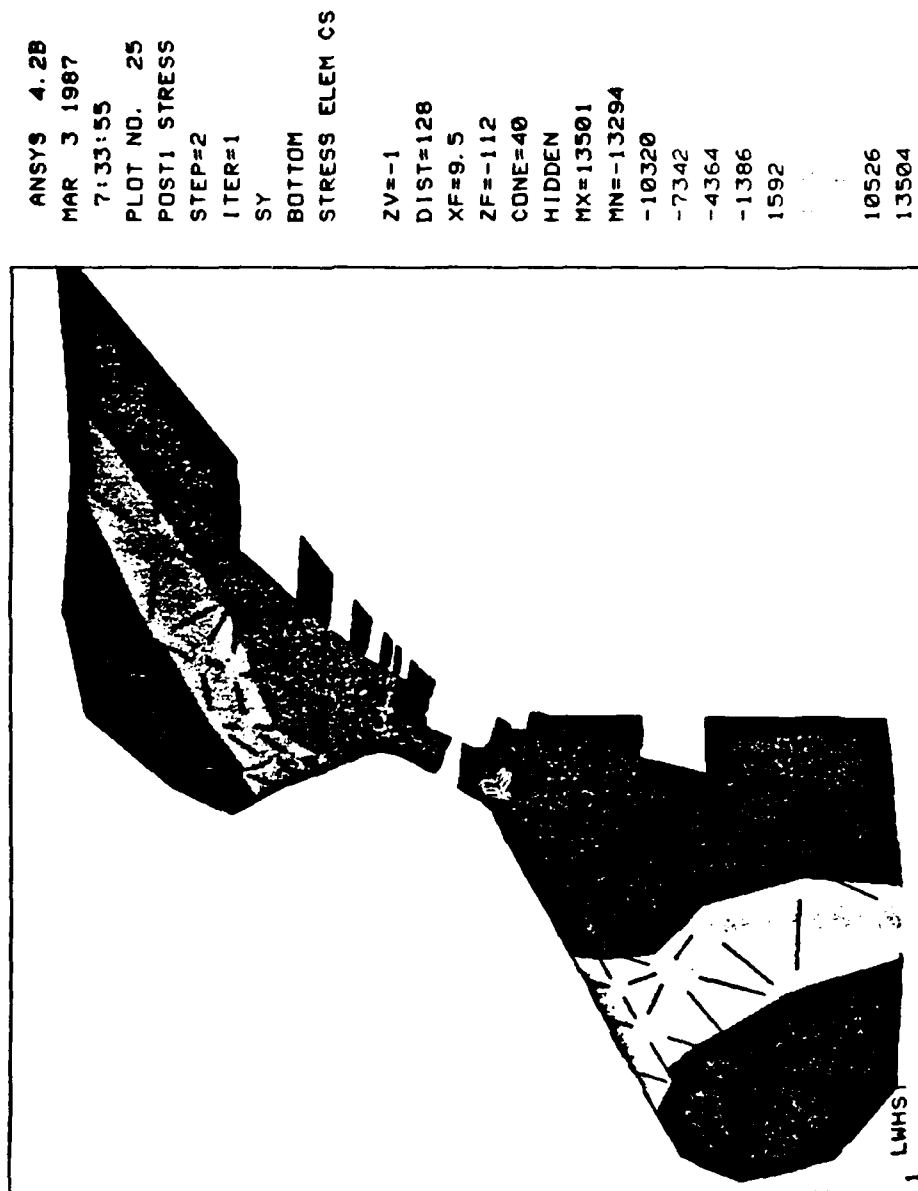


ANSYS 4.2B
 MAR 3 1987
 7:33:23
 PLOT NO. 23
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=13501
 MN=-13294
 -10320
 -7342
 -4364
 -1386
 1592



ANSYS 4.2B
 MAR 3 1987
 7:33:38
 PLOT NO. 24
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=8569
 MN=-7160
 -5414
 -3666
 -1918
 -170
 1578
 6822
 8570





ANSYS 4.2B
 MAR 3 1987
 7:33:55
 PLOT NO. 25
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=13501
 MN=-13294
 -10320
 -7342
 -4364
 -1386
 1592
 10526
 13504

ANSYS 4.2B

MAR 3 1987

7:34:26

PLOT NO. 26

POST1 STRESS

STEP=2

ITER=1

SX

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=92.2

XF=10.9

YF=1.46

ZF=-110

HIDDEN

MX=22505

MN=-22464

-17469

-12472

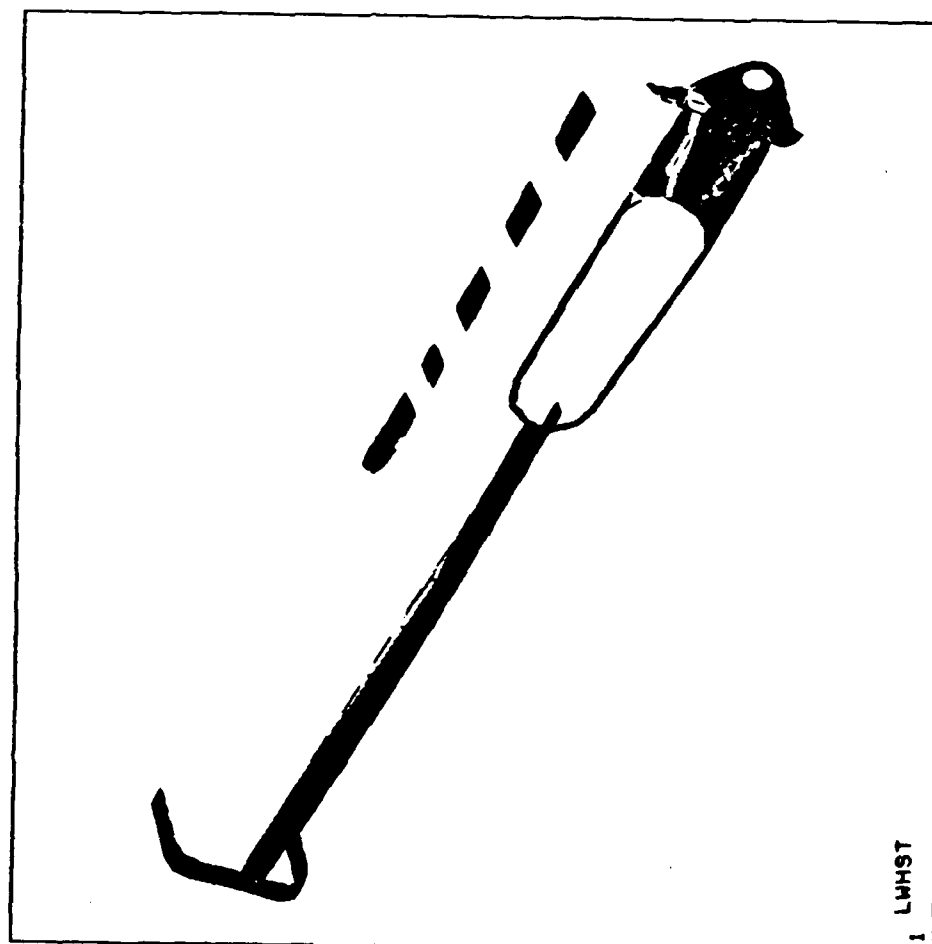
-7475

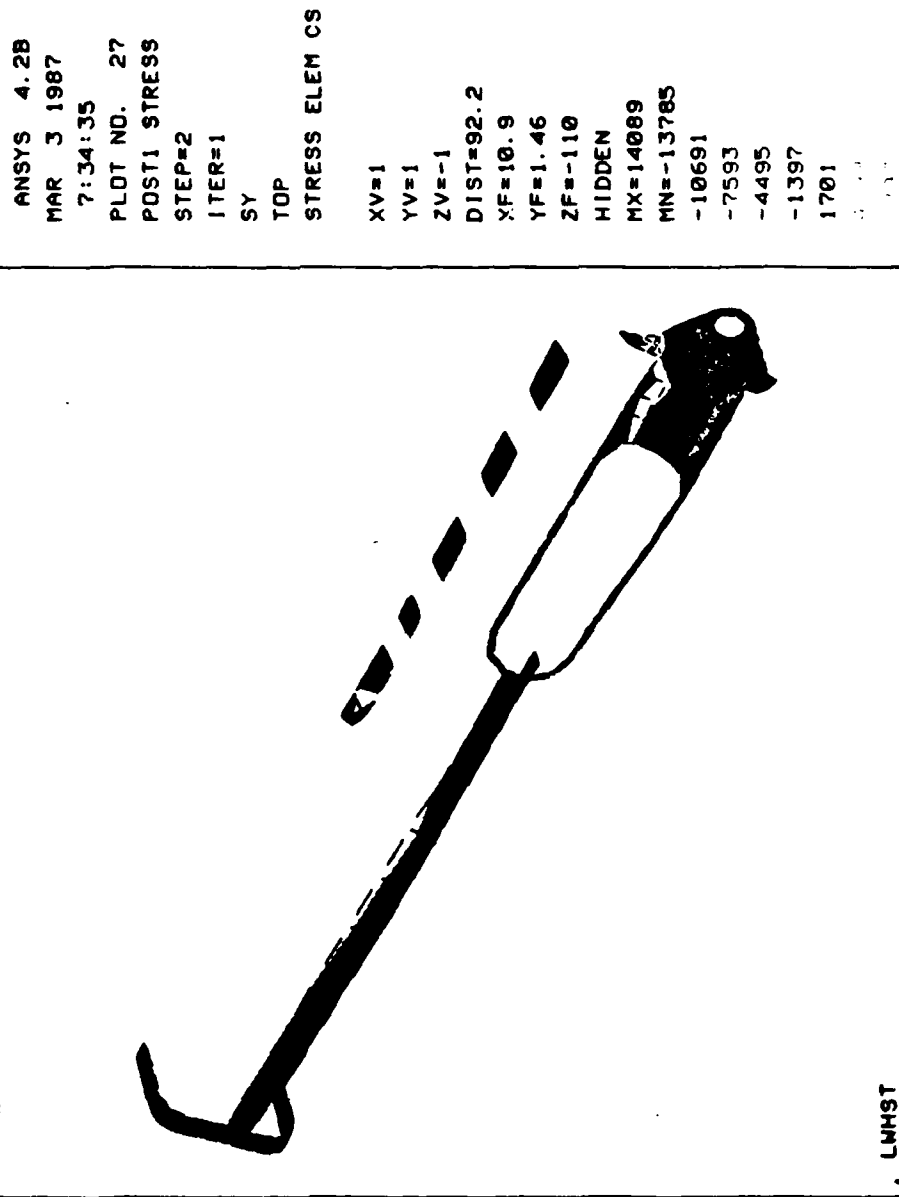
-2478

2519

2519

17517





ANSYS 4.28
 MAR 3 1987
 7:34:43
 PLOT NO. 28
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 TOP
 STRESS ELEM CS

ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=22505
 MN=-22464
 -17469
 -12472
 -7475
 -2478
 2519
 17510
 22507



ANSYS 4.2B

MAR 3 1987

7:34:53

PLOT NO. 29

POST1 STRESS

STEP=2

ITER=1

SY

TOP

STRESS ELEM CS

ZV=-1

DIST=139

XF=9.5

ZF=-119

CONE=40

HIDDEN

MX=14089

MN=-13785

-10691

-7593

-4495

-1397

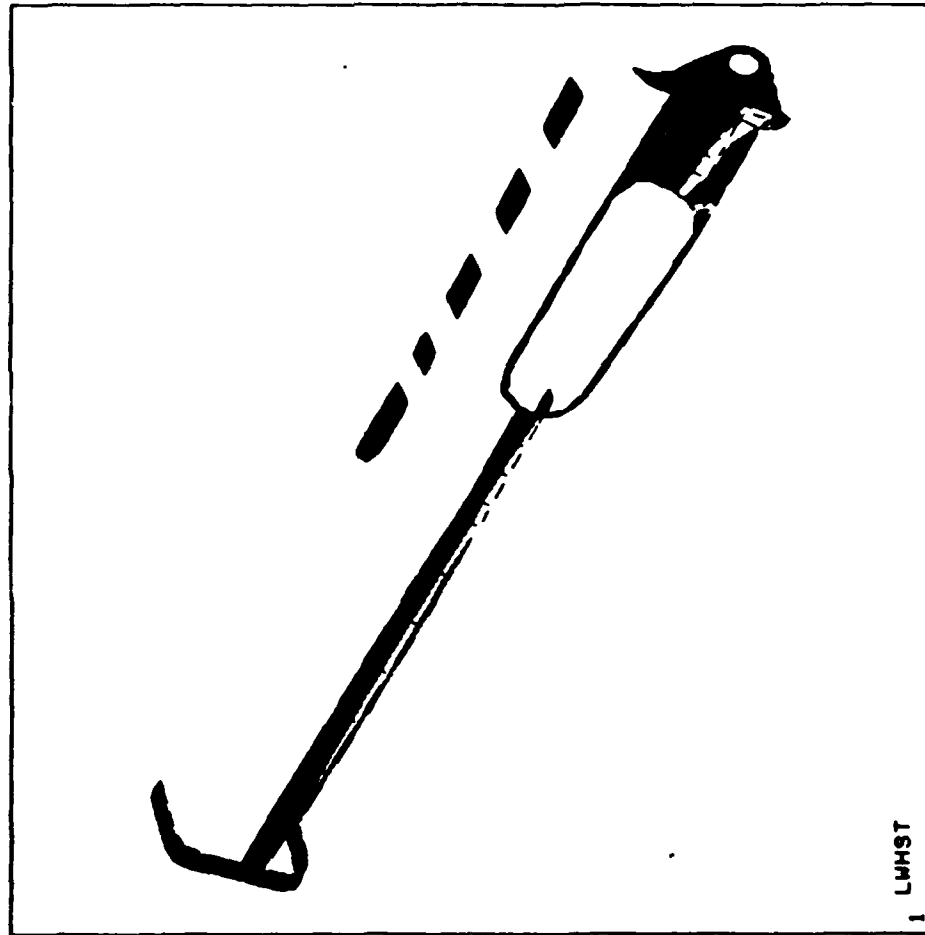
1701

10995

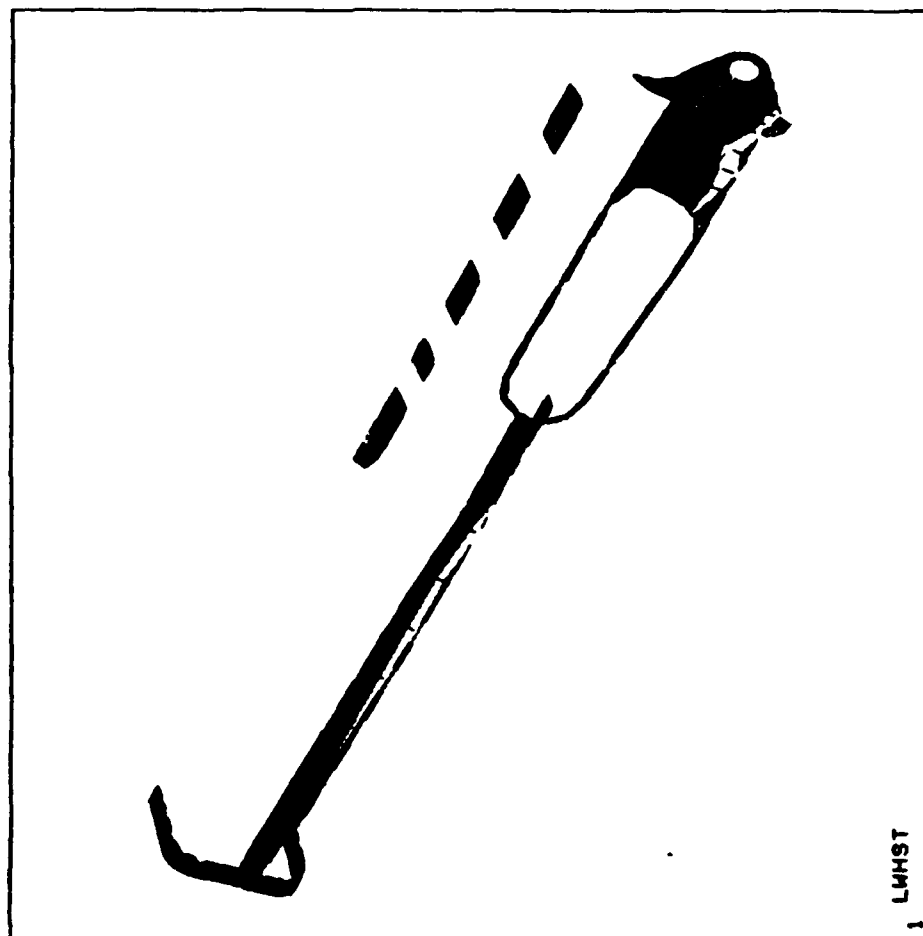
14093



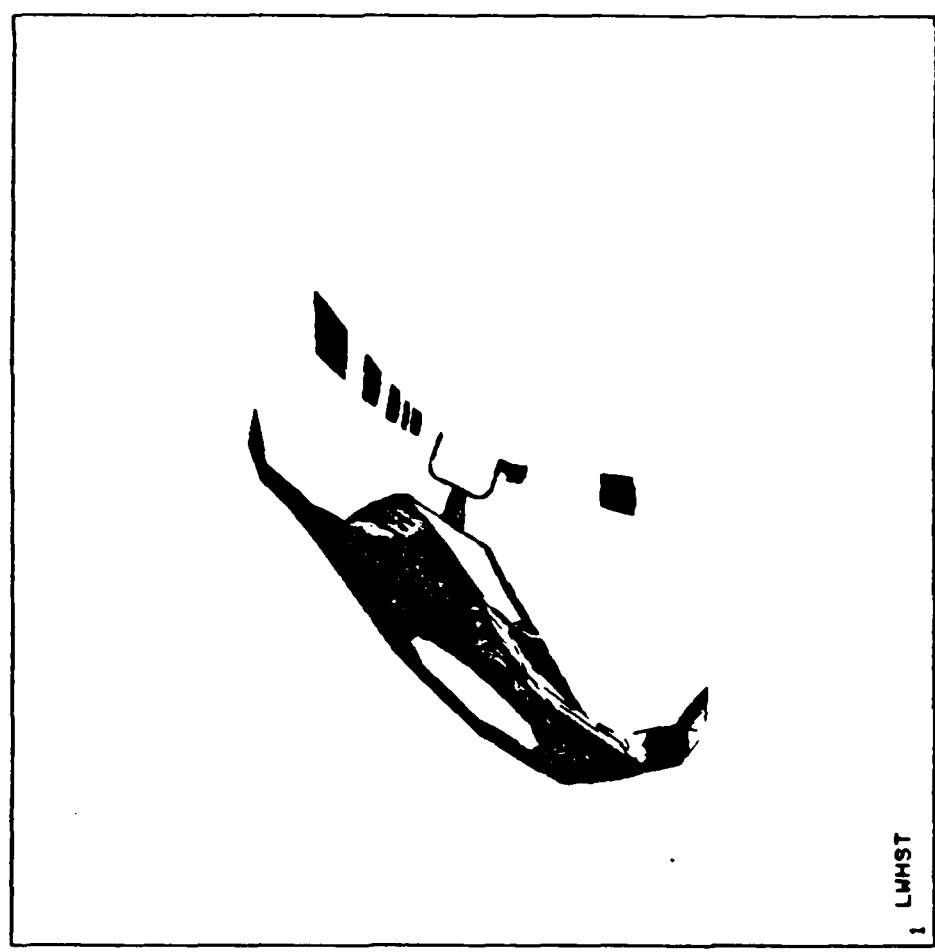
ANSYS 4.2B
 MAR 3 1987
 7:35:09
 PLOT NO. 30
 POST1 STRESS
 STEP=2
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=22872
 MN=-27900
 -22268
 -16625
 -10982
 -5339
 304
 111.00



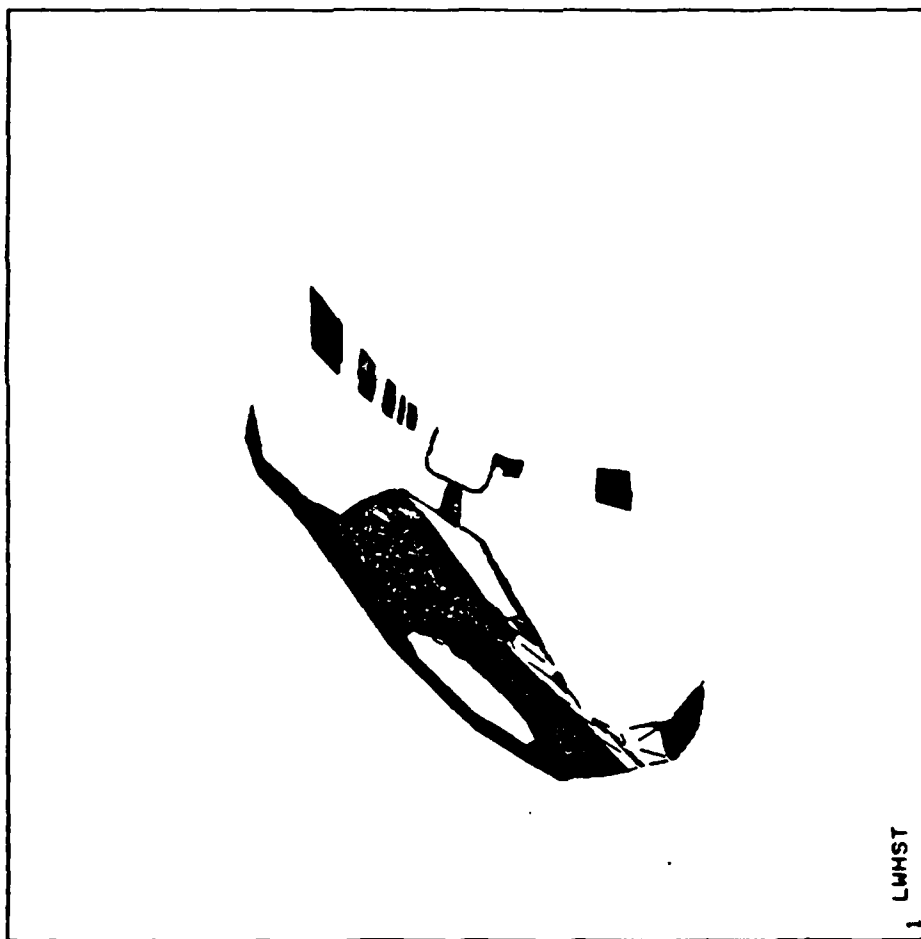
ANSYS 4.2B
 MAR 3 1987
 7:35:17
 PLOT NO. 31
 POST1 STRESS
 STEP=2
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=12133
 MN=-11642
 -9001
 -6359
 -3717
 -1075
 1567



ANSYS 4.2B
MAR 3 1987
7:35:27
PLOT NO. 32
POST1 STRESS
STEP=2
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=22872
MN=-27908
-22268
-16625
-10982
-5339
304
17233
22876



ANSYS 4.2B
MAR 3 1987
7:35:36
PLOT NO. 33
POST1 STRESS
STEP=2
ITER=1
SY
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CDNE=40
HIDDEN
MX=12133
MN=-11642
-9001
-6359
-3717
-1075
1567
9493
12135



ANSYS 4.2B

MAR 3 1987

7:35:57

PLOT NO. 34

POST1 STRESS

STEP=2

ITER=1

SIDE

BOTTOM

XV=1

YV=1

ZV=-1

DIST=59.9

YF=1.63

ZF=-52

HIDDEN

MX=1147

MN=18.9

142

268

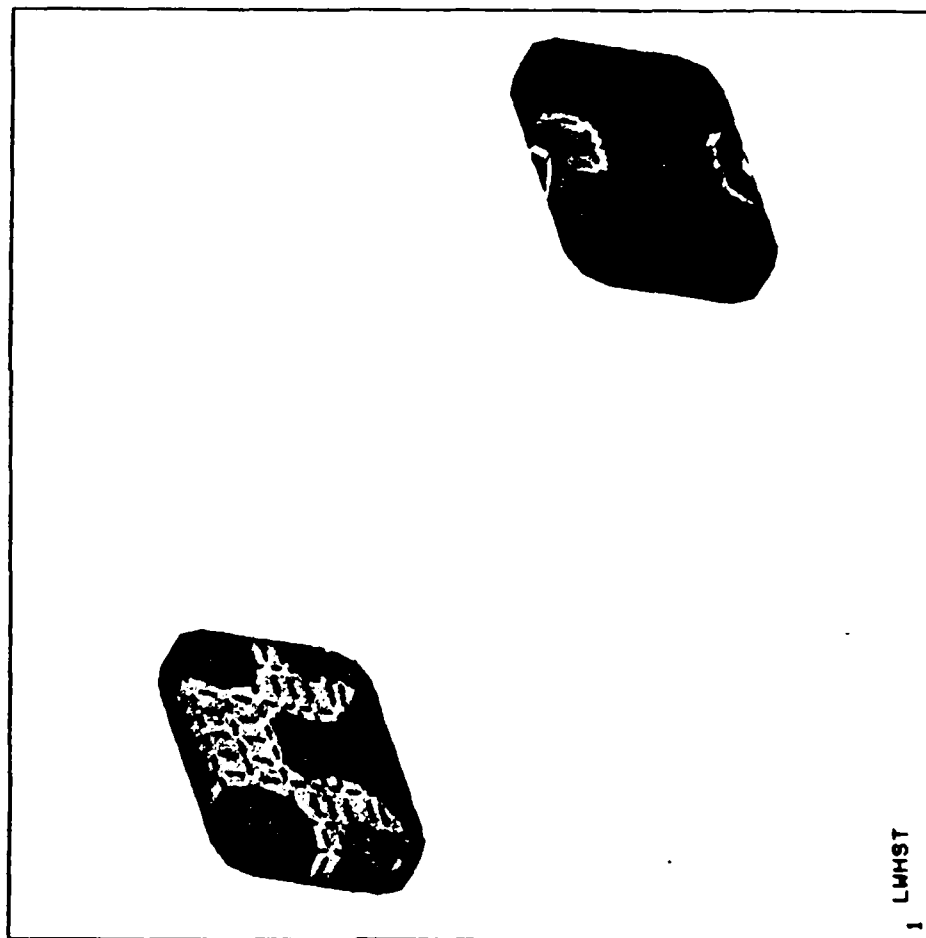
394

520

646

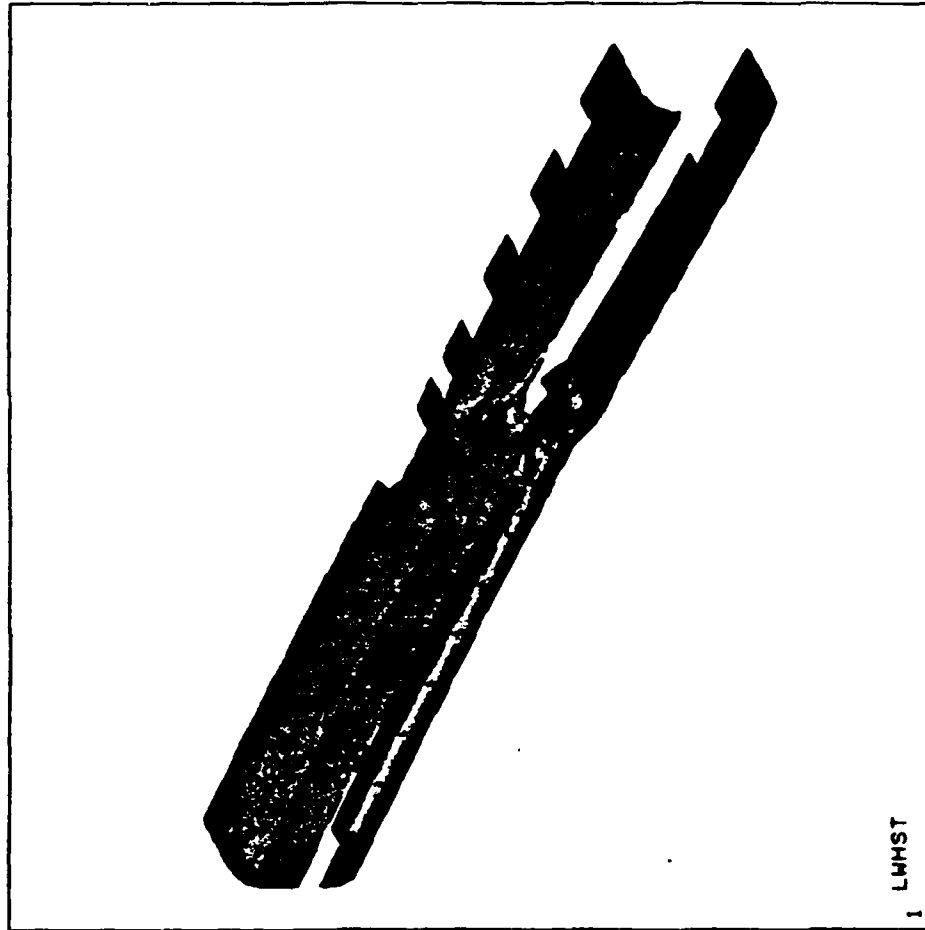
1024

1150

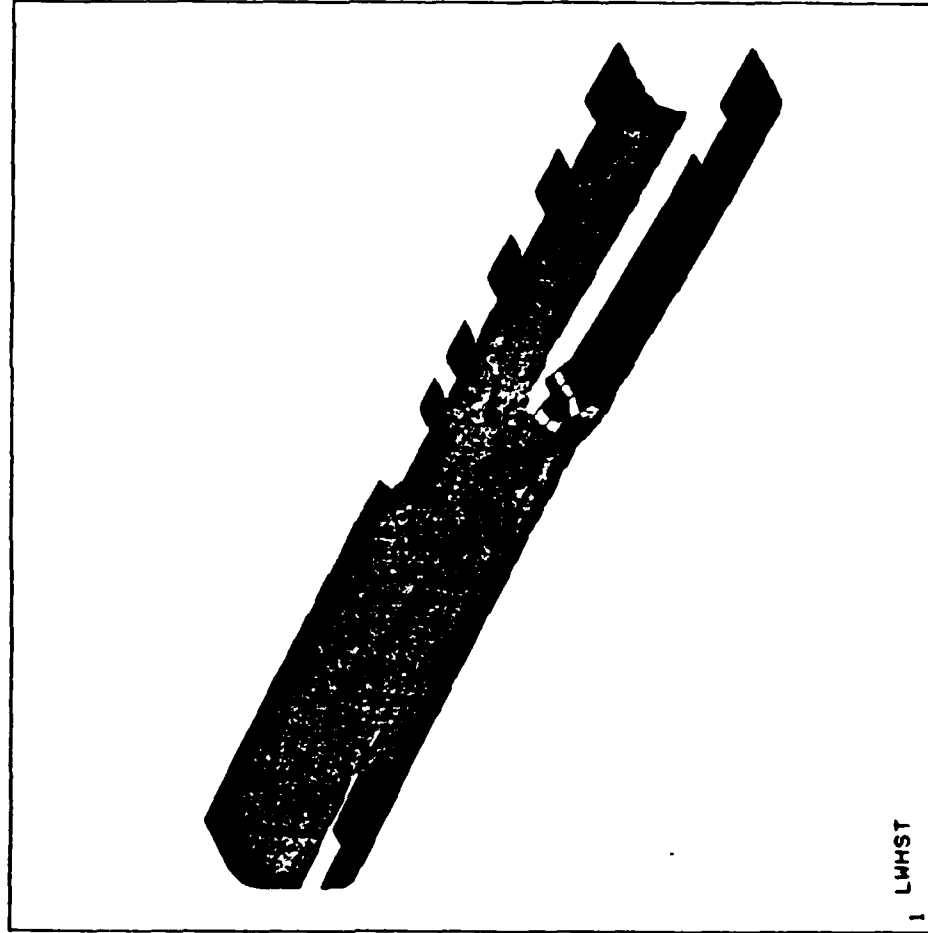


ANSYS 4.2B
 MAR 3 1987
 7:37:30
 PLOT NO. 35
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 TOP
 STRESS ELEM CS

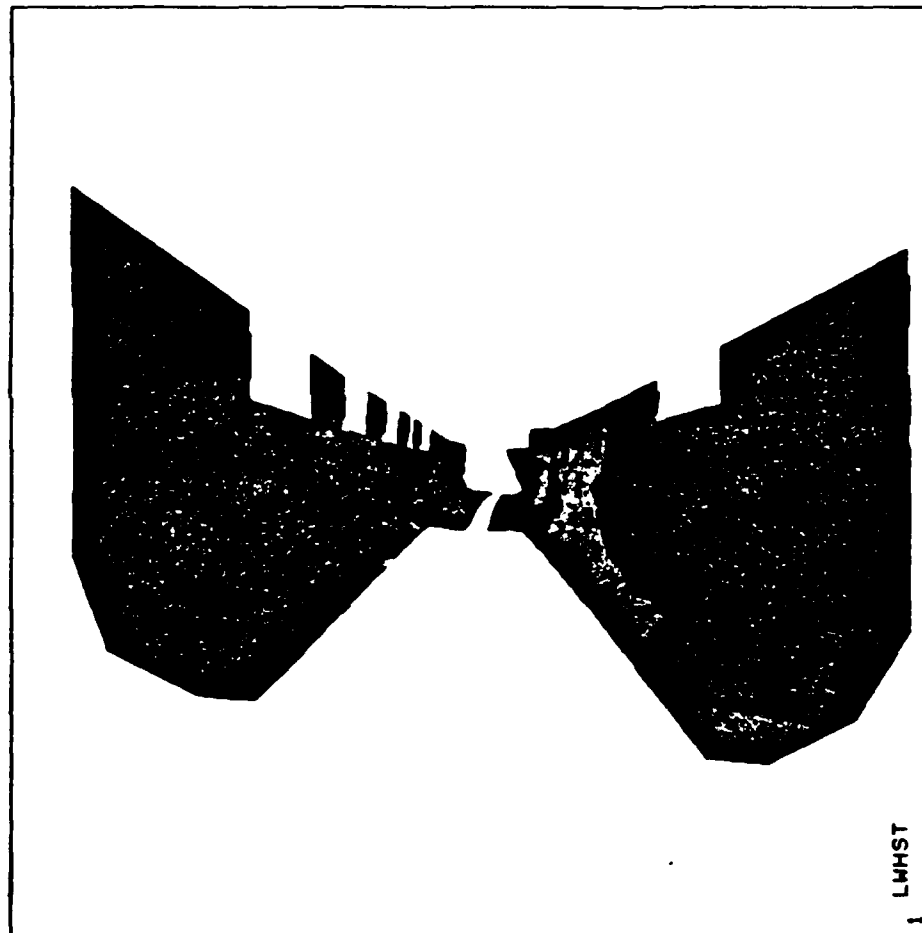
XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=9579
 MN=-6599
 -4803
 -3005
 -1207
 591
 2389

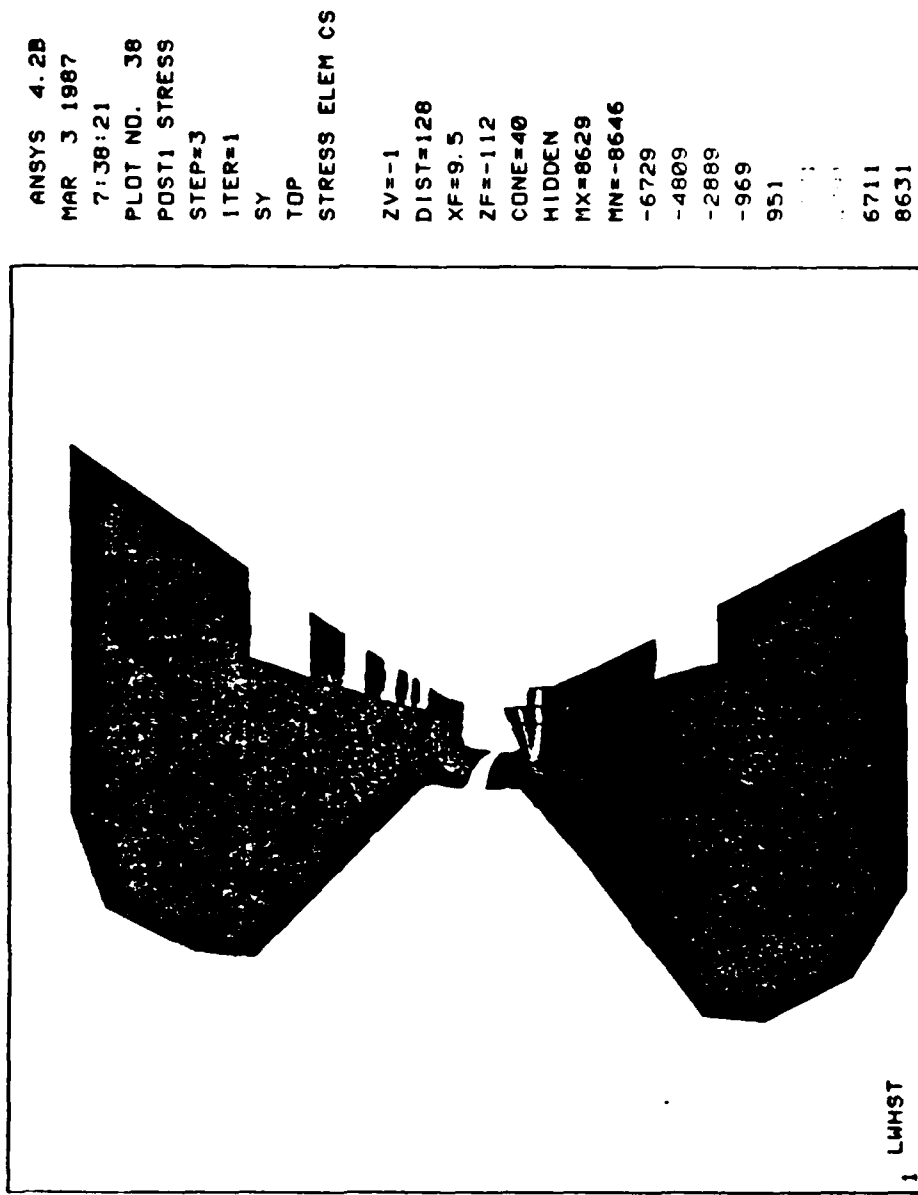


ANSYS 4.2B
MAR 3 1987
7:37:49
PLOT NO. 36
POST1 STRESS
STEP=3
ITER=1
SY
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=8629
MN=-8646
-6729
-4809
-2889
-969
951



ANSYS 4.2B
 MAR 3 1987
 7:38:05
 PLOT NO. 37
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=128
 XF=9.5
 ZF=-112
 CONE=40
 HIDDEN
 MX=9579
 MN=-6599
 -4803
 -3005
 -1207
 591
 2389
 7783
 9581





AD-A183 991

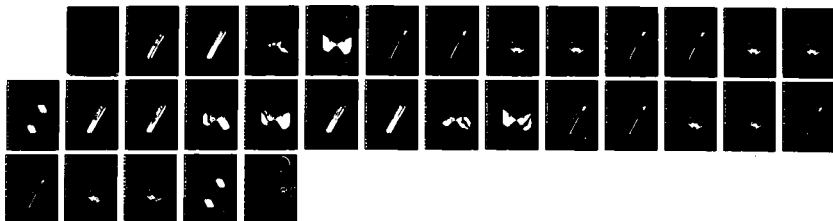
LIGHTWEIGHT TOWED HOWITZER DEMONSTRATOR PHASE 1 AND
PARTIAL PHASE 2 VOLUM (U) FMC CORP MINNEAPOLIS MINN
NORTHERN ORDNANCE DIV R RATHE ET AL APR 87
FMC-E-3041-VOL-D2-PT-3 DAAA21-86-C-0047

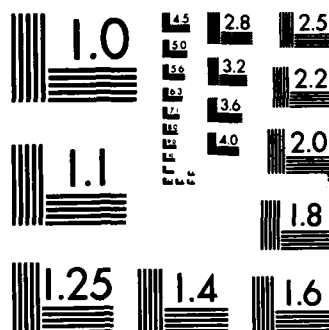
5/5

UNCLASSIFIED

F/G 19/6

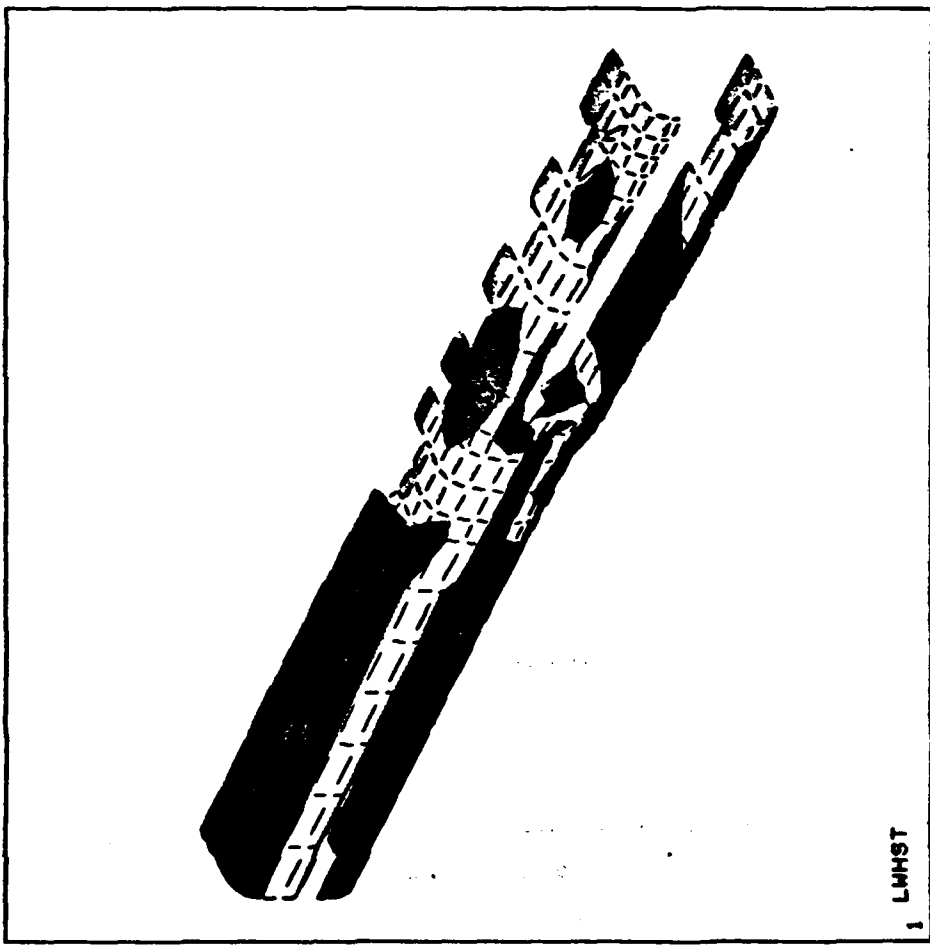
NL





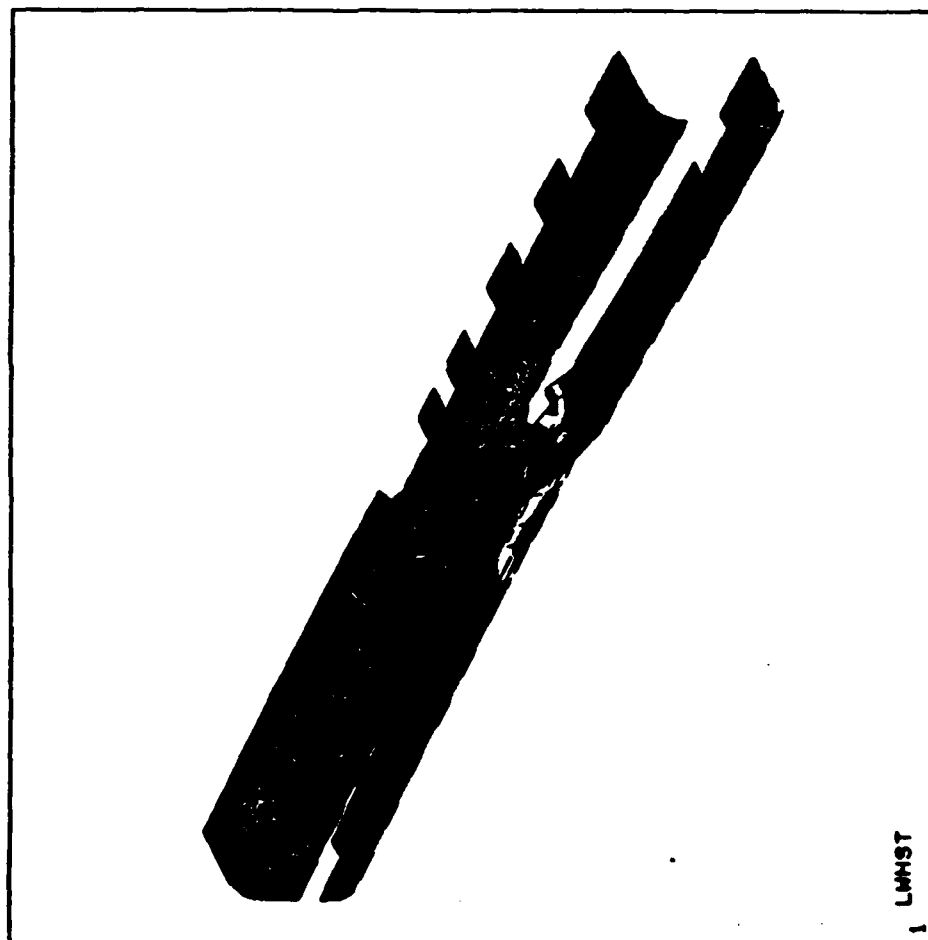
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

ANSYS 4.2B
MAR 3 1987
7:38:46
PLOT NO. 39
POST1 STRESS
STEP=3
ITER=1
SX
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=5692
MN=-12880
-10018
-8754
-6690
-4626
-2562
-10018
1166



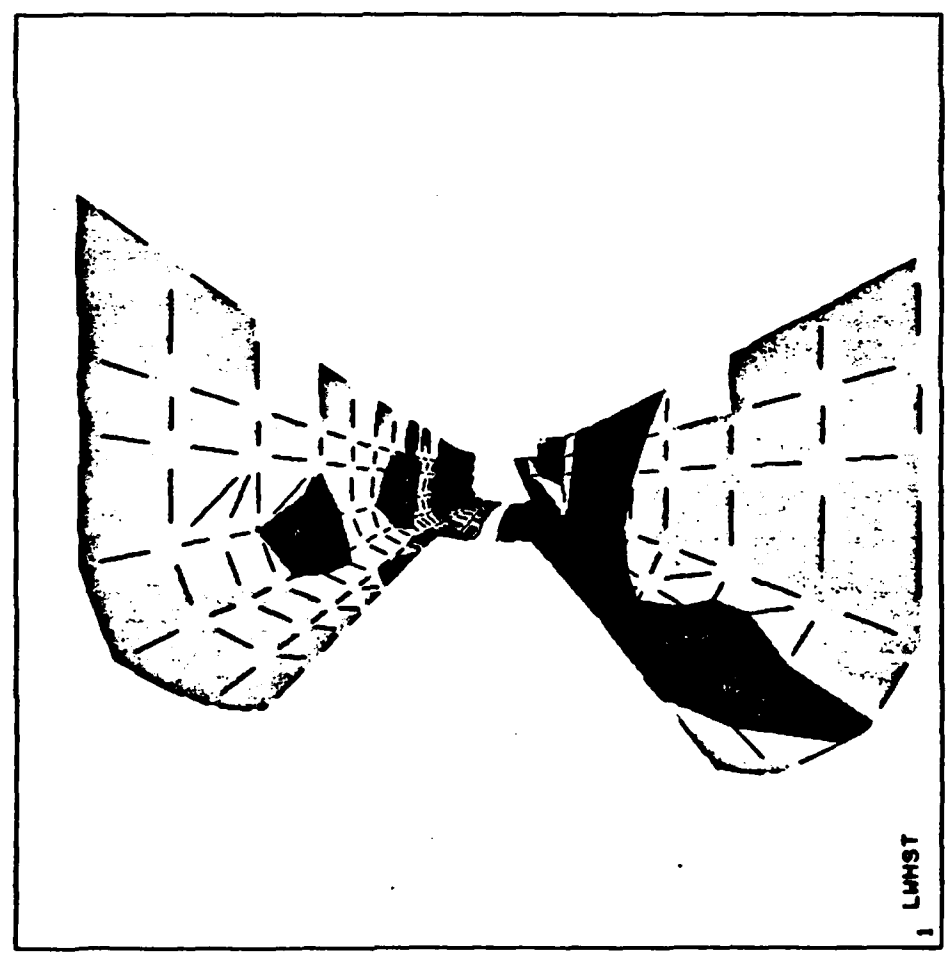
ANSYS 4.2B
MAR 3 1987
7:39:02
PLOT NO. 40
POST1 STRESS
STEP=3
ITER=1
SY
BOTTOM
STRESS ELEM C9

XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=5976
MN=-7527
-6029
-4528
-3027
-1526
-25.1
1476
1476

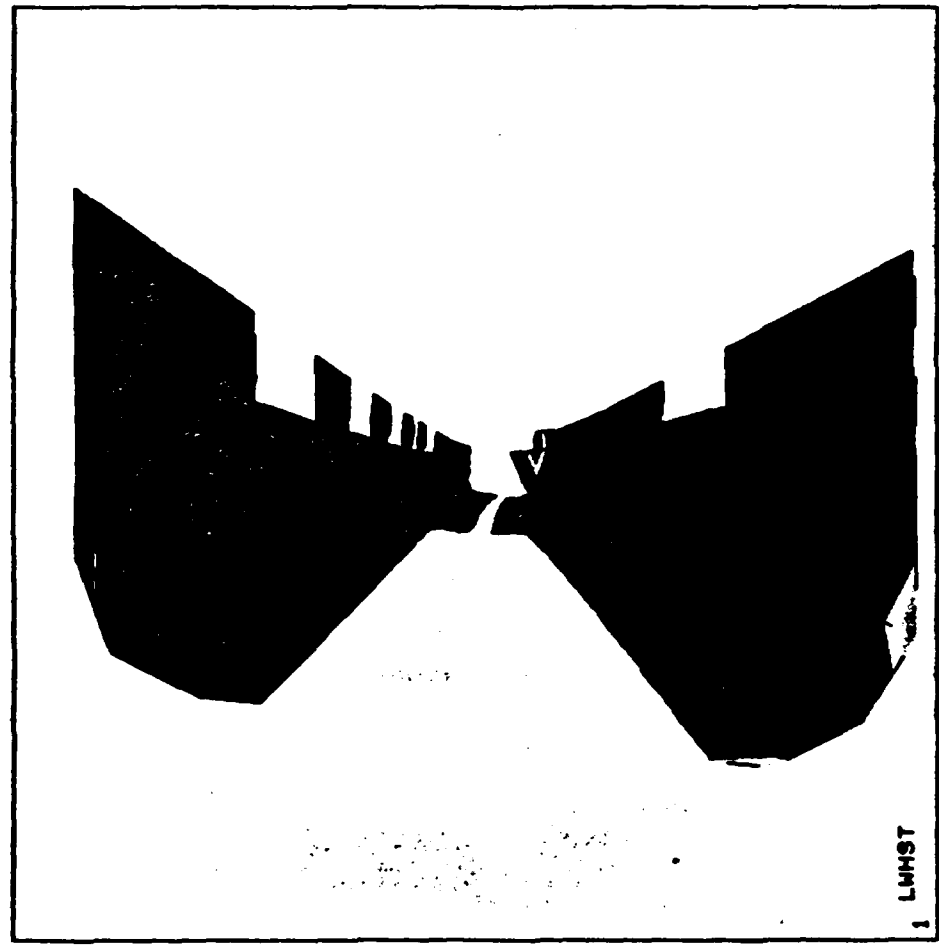


1 LMHST

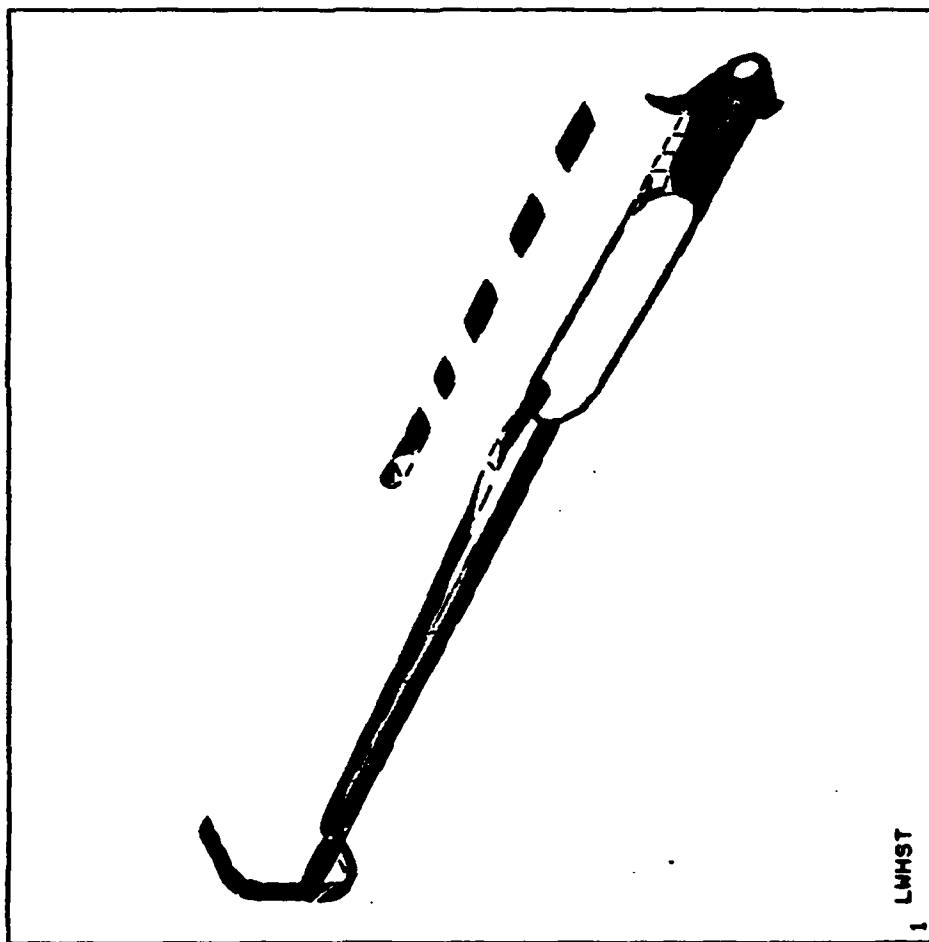
ANSYS 4.2B
MAR 3 1987
7:39:18
PLOT NO. 41
POST1 STRESS
STEP=3
ITER=1
SX
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=5692
MN=-12880
-10818
-8754
-6690
-4626
-2562
1000
3630
5694



ANSYS 4.2B
MAR 3 1987
7:39:34
PLOT NO. 42
POST1 STRESS
STEP=3
ITER=1
SY
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CDNE=48
HIDDEN
MX=5976
MN=-7527
-6029
-4528
-3027
-1526
-25.1
1425
1407
4478
5979

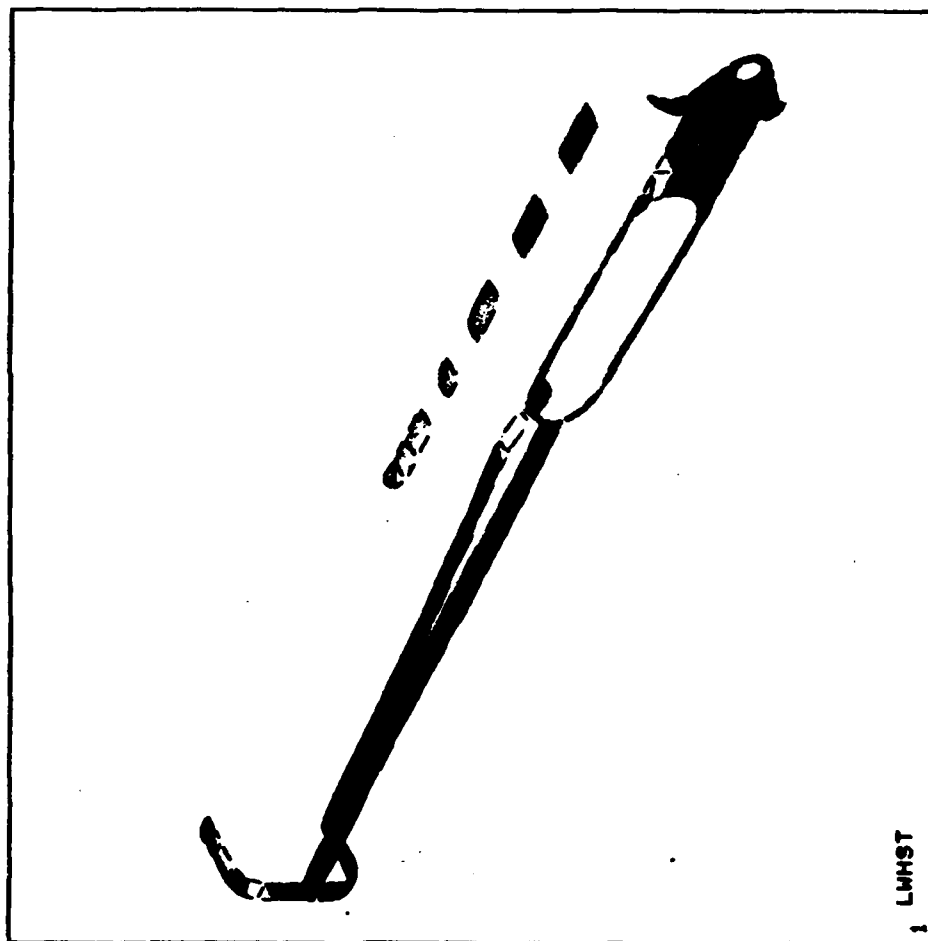


ANSYS 4.2B
 MAR 3 1987
 7:40:04
 PLOT NO. 43
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 TOP
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=7273
 MN=-10447
 -8479
 -6510
 -4541
 -2572
 -603
 1200
 3377

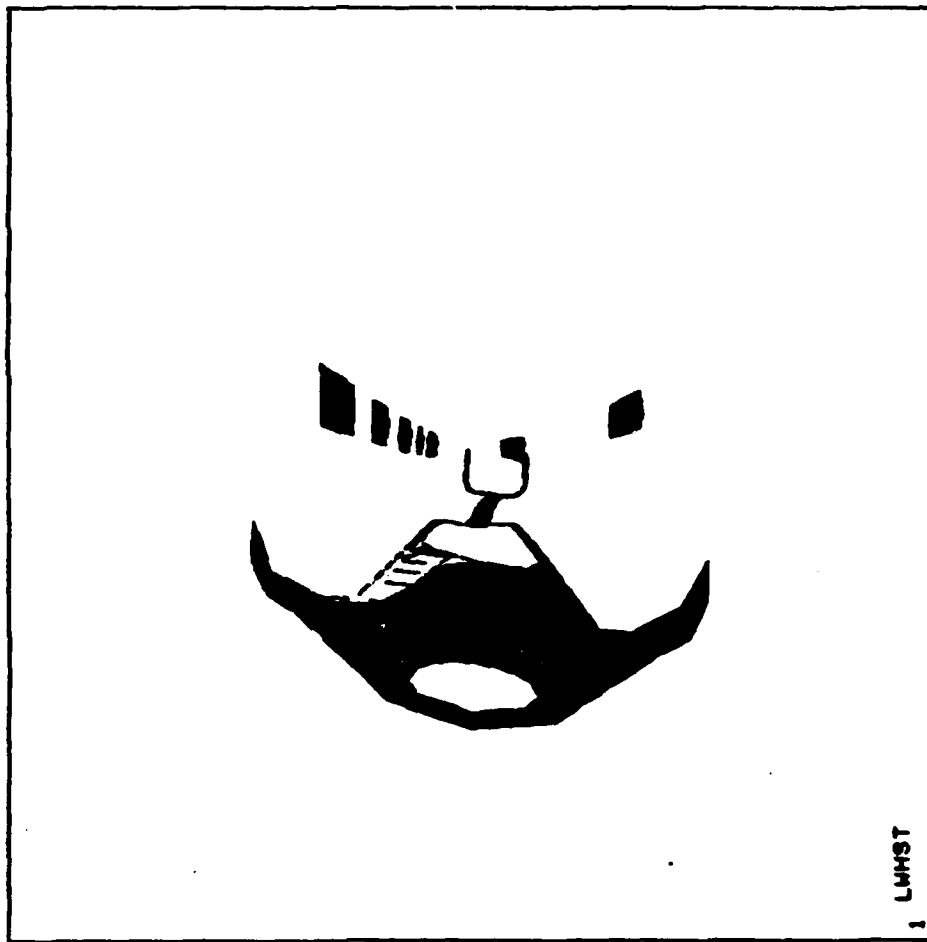


ANSYS 4.2B
MAR 3 1987
7:40:14
PLOT NO. 44
POST1 STRESS
STEP=3
ITER=1
SY
TOP
STRESS ELEM C9

XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=6464
MN=-9352
-7597
-5839
-4081
-2323
-565
1191
2451

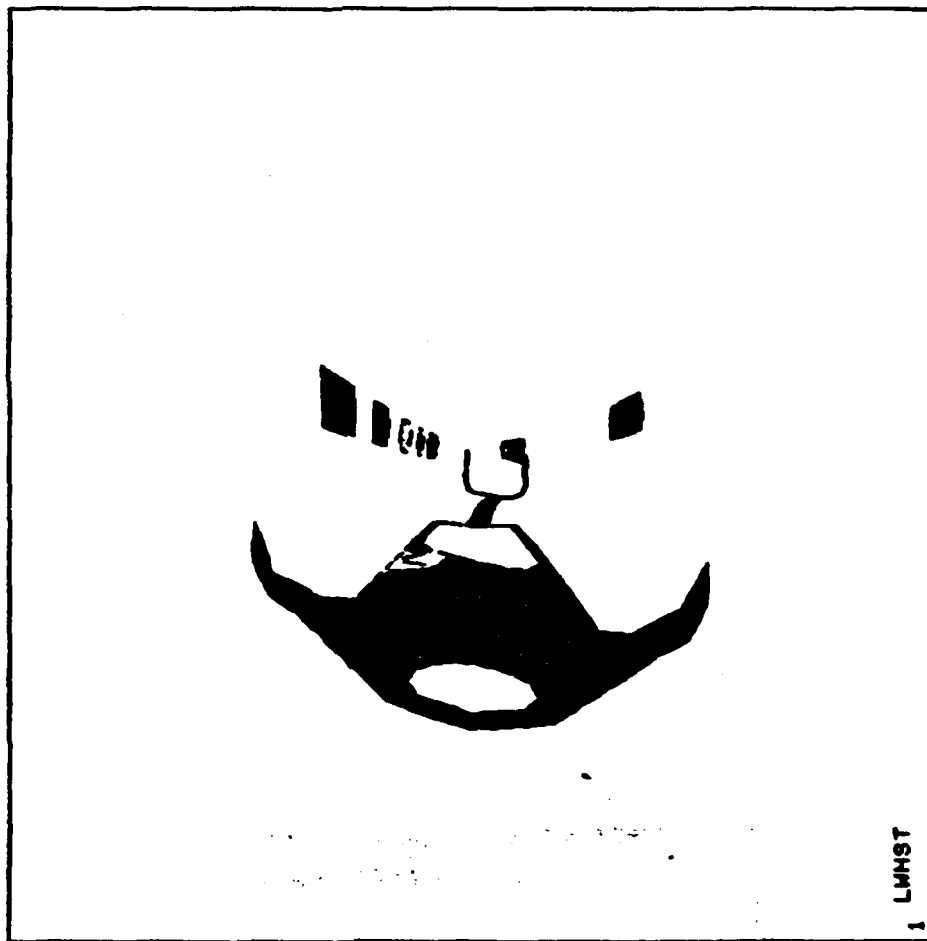


ANSYS 4.2B
MAR 3 1987
7:40:22
PLOT NO. 45
POST1 STRESS
STEP=3
ITER=1
SX
TOP
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=7273
MN=-10447
-8479
-6510
-4541
-2572
-603
1177
7175
5304
7273

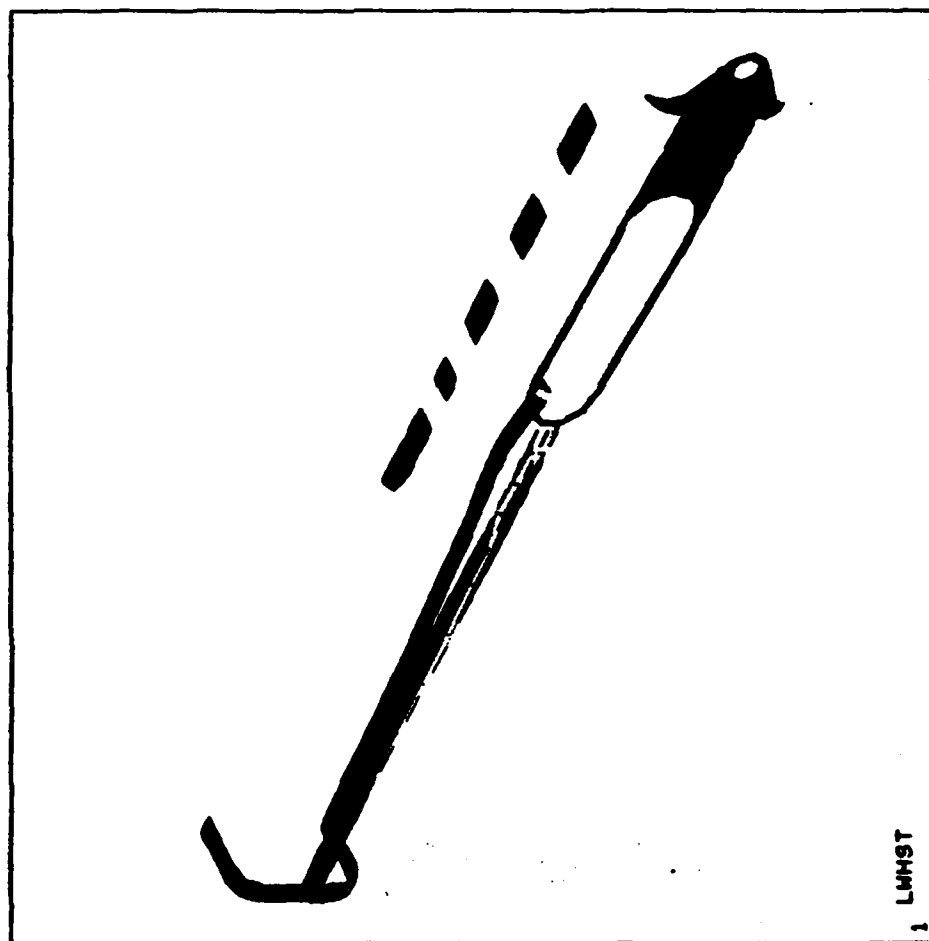


ANSYS 4.2B
 MAR 3 1987
 7:40:30
 PLOT NO. 46
 POST1 STRESS
 STEP=3
 ITER=1
 SY
 TOP
 STRESS ELEM CS

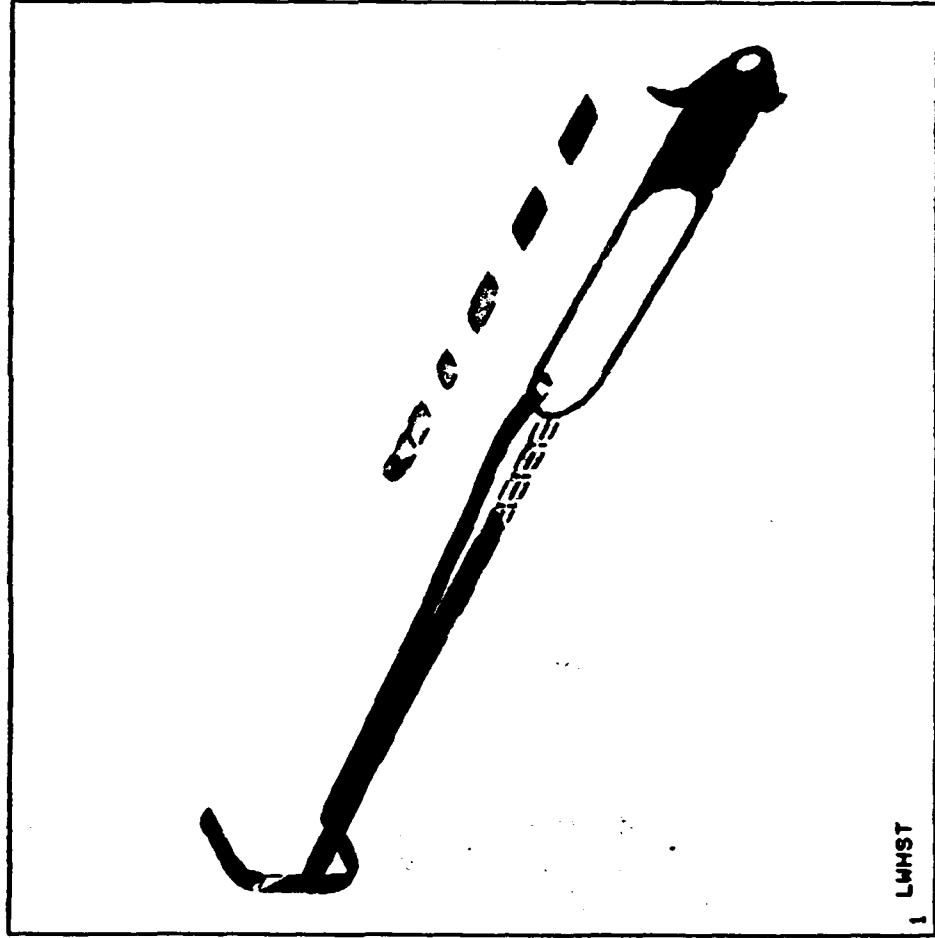
ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=6464
 MN=-9352
 -7597
 -5839
 -4081
 -2323
 -565
 1143
 2151
 4709
 6467



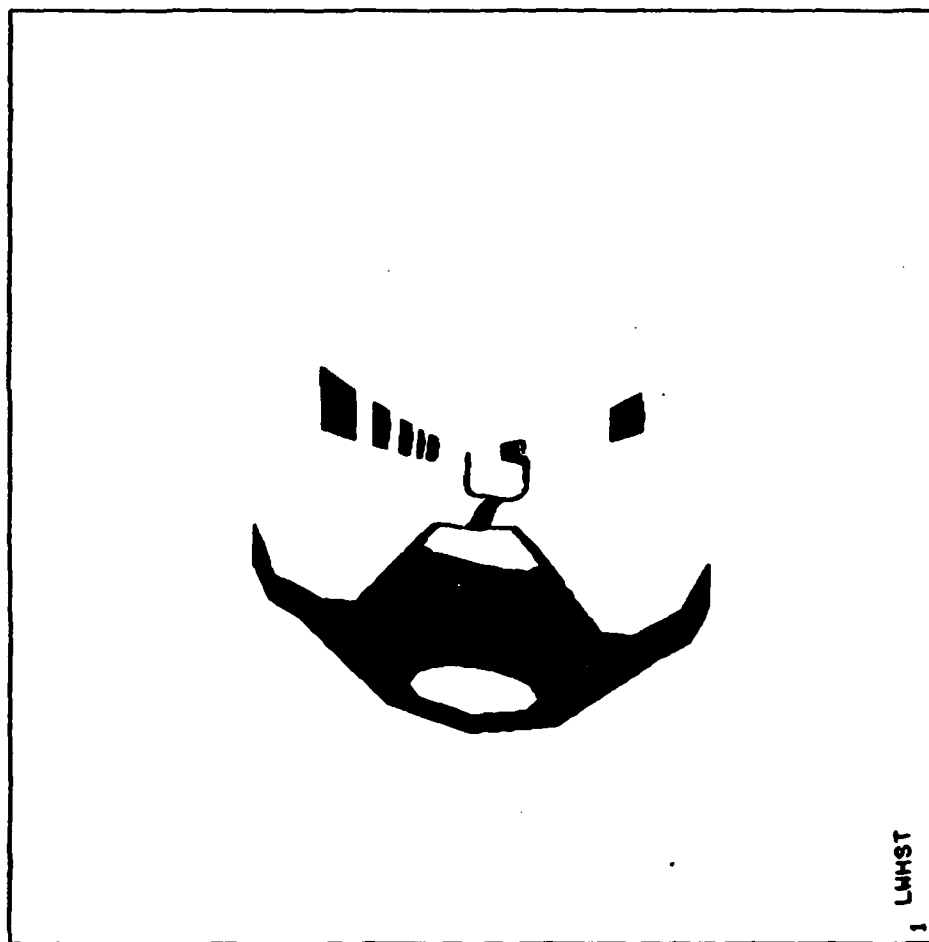
ANSYS 4.2B
 MAR 3 1987
 7:40:46
 PLOT NO. 47
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=10085
 MN=-10179
 -7929
 -5677
 -3425
 -1173
 1079
 7271
 9583



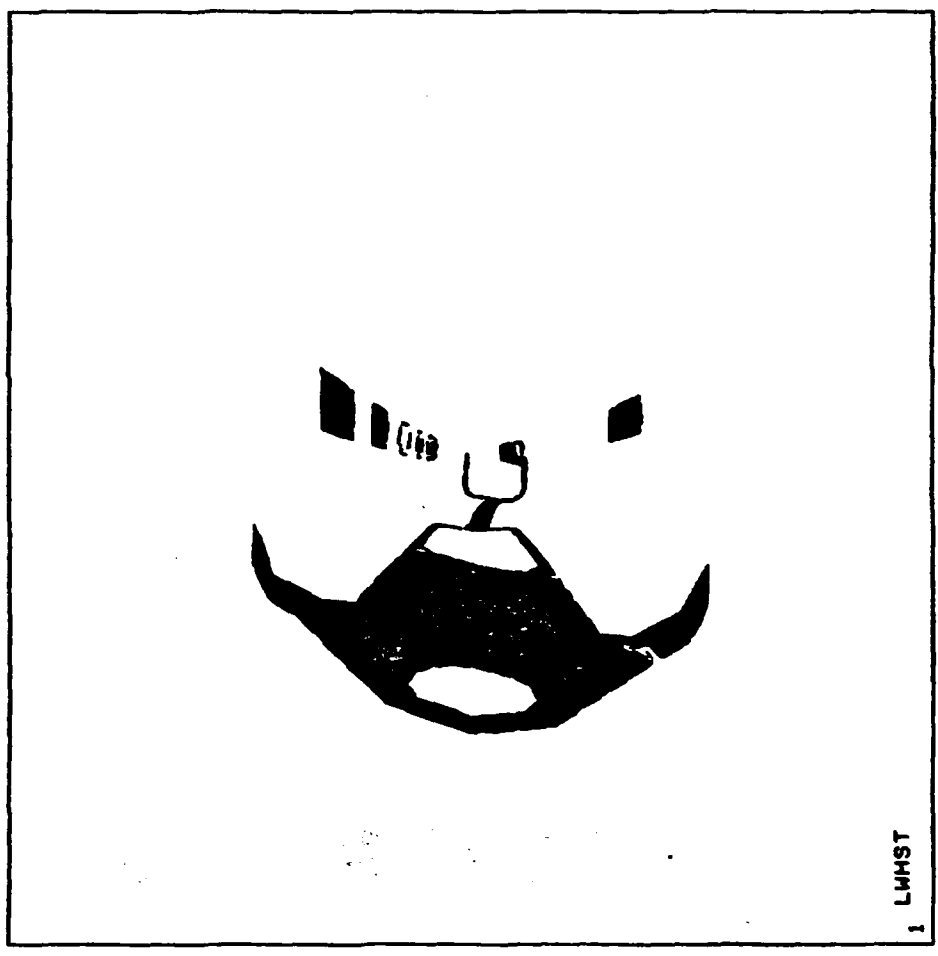
ANSYS 4.2B
 MAR 3 1987
 7:40:56
 PLOT NO. 48
 POST1 STRESS
 STEP=3
 ITER=1
 SY
 BOTTOM
 STRESS ELEM C9
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=5116
 MN=-7453
 -6058
 -4661
 -3264
 -1867
 -470
 1 LMHST



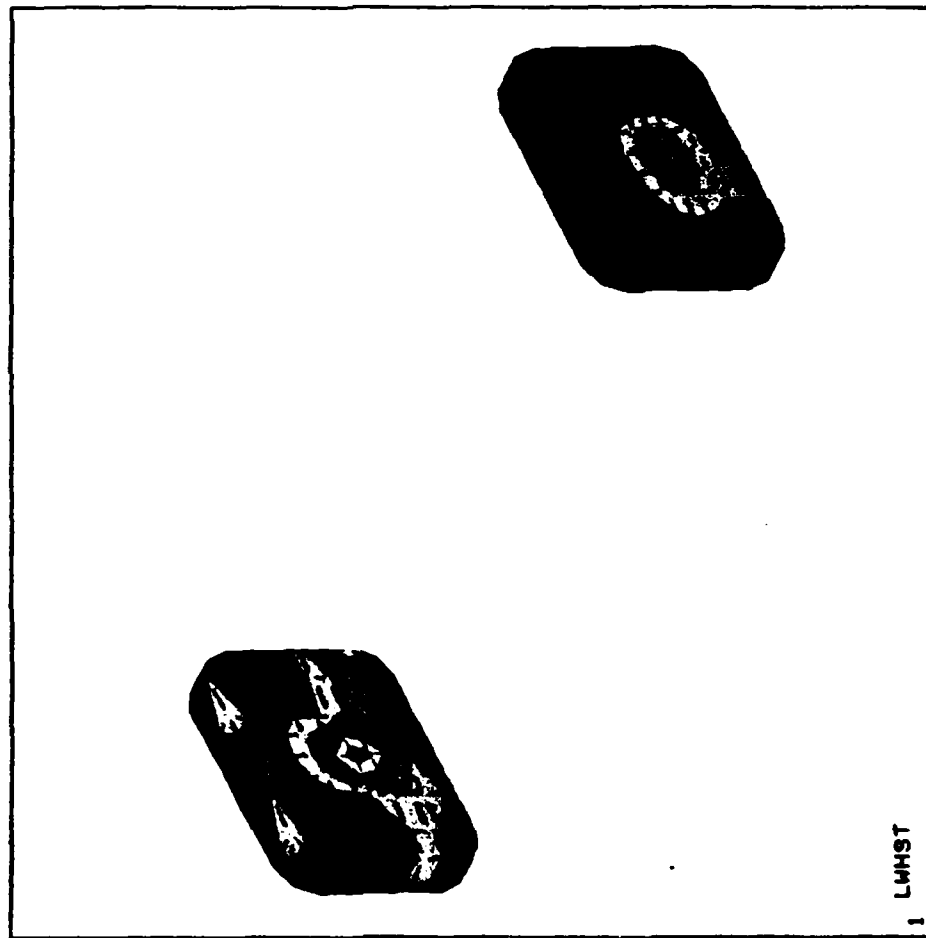
ANSYS 4.2B
 MAR 3 1987
 7:41:04
 PLOT NO. 49
 POST1 STRESS
 STEP=3
 ITER=1
 SX
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=138
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=10085
 MN=-10179
 -7929
 -5677
 -3425
 -1173
 1079
 7835
 10087



ANSYS 4.28
MAR 3 1987
7:41:12
PLOT NO. 50
POST1 STRESS
STEP=3
ITER=1
SY
BOTTOM
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=5116
MN=-7453
-6058
-4661
-3264
-1867
-470
3721
5118



ANSYS 4.28
MAR 3 1987
7:41:34
PLOT NO. 51
POST1 STRESS
STEP=3
ITER=1
SIGE
BOTTOM
XV=1
YV=1
ZV=-1
DIST=59.9
YF=1.63
ZF=-52
HIDDEN
MX=730
MN=17.5
93.9
174
254
334
414
514
600
654
734



ANSYS 4.28

MAR 3 1987

7:43:08

PLOT NO. 52

POST1 STRESS

STEP=4

ITER=1

SX

TOP

STRESS ELEM CS

XV=1

YV=1

ZV=-1

DIST=91.1

XF=9.76

YF=1.51

ZF=-112

HIDDEN

MX=6080

MN=-19537

-16710

-13861

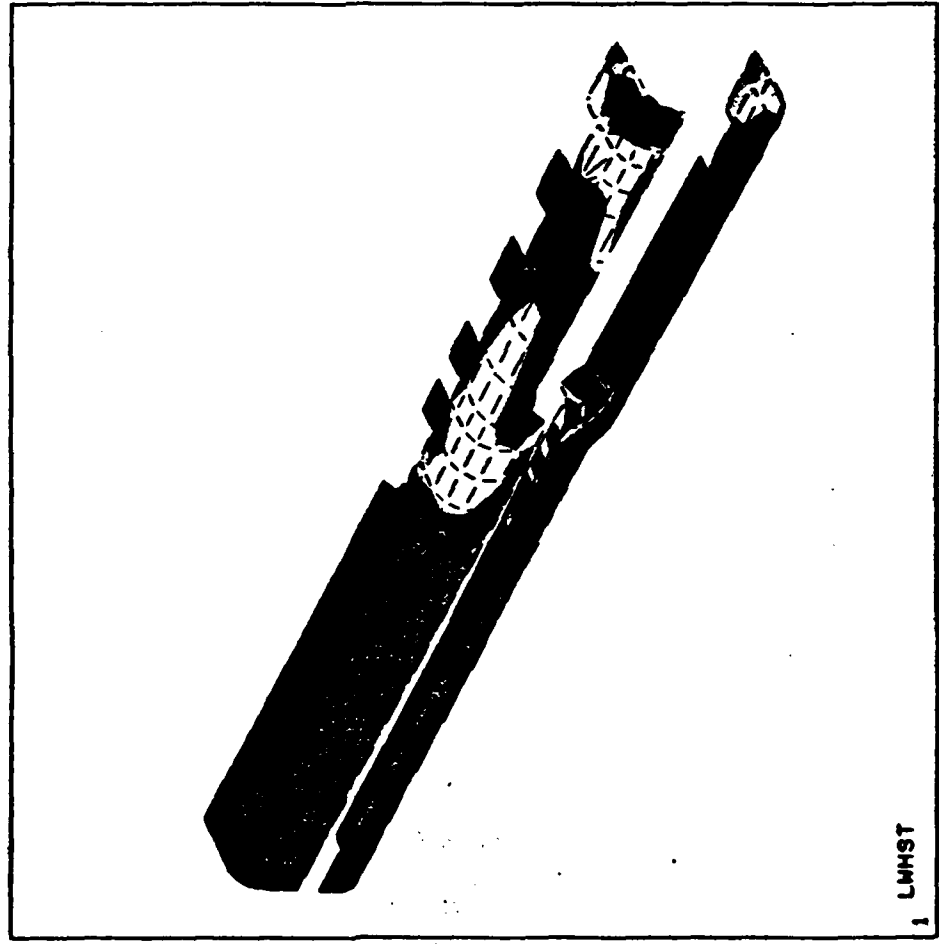
-11012

-8163

-5314

-2455

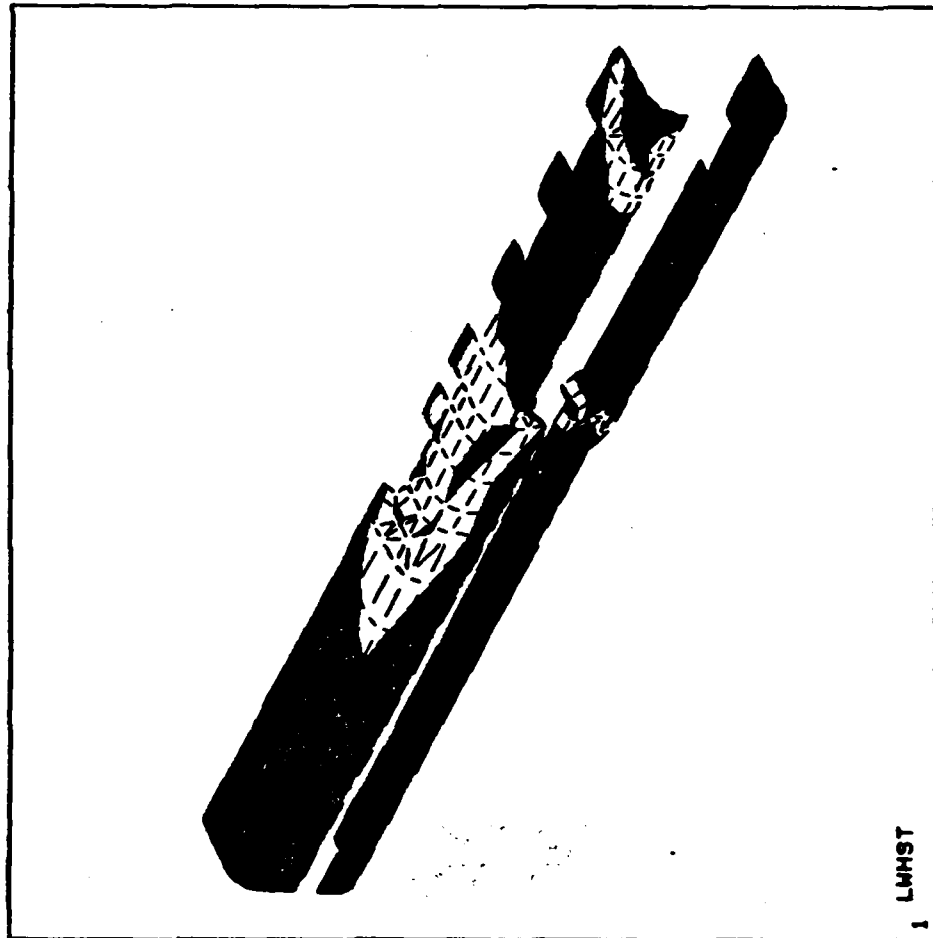
384

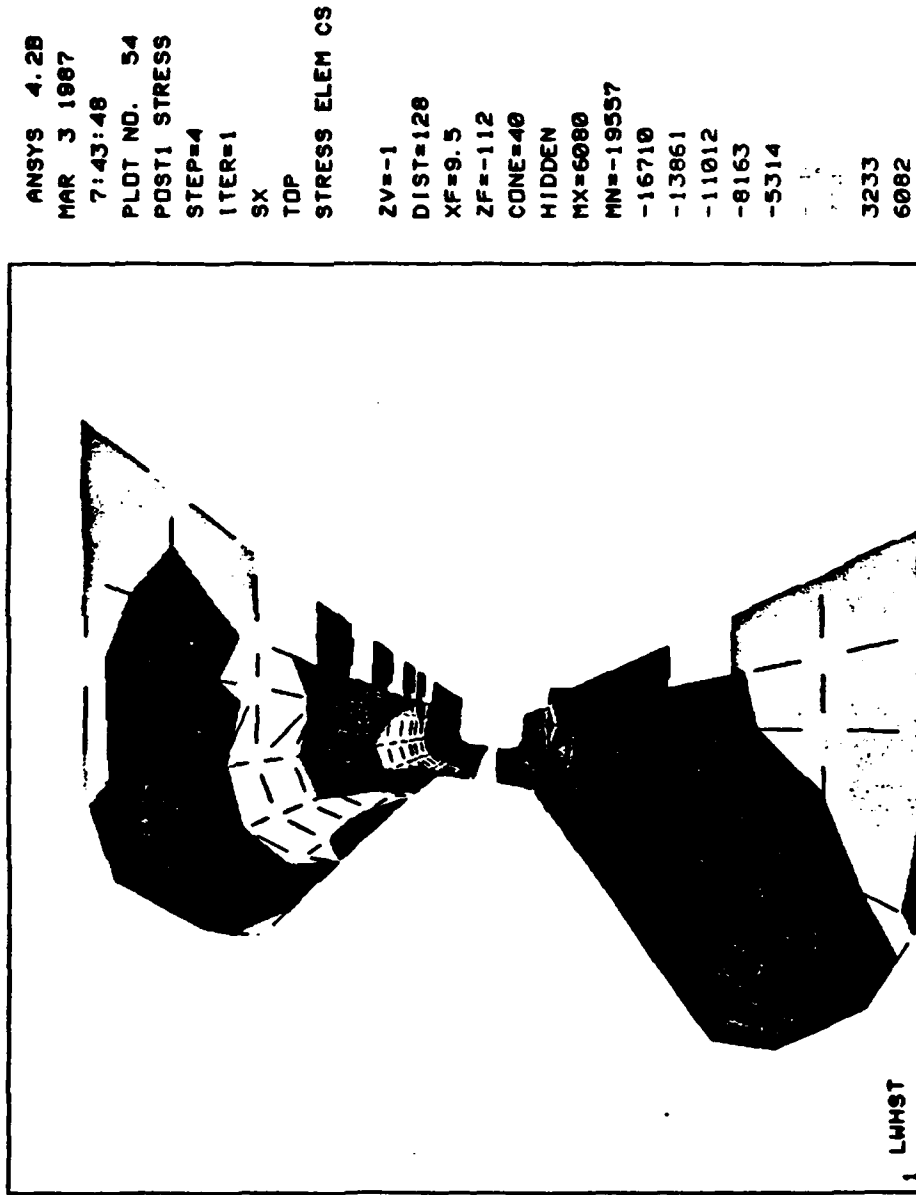


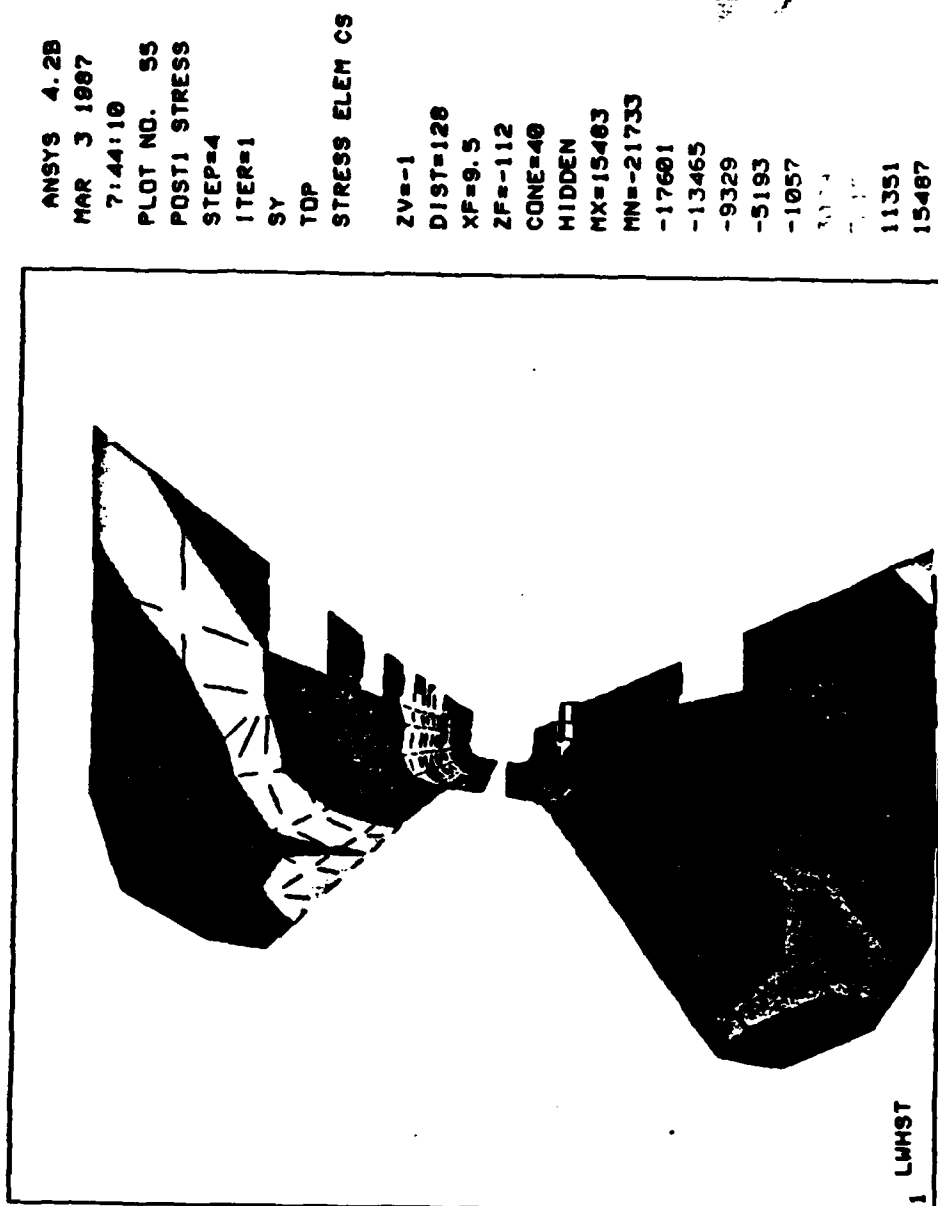
1, LMHST

ANSYS 4.2B
MAR 3 1987
7:43:28
PLOT NO. 53
POST1 STRESS
STEP=4
ITER=1
SY
TOP
STRESS ELEM CS

XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=15483
MN=-21733
-17601
-13465
-9329
-5193
-1057
2000
2015

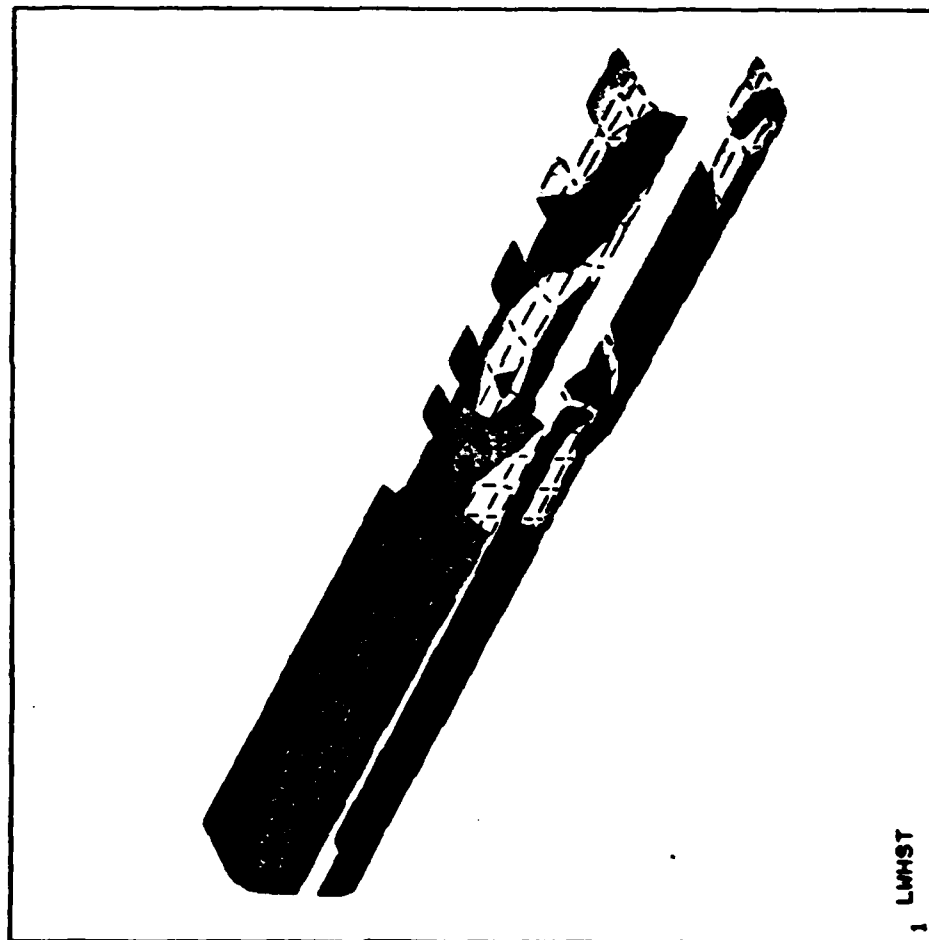




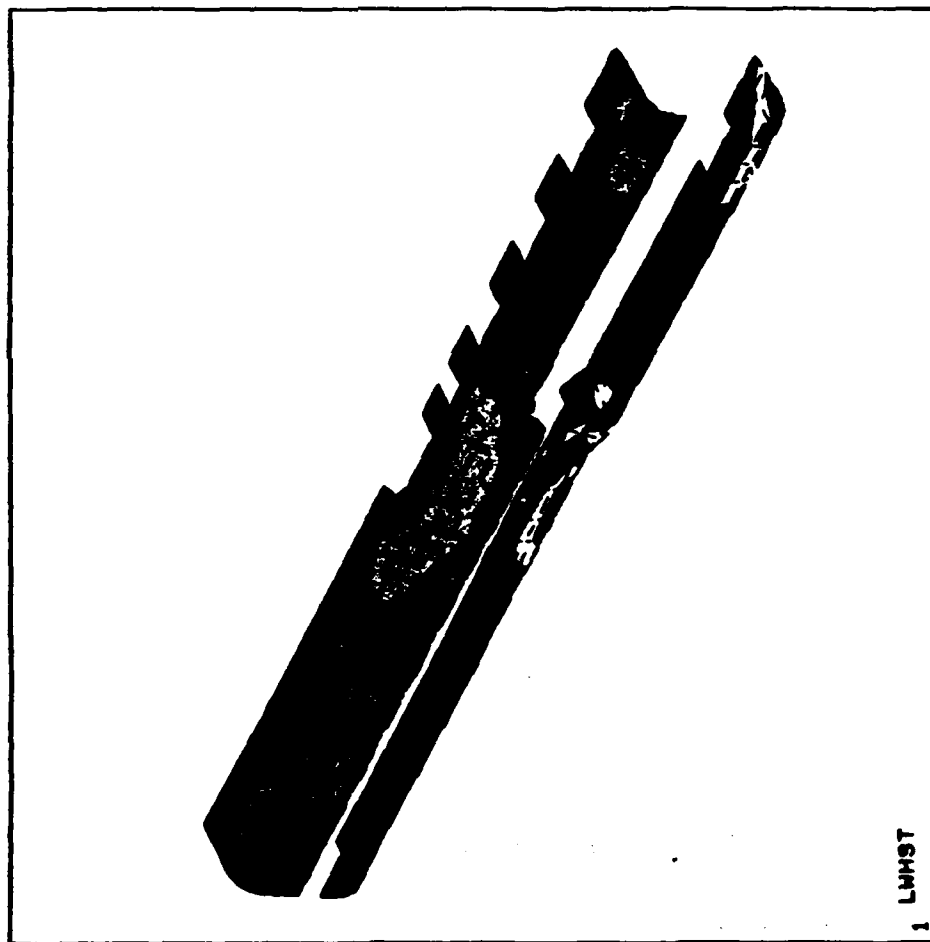


ANSYS 4.2B
MAR 3 1987
7:44:10
PLOT NO. 55
POST1 STRESS
STEP=4
ITER=1
SY
TOP
STRESS ELEM CS
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=15463
MN=-21733
-17601
-13465
-9329
-5193
-1057
11351
15487

ANSYS 4.2B
 MAR 3 1987
 7:44:37
 PLOT NO. 56
 POST1 STRESS
 STEP=4
 ITER=1
 SX
 BOTTOM
 STRESS ELEM C9
 XV=1
 YV=1
 ZV=-1
 DIST=91.1
 XF=9.76
 YF=1.51
 ZF=-112
 HIDDEN
 MX=7395
 MN=-23999
 -20514
 -17025
 -13536
 -10047
 -6558
 17000
 17000

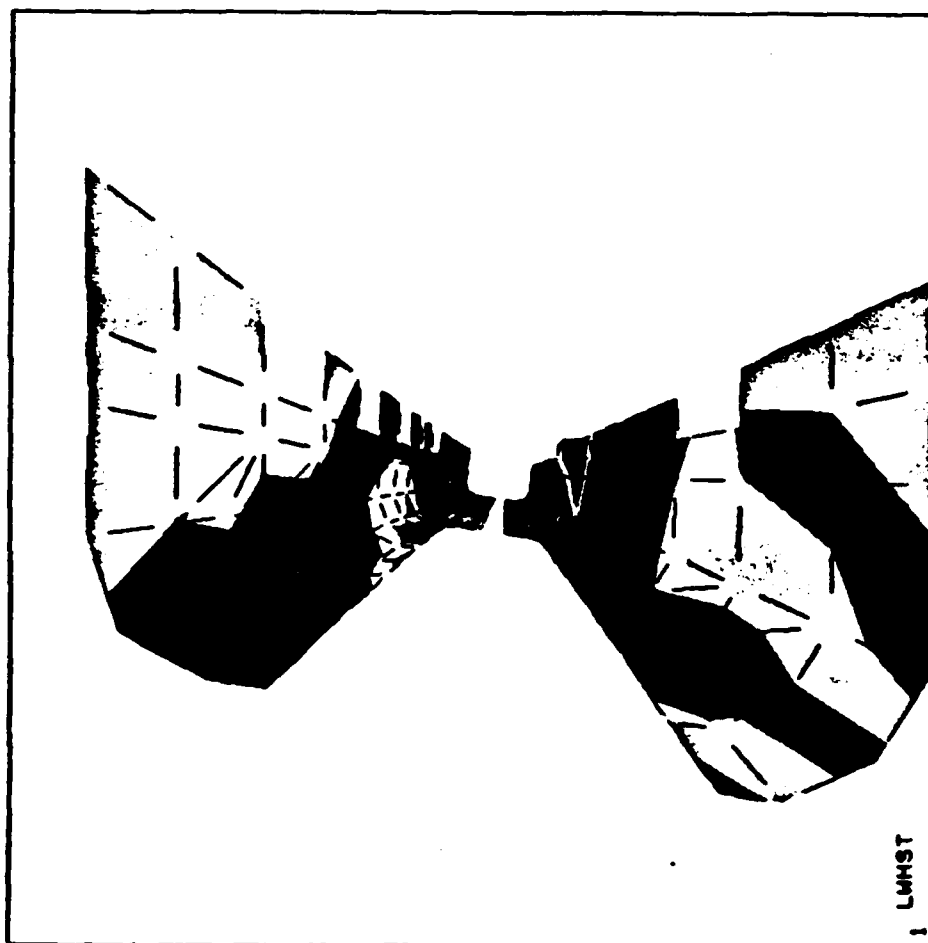


ANSYS 4.2B
MAR 3 1987
7:44:53
PLOT NO. 57
POST1 STRESS
STEP=4
ITER=1
SY
BOTTOM
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=91.1
XF=9.76
YF=1.51
ZF=-112
HIDDEN
MX=13339
MN=-12247
-9405
-6562
-3719
-876
1967
4810
755



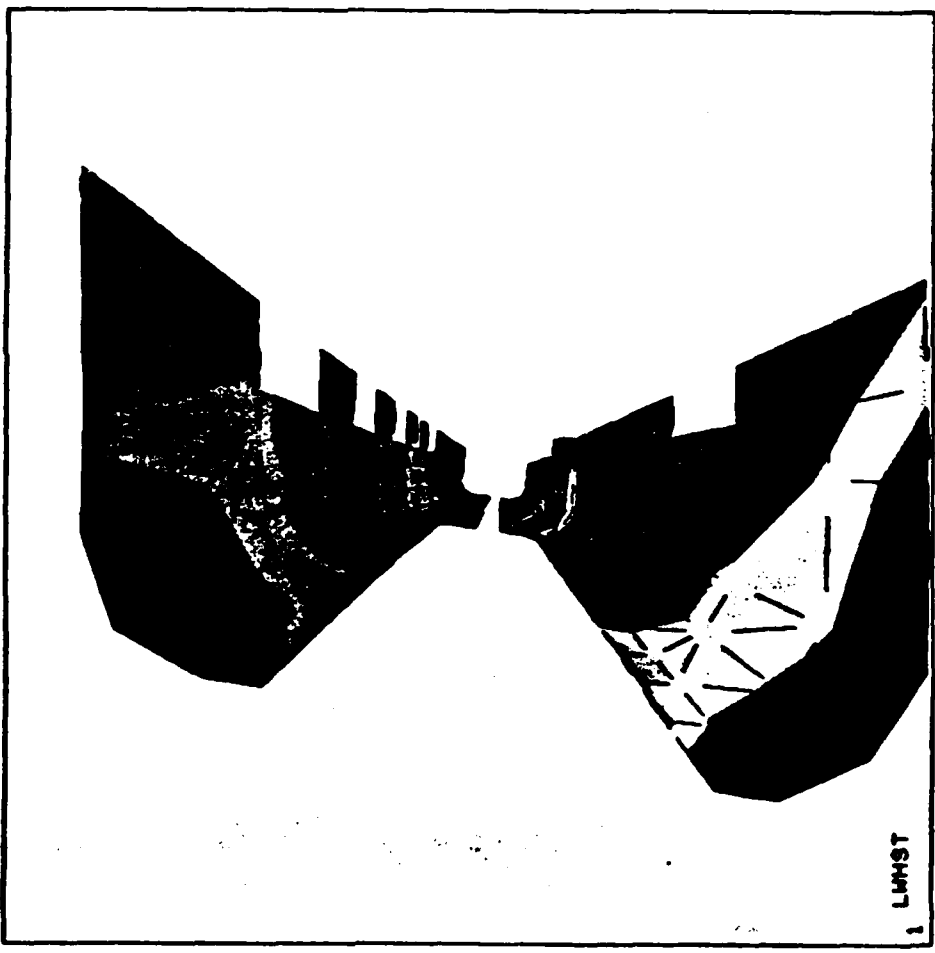
ANSYS 4.2B
MAR 3 1987
7:45:09
PLOT NO. 58
POST1 STRESS
STEP=4
ITER=1
SX
BOTTOM
STRESS ELEM CS

ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=48
HIDDEN
MX=7395
MN=-23998
-28514
-17025
-13536
-18047
-6558
3909
7398

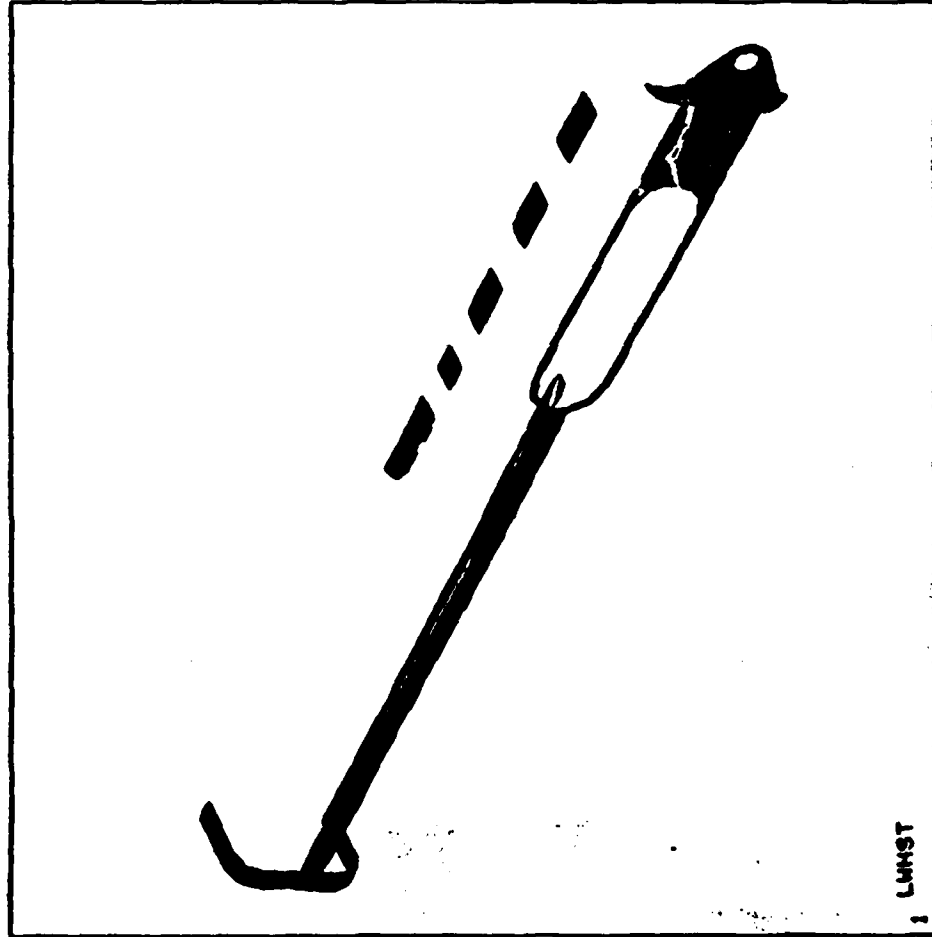


ANSYS 4.2B
MAR 3 1987
7:45:25
PLOT NO. 59
POST1 STRESS
STEP=4
ITER=1
SY
BOTTOM
STRESS ELEM CS

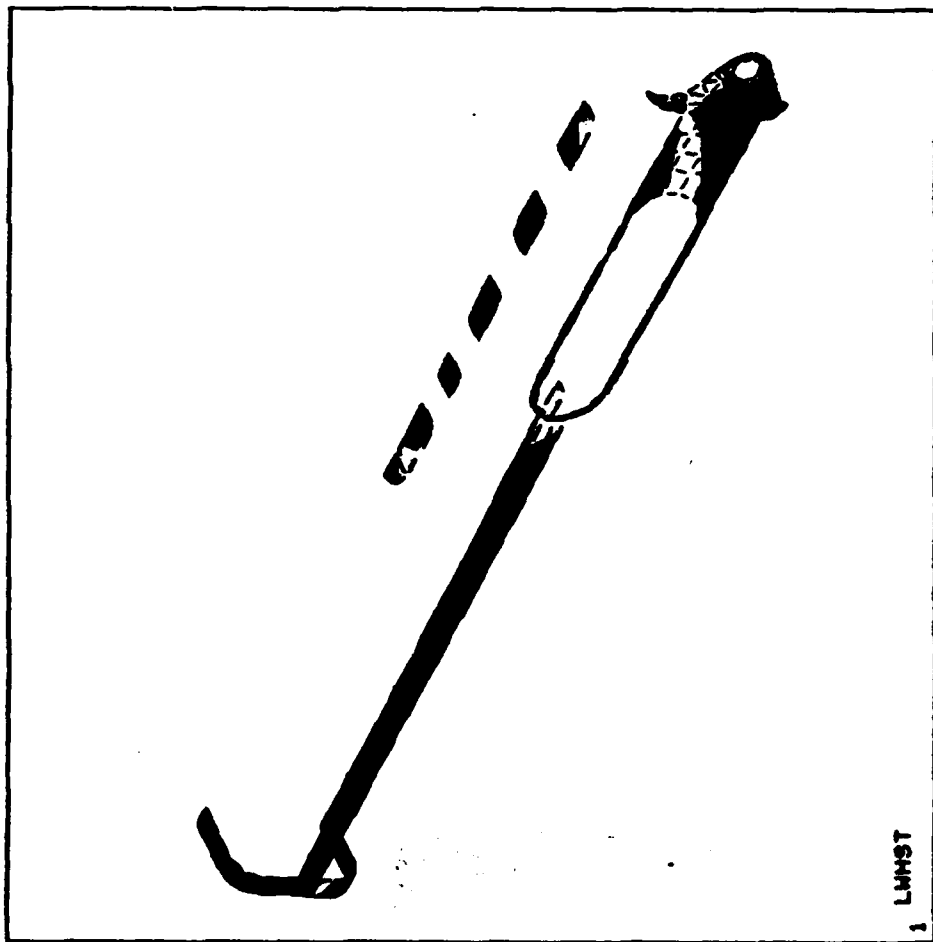
ZV=-1
DIST=128
XF=9.5
ZF=-112
CONE=40
HIDDEN
MX=13339
MN=-12247
-9405
-6562
-3719
-876
1967
10496
13339



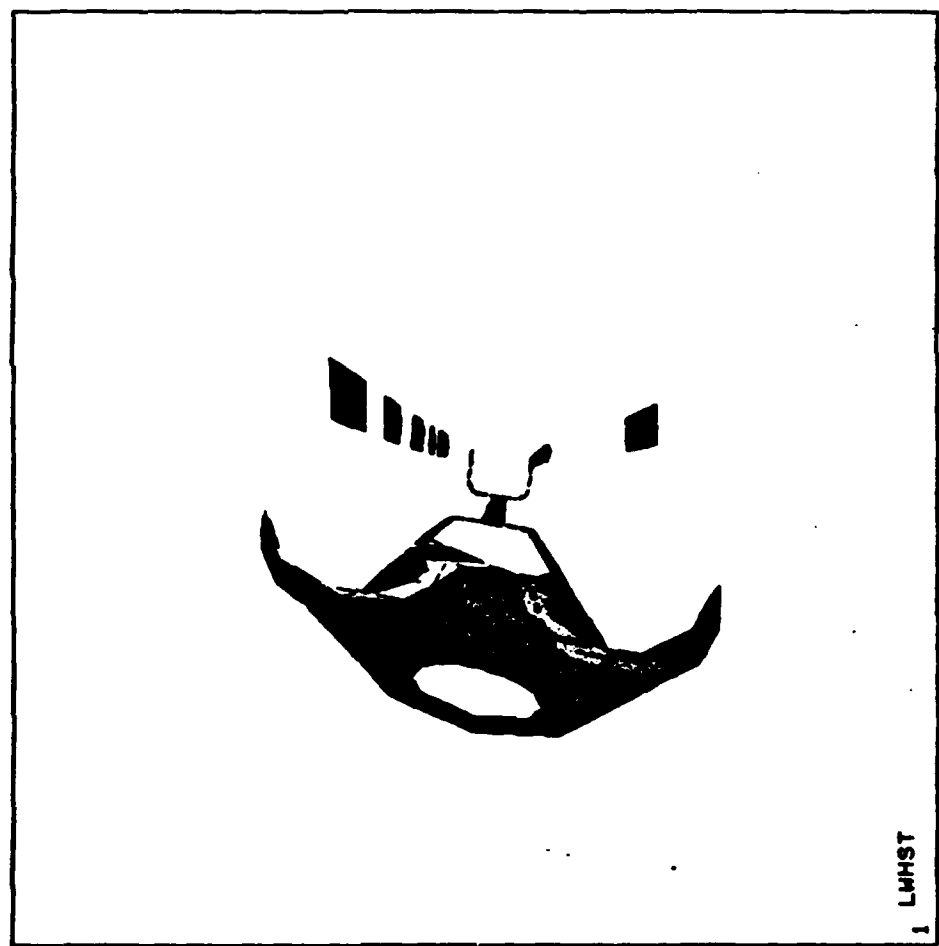
ANSYS 4.2B
 MAR 3 1987
 7:45:56
 PLOT NO. 60
 POST1 STRESS
 STEP=4
 ITER=1
 SX
 TOP
 STRESS ELEM C9
 XV=1
 YV=1
 ZV=-1
 DIST=92.2
 XF=10.9
 YF=1.46
 ZF=-110
 HIDDEN
 MX=23654
 MN=-22650
 -17505
 -12360
 -7215
 -2070
 3075
 8770
 11355



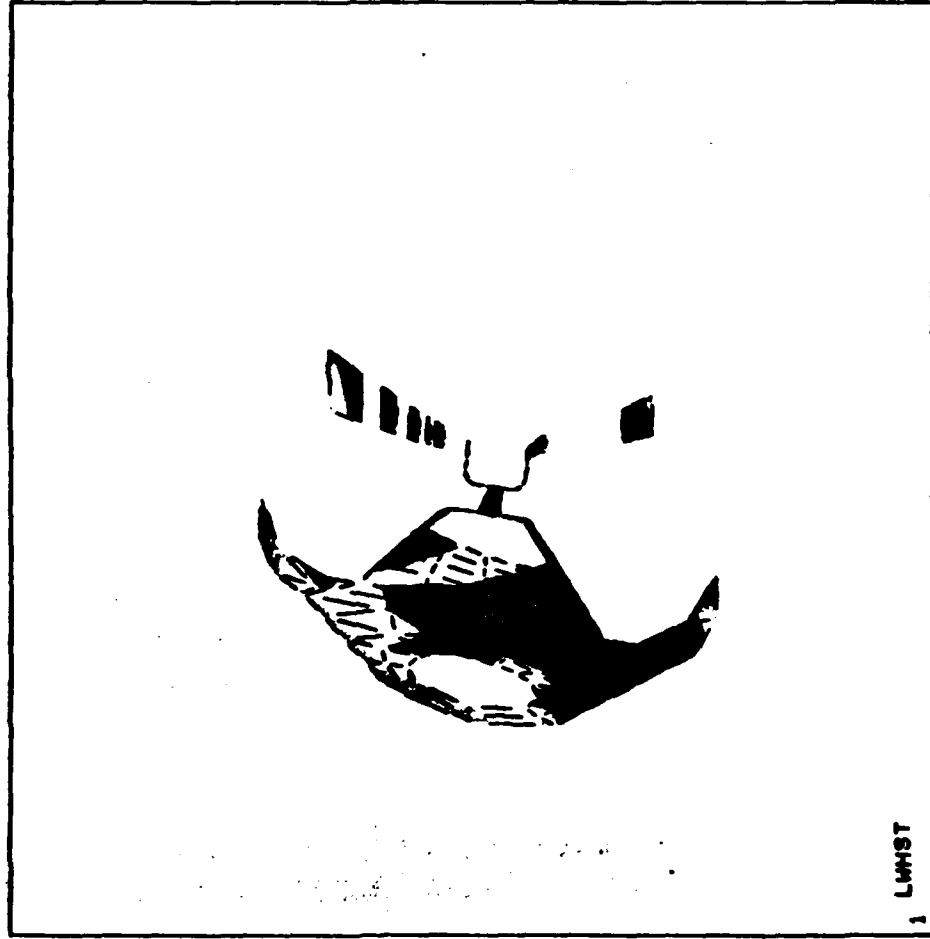
ANSYS 4.2B
MAR 3 1987
7:46:06
PLOT NO. 61
POST1 STRESS
STEP=4
ITER=1
SY
TOP
STRESS ELEM CS
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=15210
MN=-35830
-30166
-24493
-18820
-13147
-7474
-1301
3000



ANSYS 4.2B
 MAR 3 1987
 7:46:13
 PLOT NO. 62
 POST1 STRESS
 STEP=4
 ITER=1
 SX
 TOP
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=23654
 MN=-22650
 -17505
 -12360
 -7215
 -2070
 3075
 18510
 23655

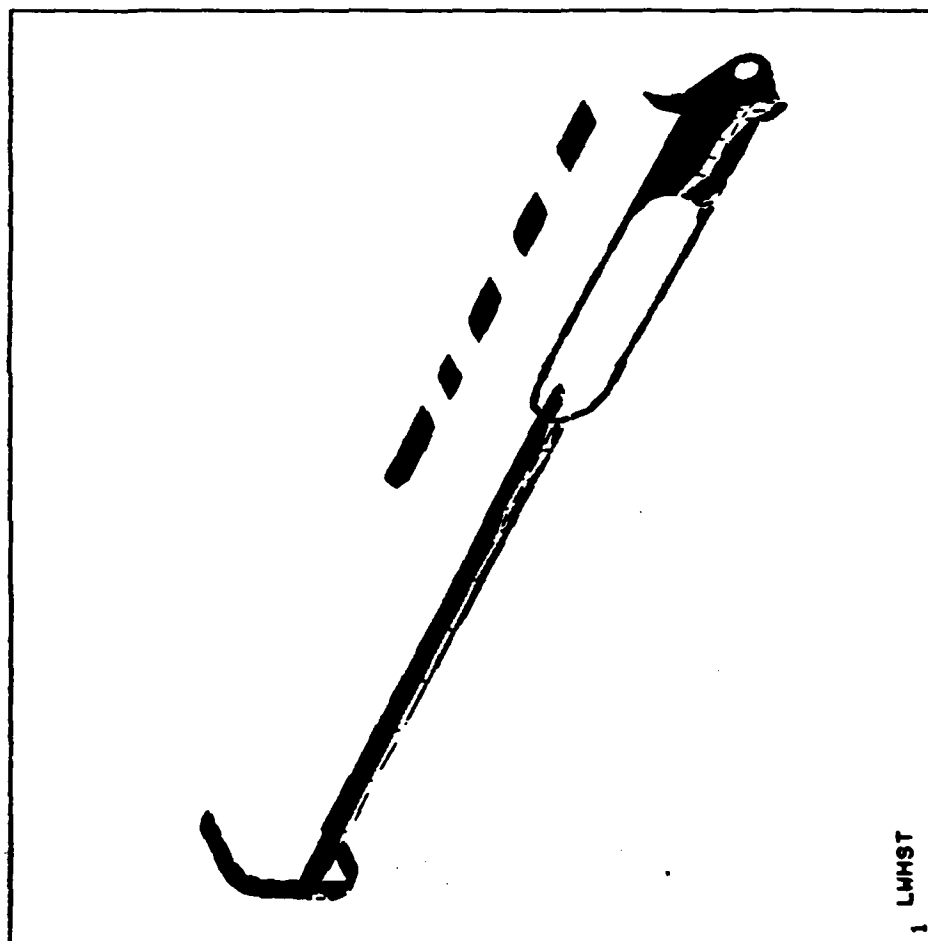


ANSYS 4.2B
MAR 3 1987
7:46:24
PLOT NO. 63
POST1 STRESS
STEP=4
ITER=1
SY
TOP
STRESS ELEM CS
ZV=-1
DIST=139
XF=9.5
ZF=-119
CONE=40
HIDDEN
MX=15210
MN=-35830
-30166
-24493
-18820
-13147
-7474
-1101
9545
15210



ANSYS 4.2B
MAR 3 1987
7:46:39
PLOT NO. 64
POST1 STRESS
STEP=4
ITER=1
SX
BOTTOM
STRESS ELEM CS

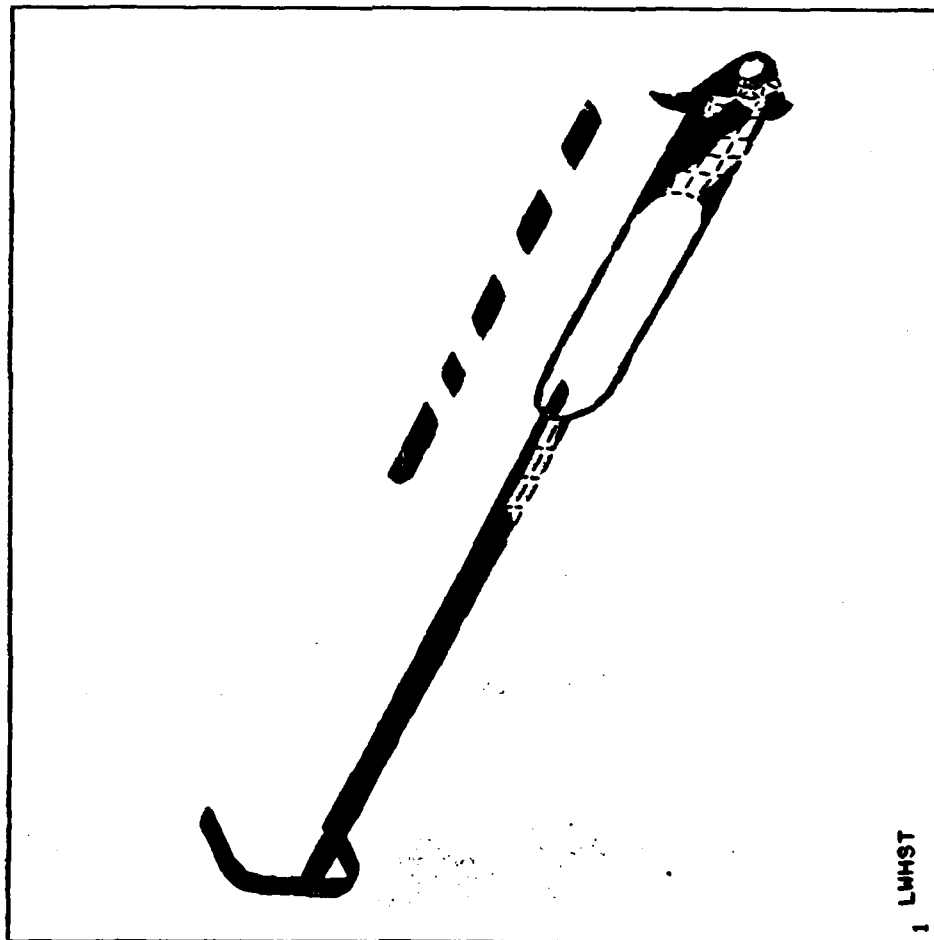
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=22780
MY=-32228
-26116
-20004
-13892
-7780
-1668
4444
10556



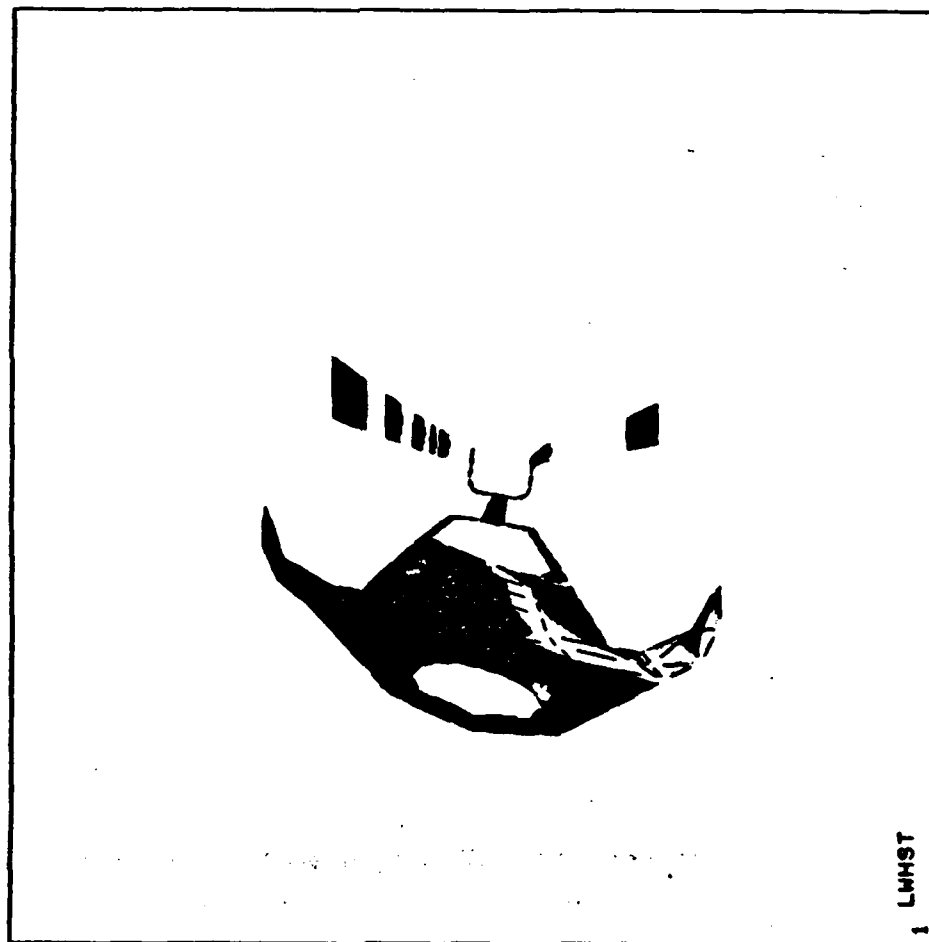
79

ANSYS 4.2B
MAR 3 1987
7:46:48
PLOT NO. 65
POST1 STRESS
STEP=4
ITER=1
SY
BOTTOM
STRESS ELEM CS

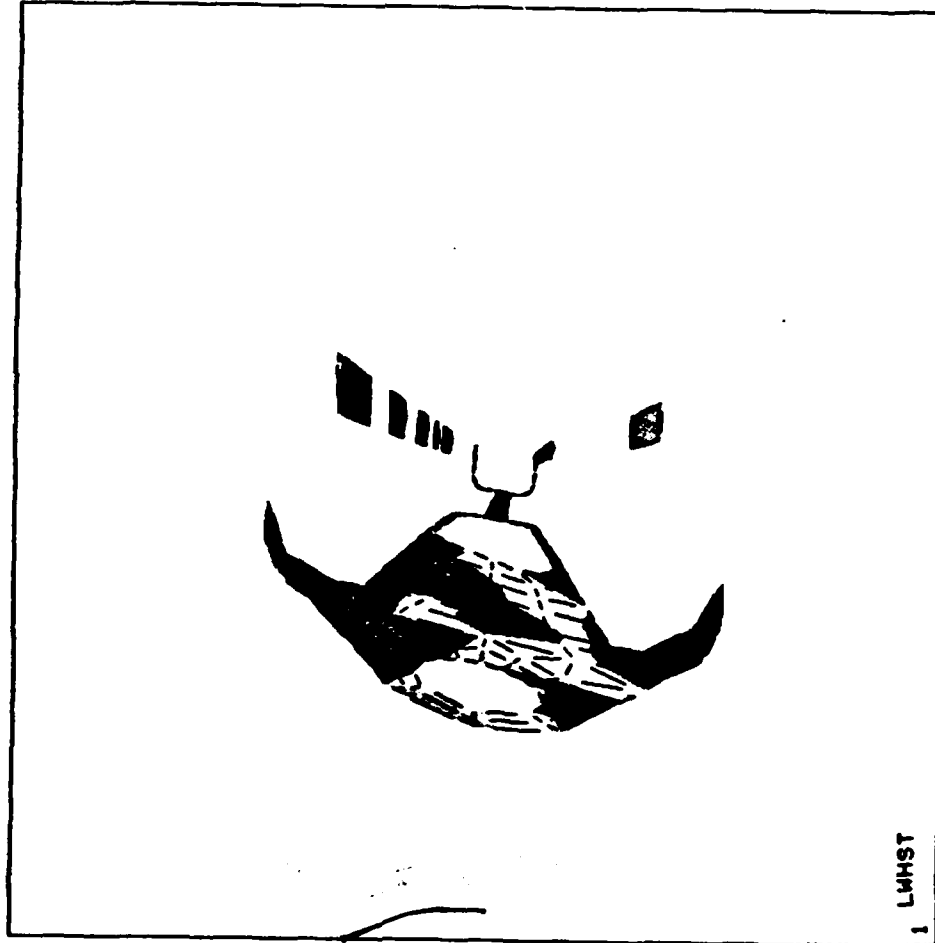
XV=1
YV=1
ZV=-1
DIST=92.2
XF=10.9
YF=1.46
ZF=-110
HIDDEN
MX=9792
MN=-24241
-20461
-16679
-12897
-9115
-5333
-1551
2331



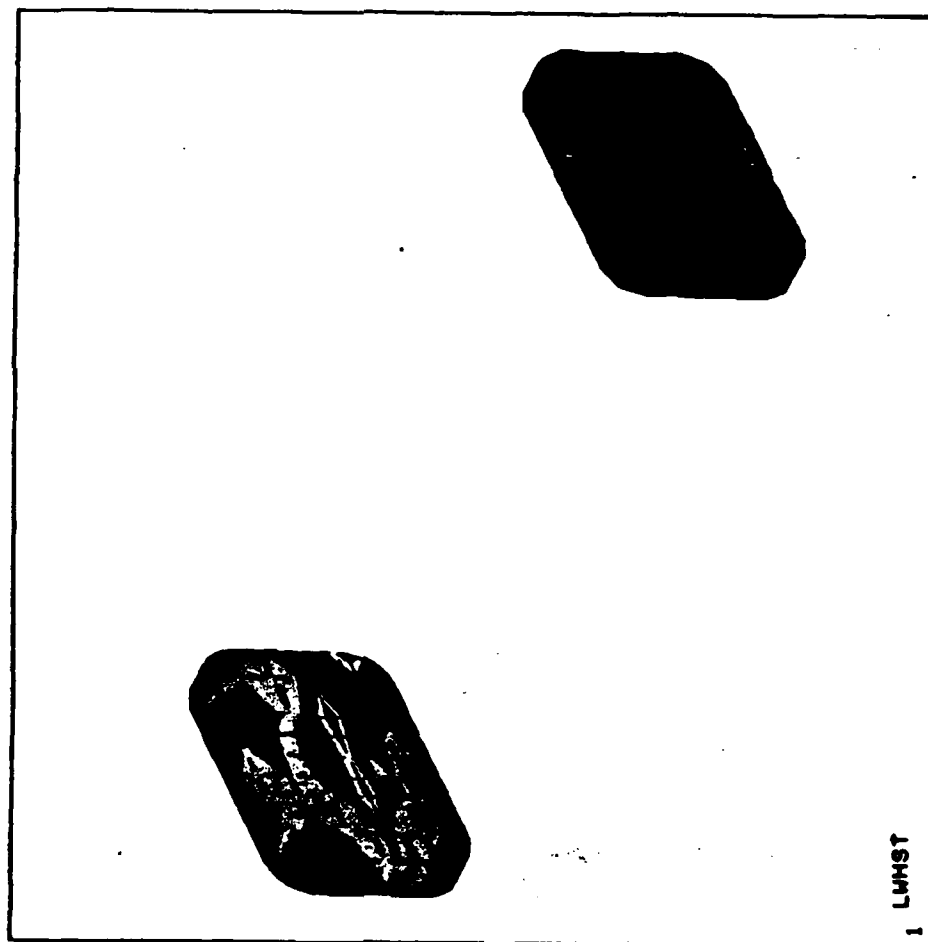
ANSYS 4.2B
 MAR 3 1987
 7:46:57
 PLOT NO. 66
 POST1 STRESS
 STEP=4
 ITER=1
 SX
 BOTTOM
 STRESS ELEM C3
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=22780
 MN=-32220
 -26116
 -20004
 -13892
 -7780
 -1668
 16668
 22780



ANSYS 4.2B
 MAR 3 1987
 7:47:07
 PLOT NO. 67
 POST1 STRESS
 STEP=4
 ITER=1
 SY
 BOTTOM
 STRESS ELEM CS
 ZV=-1
 DIST=139
 XF=9.5
 ZF=-119
 CONE=40
 HIDDEN
 MX=9792
 MN=-24241
 -20461
 -16679
 -12897
 -9115
 -5333
 6013
 9795



ANSYS 4.2B
MAR 3 1987
7:47:29
PLOT NO. 68
POST1 STRESS
STEP=4
ITER=1
SIGE
BOTTOM
XV=1
YV=1
ZV=-1
DIST=59.9
YF=1.63
ZF=-52
HIDDEN
MX=2531
MN=12.2
292
572
852
1132
1412
1692
1972
2252
2532



END

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DTIC