TALAT Lectures 2711 - Appendix

Design of A Helicopter deck

81 pages, 7 figures

Advanced Level

Prepared by Federico M. Mazzolani, University of Naples Federico II, Napoli

Update from the TAS Project :

TAS

Leonardo da Vinci program
Training in Aluminium Alloy Structural Design

Remark

The design of the main structural parts of an aluminium alloy helicopter deck is shown in this document. The design of a bolted connection on the supporting structure is also presented. The calculations carried out hereafter are based on the European Standard prENV 1999 (version April 1997).

Date of Issue: 1999

2711 Design of A Helicopter deck - Appendix

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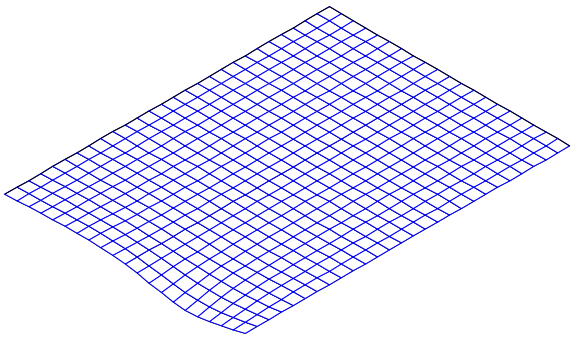
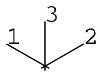
FIG. 1 – DISPLACEMENT AND STRESS CONTOUR, LOAD CONDITION 1,ULTIMATE LIMIT STATE

ABAQUS





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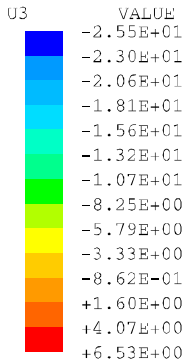
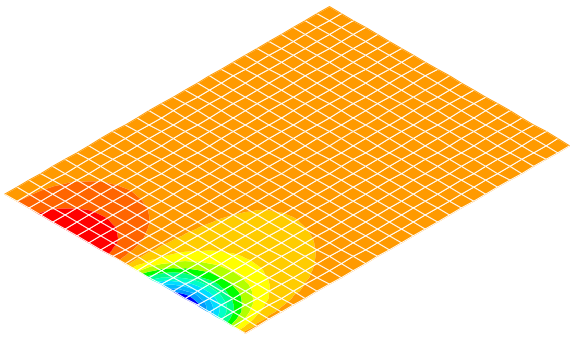
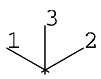
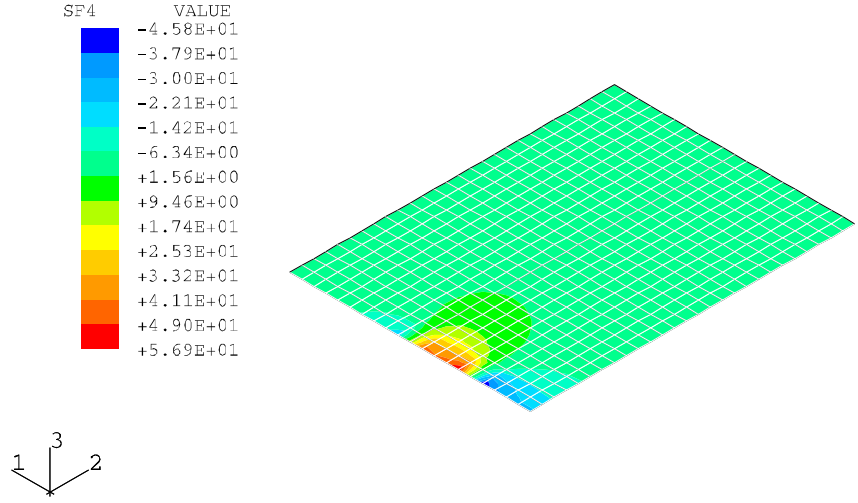






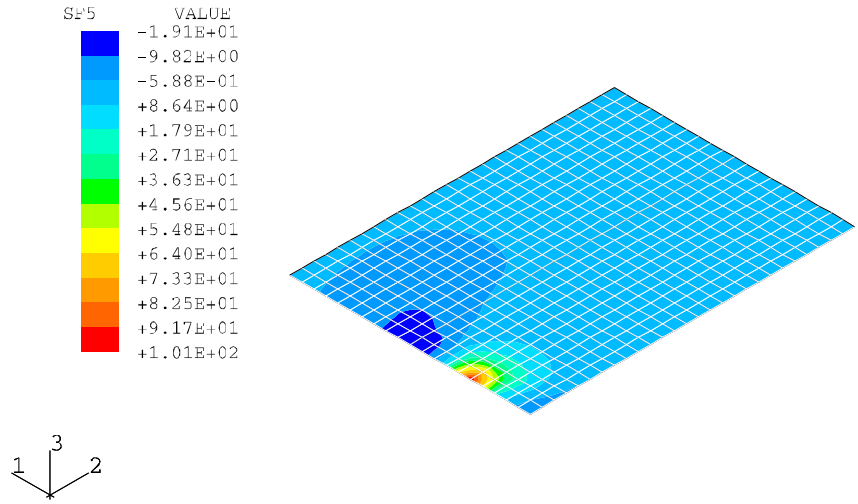
Maximum value = 6.531 at node 1401
Minimum value = -25.50 at node 501

ABAQUS



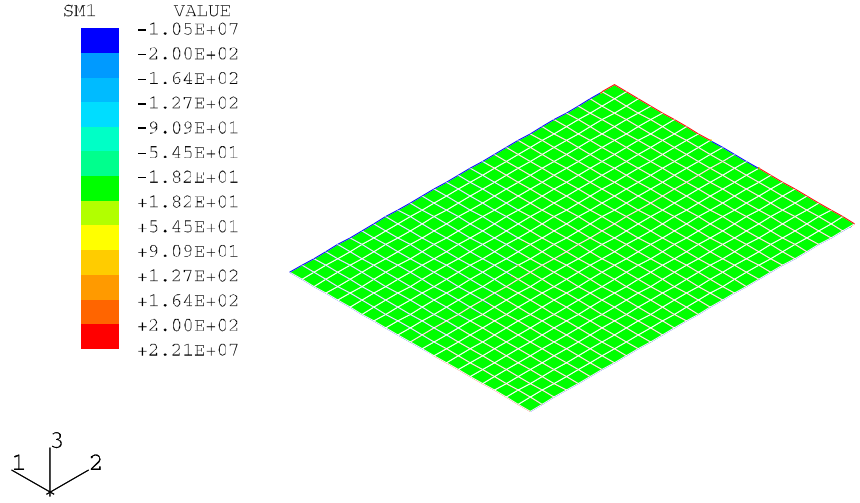
Maximum value = 56.88 at node 601
Minimum value = -45.85 at node 401

ABAQUS



Maximum value = 101.0 at node 501
Minimum value = -19.05 at node 1001

ABAQUS

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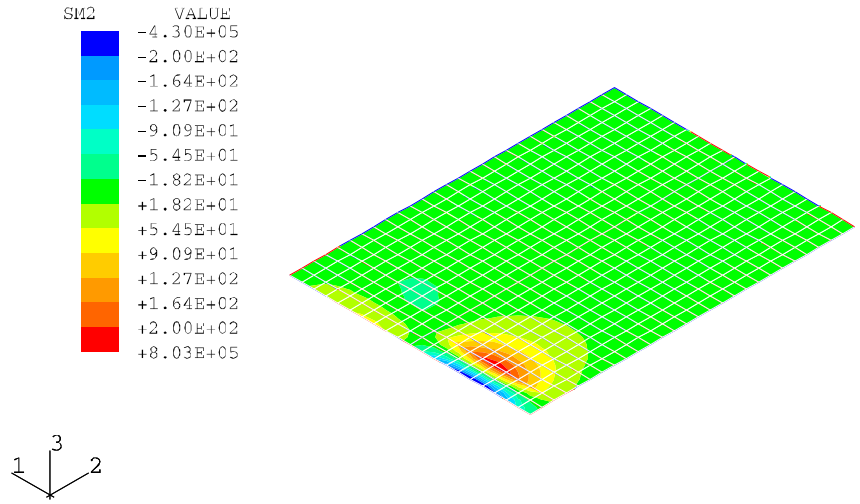


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Maximum value =   8.0318E+05 at node        2
Minimum value =  -4.3009E+05 at node      502
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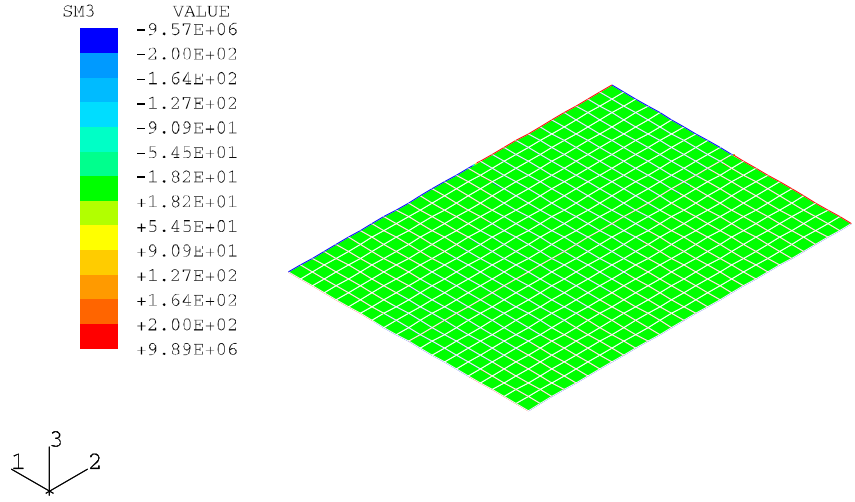
ABAQUS

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Maximum value =   9.8871E+06 at node      102
Minimum value =  -9.5695E+06 at node      802
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FIG. 2 – DISPLACEMENT AND STRESS CONTOUR, LOAD CONDITION 2, ULTIMATE LIMIT STATE

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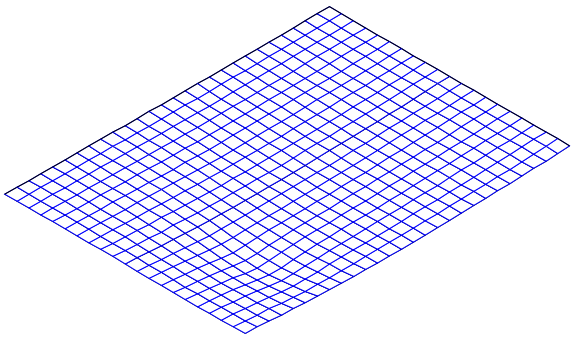

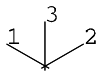

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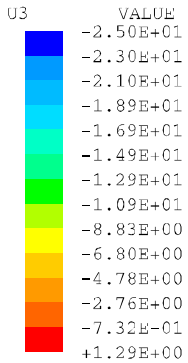
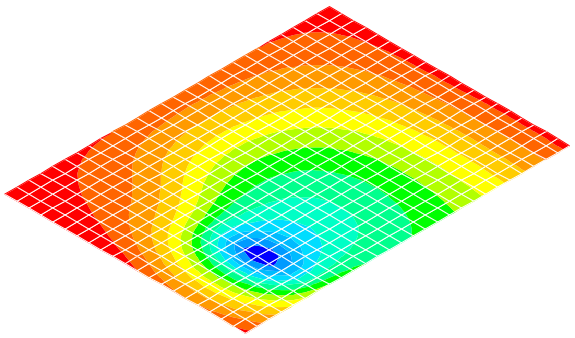
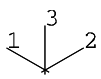
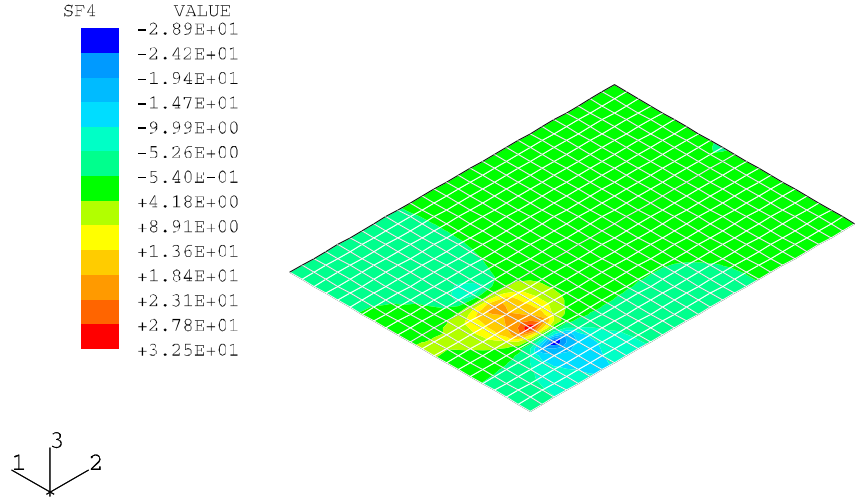






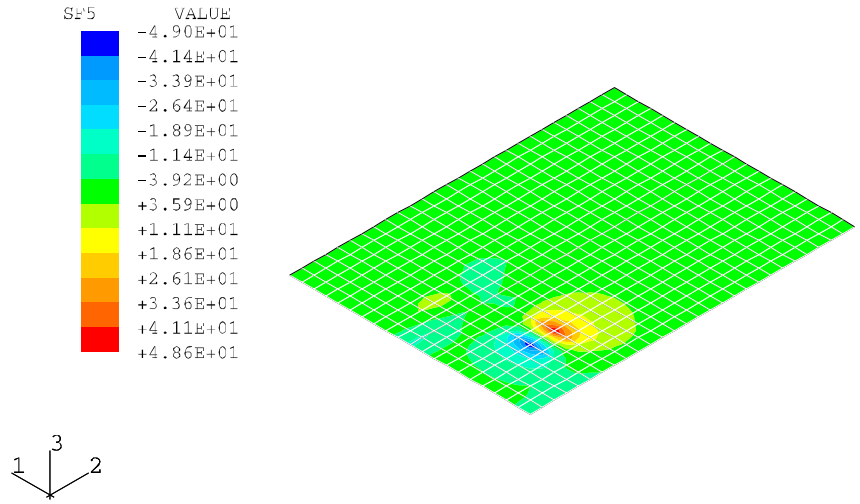
Maximum value = 1.292 at node 1401
Minimum value = -25.02 at node 507

ABAQUS



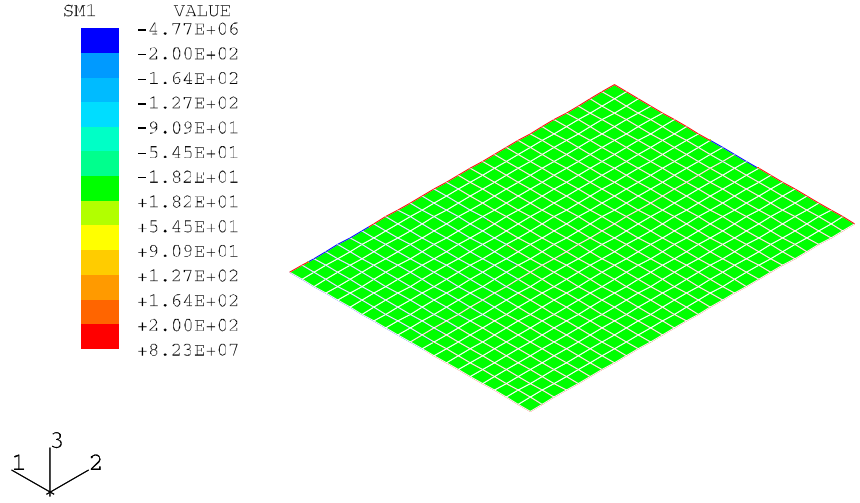
Maximum value = 32.53 at node 607
Minimum value = -28.89 at node 407

ABAQUS



Maximum value = 48.62 at node 508
Minimum value = -48.95 at node 506

ABAQUS

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Maximum value =   8.2285E+07 at node      1007
Minimum value =  -4.7661E+06 at node      1007
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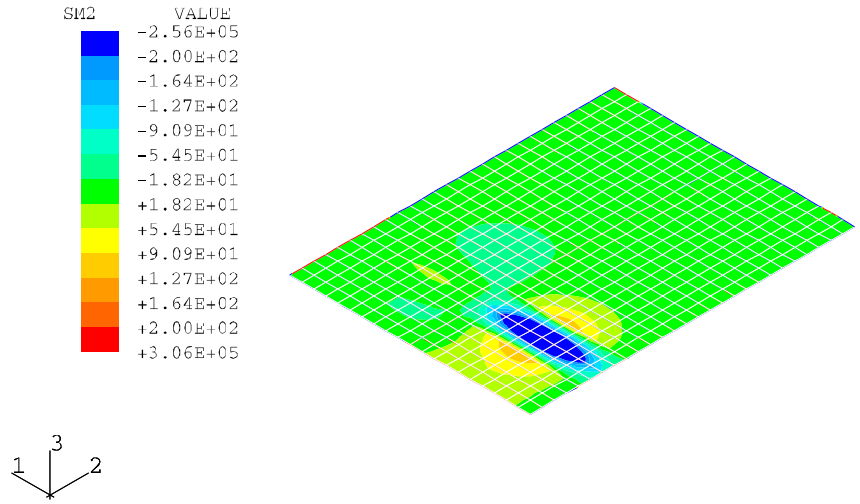
ABAQUS

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Maximum value =   3.0559E+05 at node         7
Minimum value =  -2.5650E+05 at node       508
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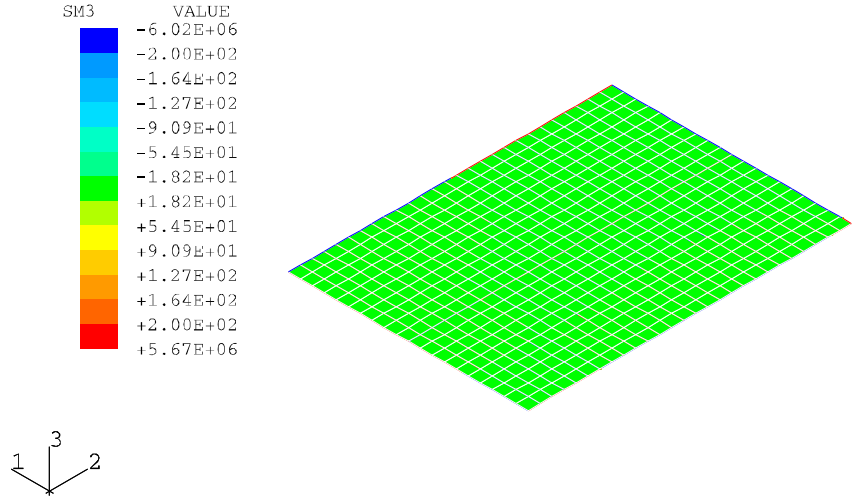
ABAQUS

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Maximum value =   5.6703E+06 at node      108
Minimum value =  -6.0219E+06 at node        6
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FIG. 3 – DISPLACEMENT AND STRESS CONTOUR, LOAD CONDITION 3, ULTIMATE LIMIT STATE

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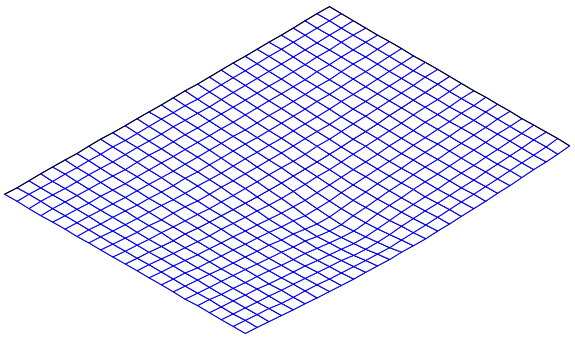

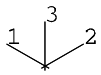

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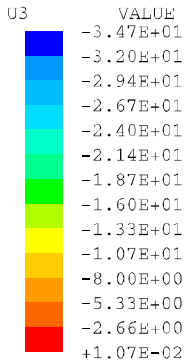
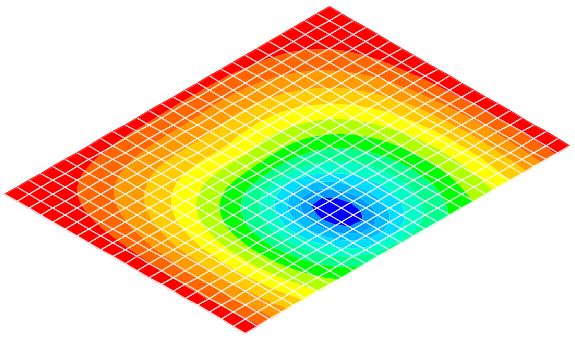
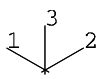
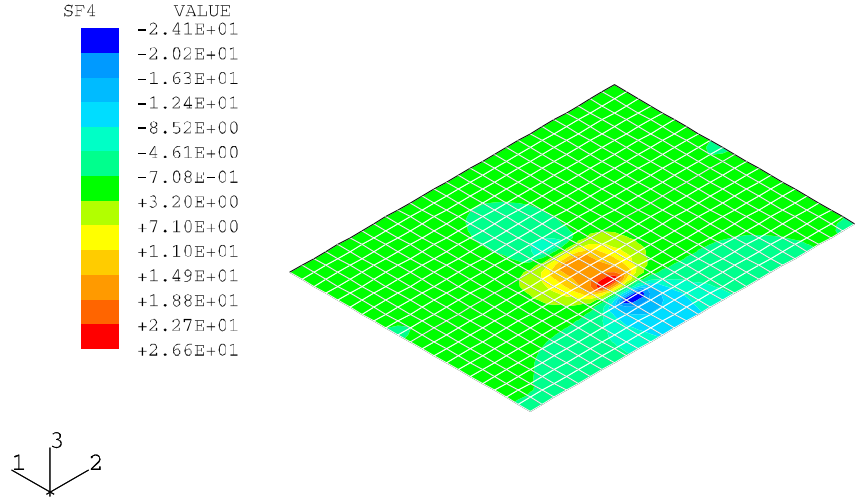






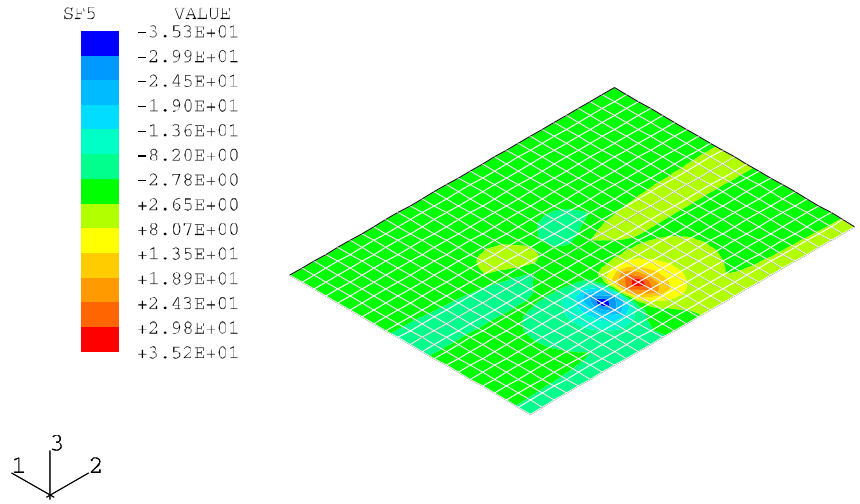
Maximum value = 1.0713E-02 at node 1101
Minimum value = -34.70 at node 514

ABAQUS



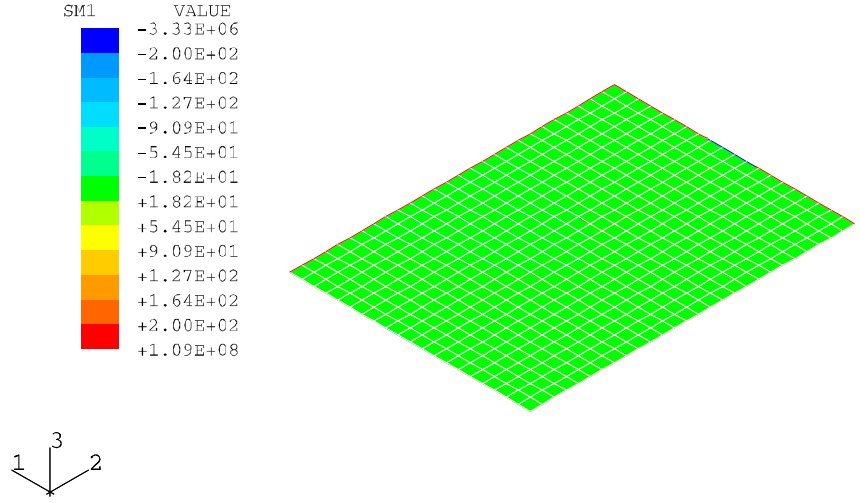
Maximum value = 26.64 at node 613
Minimum value = -24.15 at node 414

ABAQUS



Maximum value = 35.18 at node 515
Minimum value = -35.31 at node 512

ABAQUS

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Maximum value =   1.0916E+08 at node      1014
Minimum value =  -3.3256E+06 at node      1013
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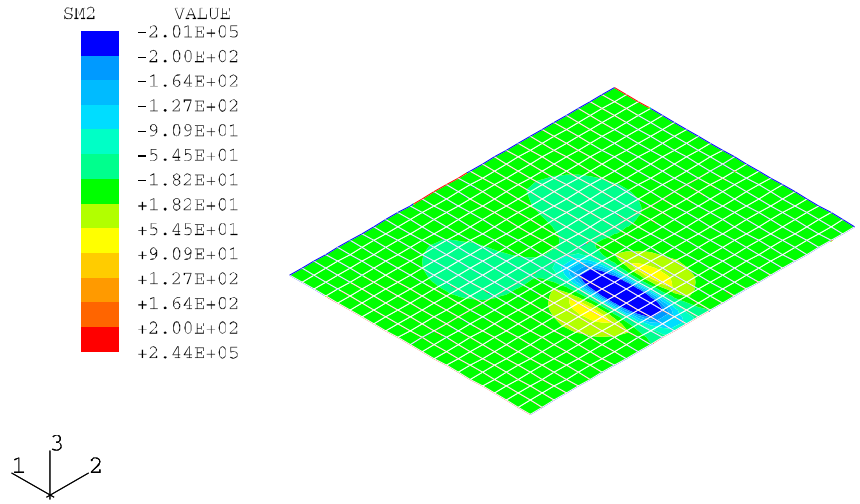
ABAQUS

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Maximum value =   2.4357E+05 at node        14
Minimum value =  -2.0058E+05 at node       515
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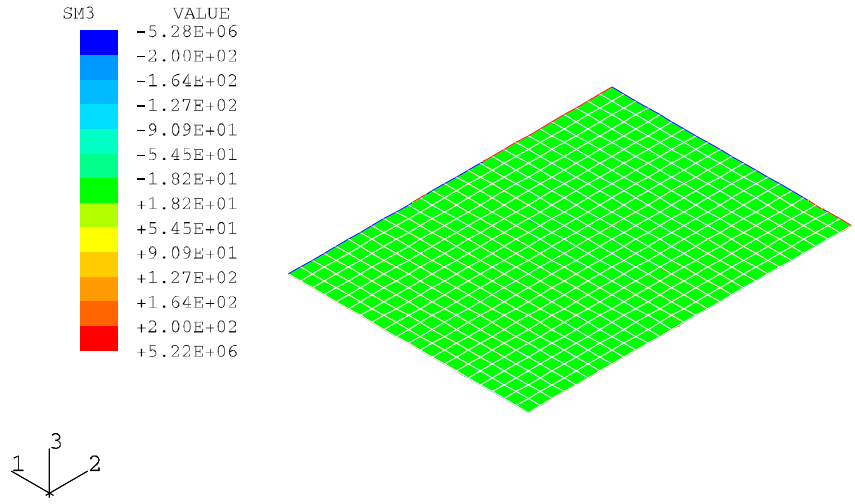
ABAQUS

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Maximum value =   5.2227E+06 at node       15
Minimum value =  -5.2836E+06 at node       12
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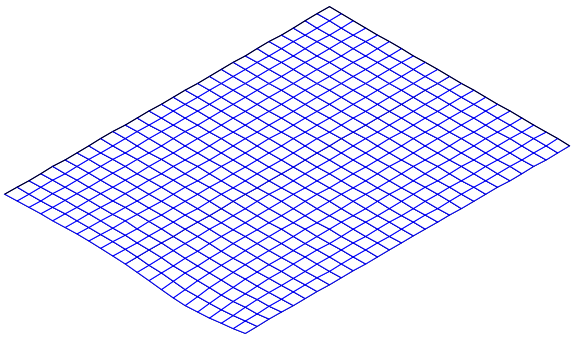
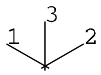
FIG. 4 – DISPLACEMENT AND STRESS CONTOUR, LOAD CONDITION 1, SERVICEABILITY LIMIT STATE

ABAQUS





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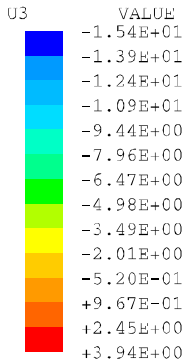
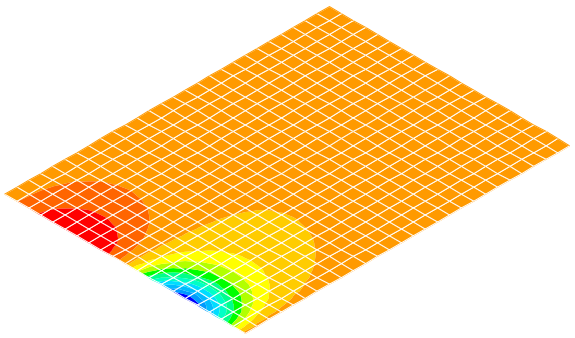
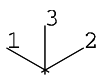
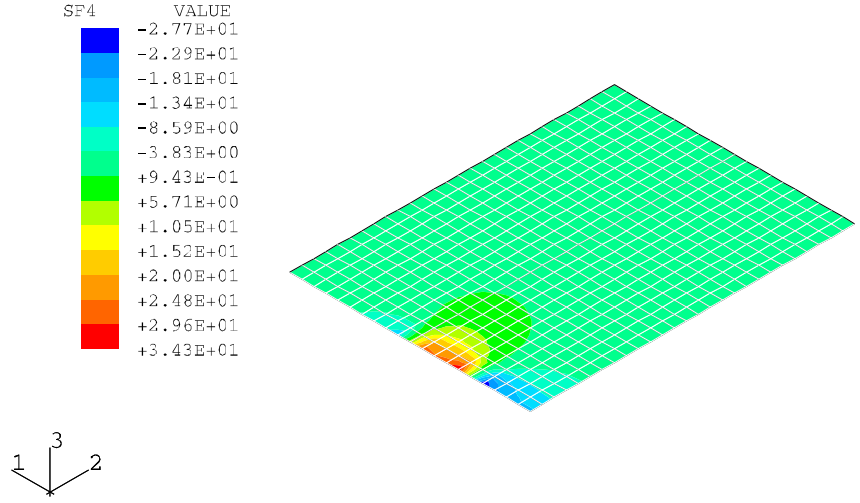






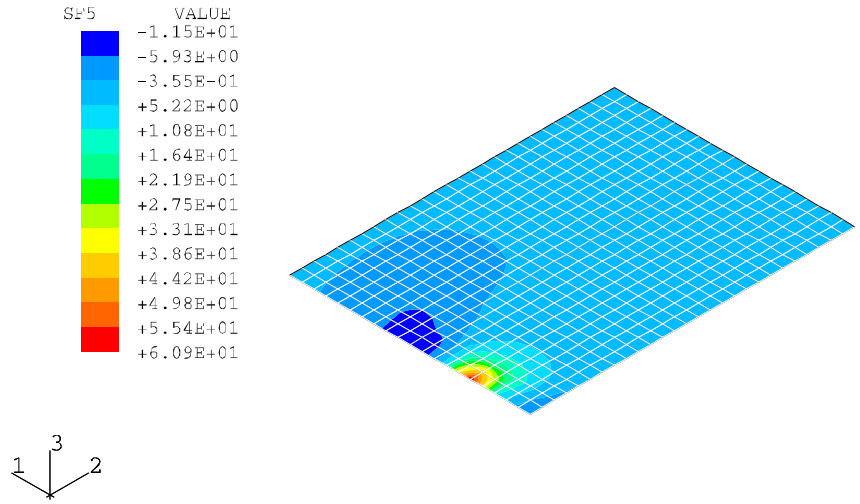
Maximum value = 3.941 at node 1401
Minimum value = -15.39 at node 501

ABAQUS



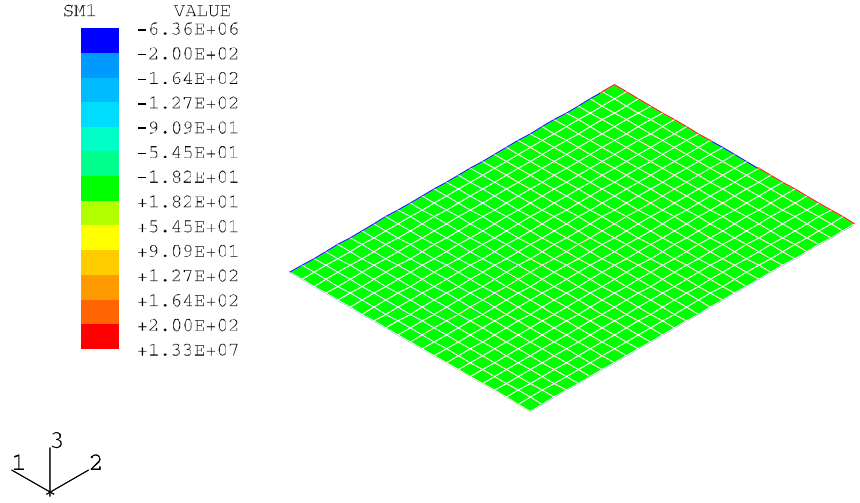
Maximum value = 34.32 at node 601
Minimum value = -27.67 at node 401

ABAQUS



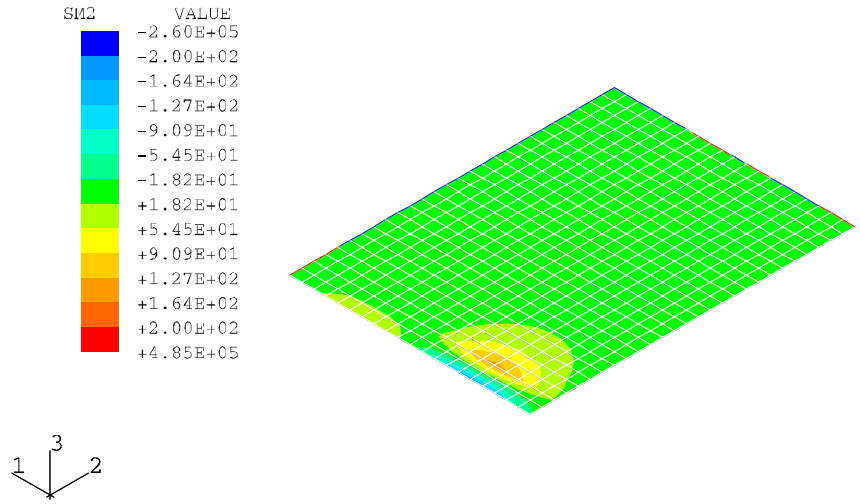
Maximum value = 60.93 at node 501
Minimum value = -11.50 at node 1001

ABAQUS




```
Maximum value =   1.3314E+07 at node      501
Minimum value =  -6.3587E+06 at node     1001
```

ABAQUS

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Maximum value =   4.8468E+05 at node        2
Minimum value =  -2.5954E+05 at node      502
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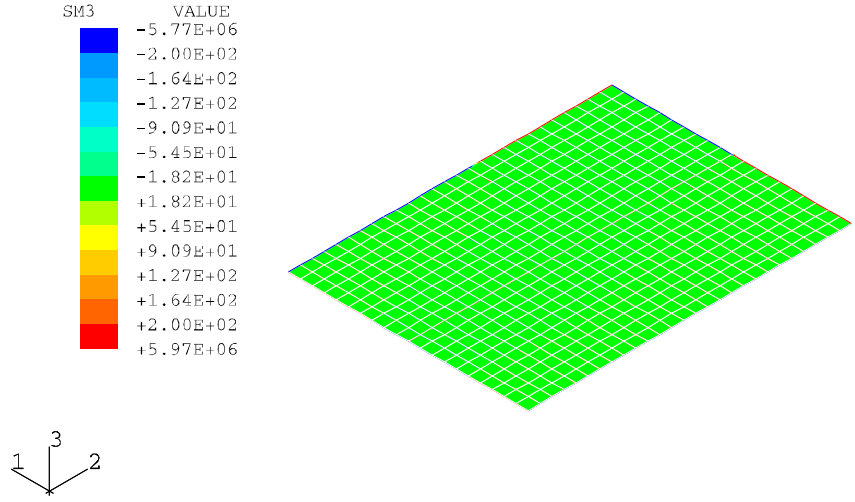
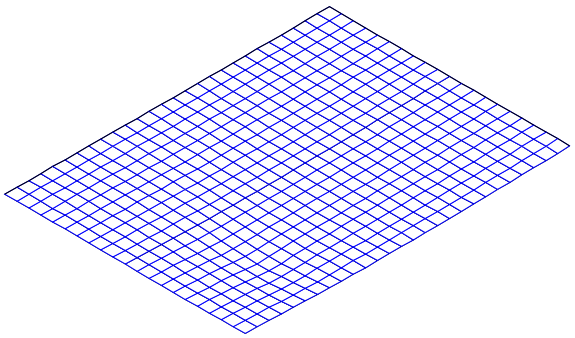
ABAQUS

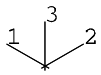



```
Maximum value =   5.9663E+06 at node      102
Minimum value =  -5.7747E+06 at node      802
```

FIG. 5 – DISPLACEMENT AND STRESS CONTOUR, LOAD CONDITION 2, SERVICEABILITY LIMIT STATE

ABAQUS





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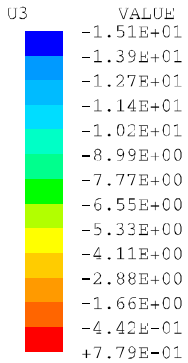
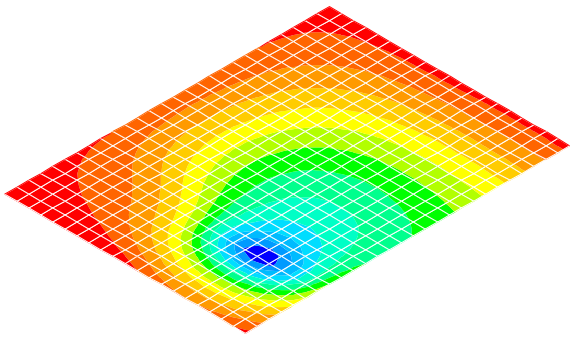
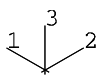
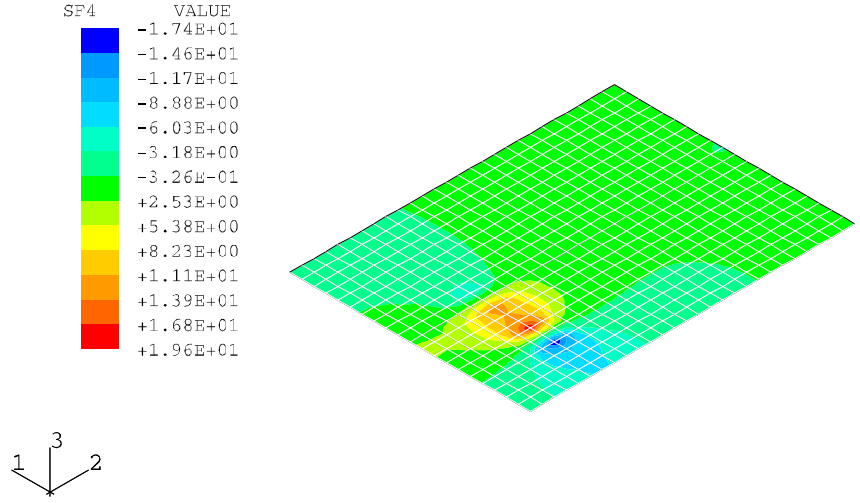






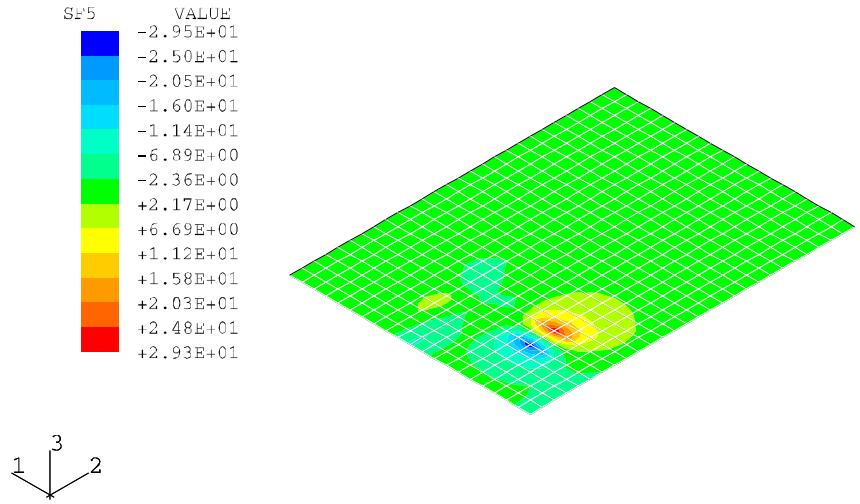
Maximum value = .7795 at node 1401
Minimum value = -15.10 at node 507

ABAQUS



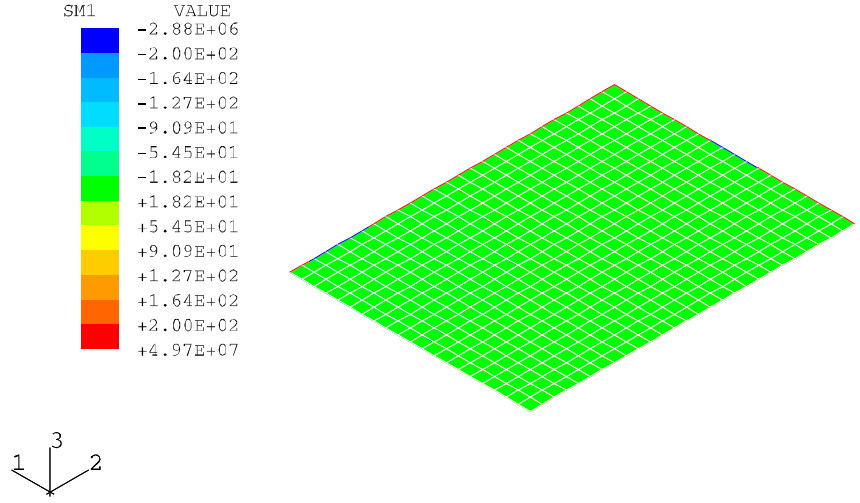
Maximum value = 19.63 at node 607
Minimum value = -17.43 at node 407

ABAQUS



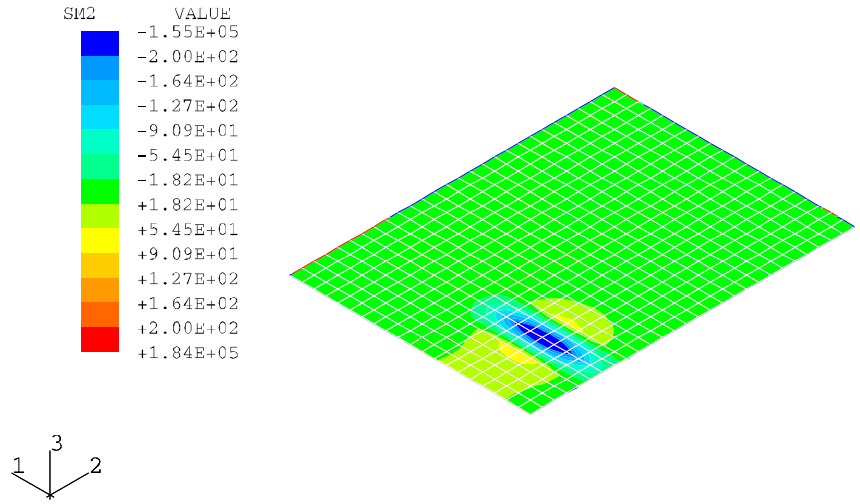
Maximum value = 29.34 at node 508
Minimum value = -29.54 at node 506

ABAQUS



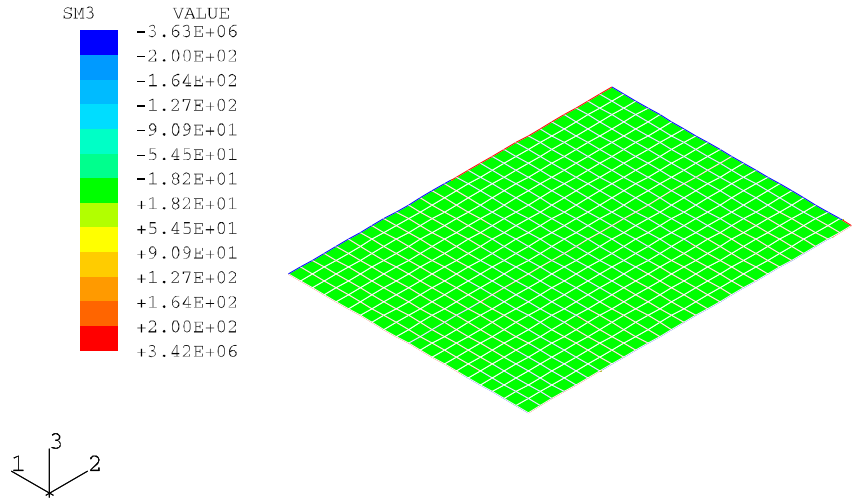

```
Maximum value =   4.9655E+07 at node      1007
Minimum value =  -2.8761E+06 at node      1007
```

ABAQUS




```
Maximum value =   1.8441E+05 at node         7
Minimum value =  -1.5478E+05 at node       508
```

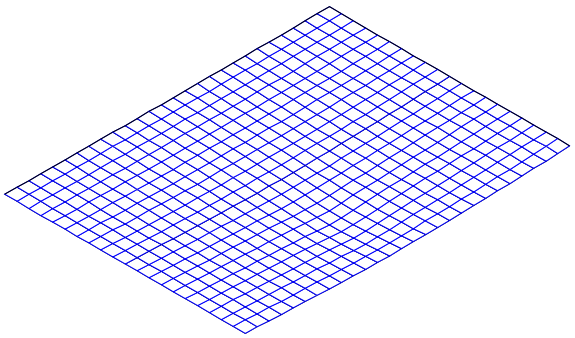
ABAQUS

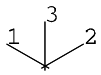



```
Maximum value =   3.4218E+06 at node      108
Minimum value =  -3.6339E+06 at node        6
```

FIG. 6 – DISPLACEMENT AND STRESS CONTOUR, LOAD CONDITION 3, SERVICEABILITY LIMIT STATE

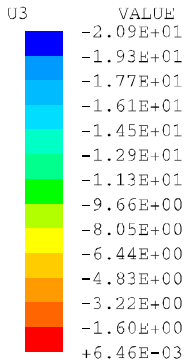
ABAQUS

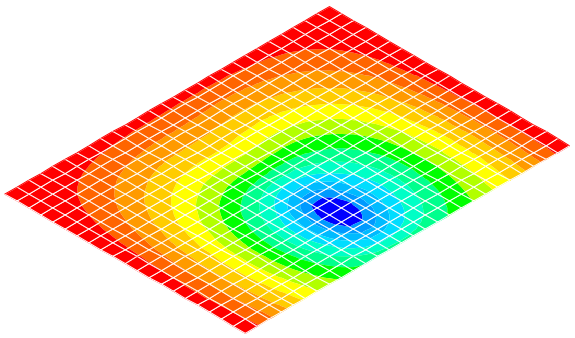


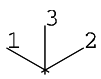


DISPLACEMENT MAGNIFICATION FACTOR = 10.0
RESTART FILE = deck-3ei STEP 1 INCREMENT 1
TIME COMPLETED IN THIS STEP 1.00 TOTAL ACCUMULATED TIME 1.00
ABAQUS VERSION: 5.6-1 DATE: 07-MAR-98 TIME: 18:09:41

ABAQUS

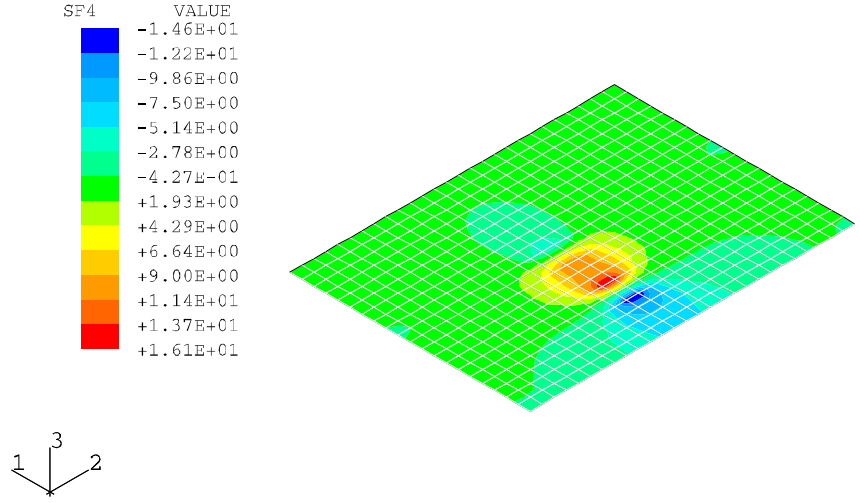






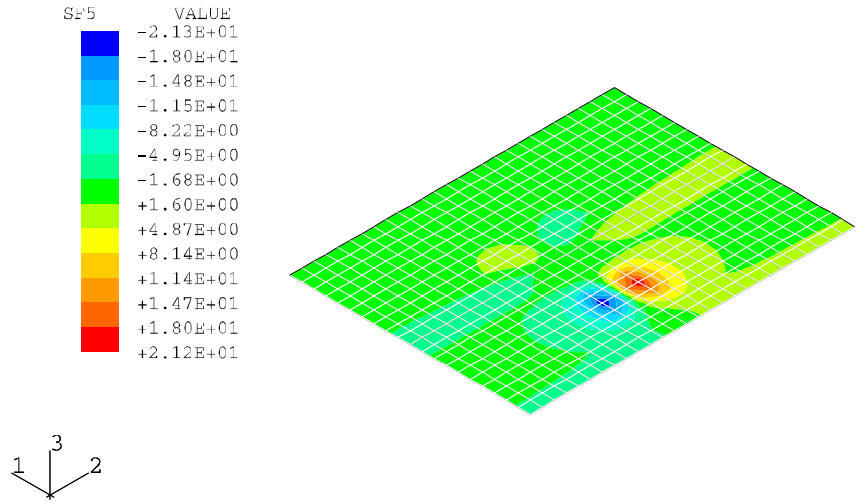
Maximum value = 6.4647E-03 at node 1101
Minimum value = -20.94 at node 514

ABAQUS



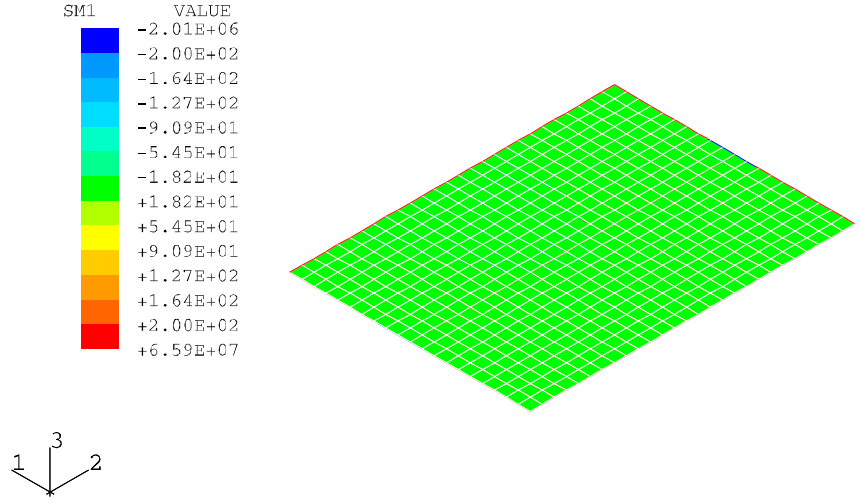
Maximum value = 16.07 at node 613
Minimum value = -14.57 at node 414

ABAQUS



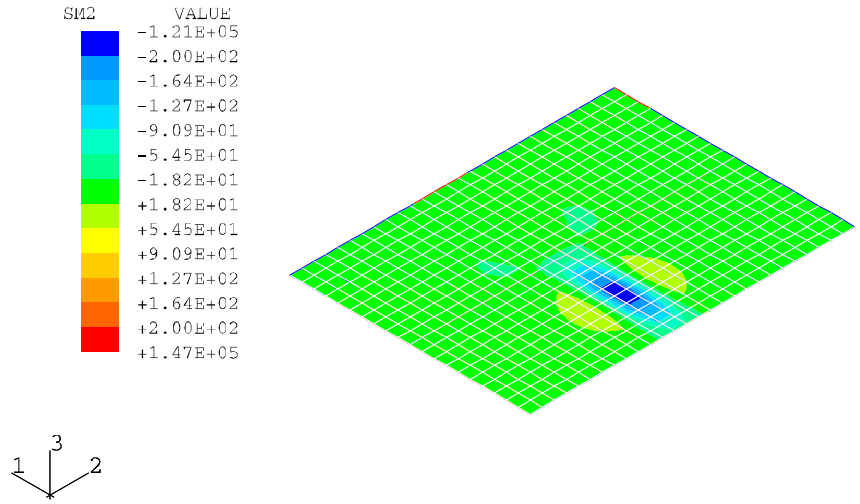
Maximum value = 21.23 at node 515
Minimum value = -21.31 at node 512

ABAQUS



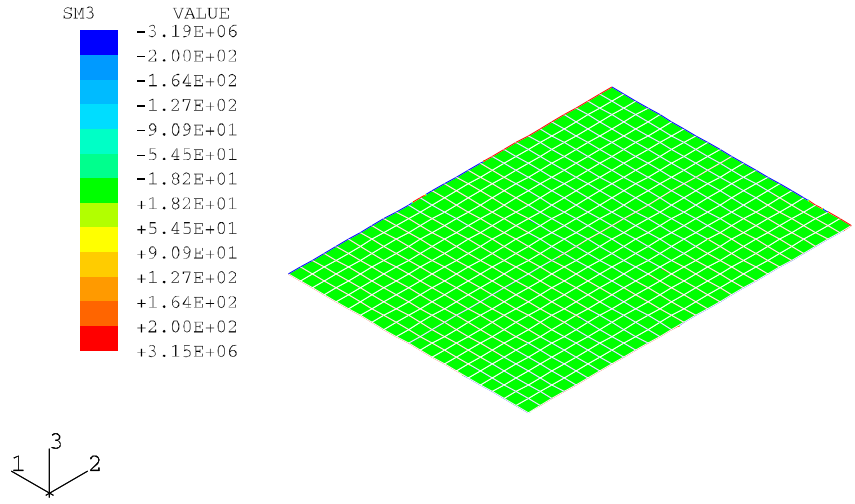

```
Maximum value =   6.5875E+07 at node      1014
Minimum value =  -2.0068E+06 at node      1013
```

ABAQUS



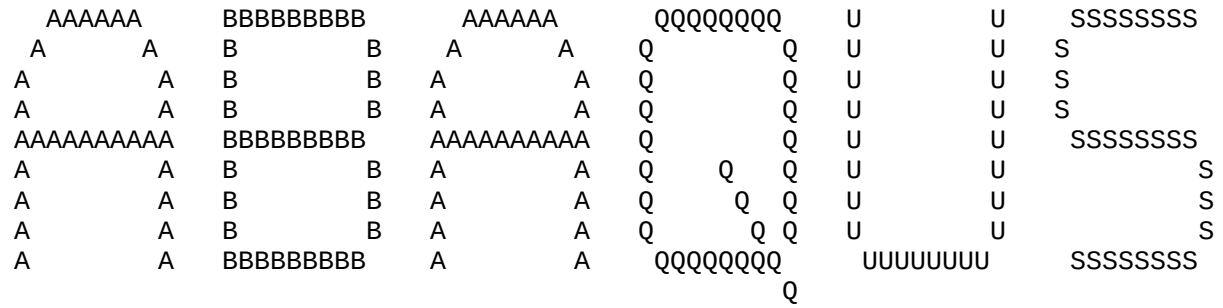

```
Maximum value =   1.4698E+05 at node        14
Minimum value =  -1.2104E+05 at node       515
```

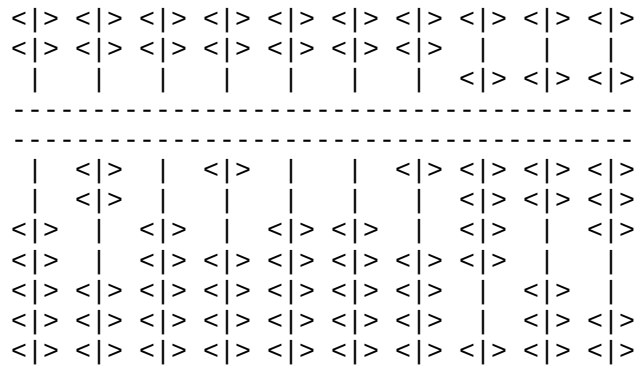
ABAQUS




```
Maximum value =   3.1517E+06 at node       15
Minimum value =  -3.1884E+06 at node       12
```

TAB. 1 – DISPLACEMENTS AND STRESSES, LOAD CONDITION 1,
ULTIMATE LIMIT STATE





THIS PROGRAM HAS BEEN DEVELOPED BY

HIBBITT, KARLSSON AND SORENSEN, INC.
1080 MAIN STREET
PAWTUCKET, R.I. 02860

INPUT FILE (LOAD CONDITION 1 - U.L.S.)

```
*HEADING
*PREPRINT, ECHO=YES, MODEL=YES
**
** BASE NODES
**
*NODE
1,0.,0., 0.
1001, 3000., 0., 0.
2001, 6000., 0., 0.
28, 0., 8100., 0.
1028, 3000., 8100., 0.
2028, 6000., 8100., 0.
*NGEN, NSET=GIRDER-A
1,28,1
*NGEN, NSET=GIRDER-B
1001,1028,1
*NGEN, NSET=GIRDER-C
2001,2028,1
*NFILL, NSET=DECK
GIRDER-A, GIRDER-B, 10, 100
GIRDER-B, GIRDER-C, 10, 100
*NSET, NSET=RES
1, 28, 1001, 1028, 2001, 2028
**
**
** ELEMENTS
**
**
*ELEMENT, TYPE=S4R
10001, 1, 101, 102, 2
*ELGEN, ELSET=DECK
10001,20,100,1,27,1,20
*ELSET,ELSET=ELPR1
1
*ELEMENT, TYPE=B31
20001, 1, 101
*ELGEN, ELSET=STIFF
20001, 20, 100, 1, 28, 1, 20
**
**
**GIRDERS
**
*ELEMENT, TYPE=B31
1, 1, 2
*ELGEN, ELSET=GIRDER-A
1, 27, 1, 1
*ELEMENT, TYPE=B31
1001, 1001, 1002
*ELGEN, ELSET=GIRDER-B
1001, 27, 1, 1
*ELEMENT, TYPE=B31
2001, 2001, 2002
*ELGEN, ELSET=GIRDER-C
2001, 27, 1, 1
**
**   MATERIAL PROPERTIES
**
**
*BEAM SECTION, SECTION=I, ELSET=GIRDER-A, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
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1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-B, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-C, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*SHELL SECTION, ELSET=DECK, MATERIAL=ALLOY3
4., 5
*BEAM SECTION, SECTION=BOX, ELSET=STIFF, MATERIAL=ALLOY2
200., 125., 4.5, 4., 4.5, 6.5
0.,-1.,0.
*MATERIAL, NAME=ALLOY1
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY2
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY3
*ELASTIC, TYPE=ENGINEERING COSTANTS
70000., 1890000., 70000., .01, .3, .01, 27000., 27000.
27000.
**
**   BOUNDARY CONDITIONS
**
*BOUNDARY
RES, 1
RES, 2
RES, 3
*RESTART, W, F=1
**
**   STEP(S)
**
*STEP, INC=1
*STATIC
1.,,,,,
*CLOAD
501,3,-116000.
*MONITOR, NODE=501, DOF=3
**MONITOR, NODE=507, DOF=3
**MONITOR, NODE=513, DOF=3
*NODE PRINT, NSET=DECK, F=1
U3
*NODE PRINT, NSET=GIRDER-A, F=1
U3
*NODE PRINT, NSET=GIRDER-B, F=1
U3
*NODE PRINT, NSET=GIRDER-C, F=1
U3
*EL PRINT, ELSET=GIRDER-A
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-B
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-C
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=DECK, F=1
SM1, SM2, SM3, SF4, SF5
*EL PRINT, ELSET=STIFF, F=1
SM1, SM2, SM3, SF1, SF2
*RESTART, WRITE, F=1
*ENDSTEP
```

E L E M E N T O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-A

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1	1		-9.7756E+05	2.3777E+05	-6.0890E+05	-231.0	3.4010E+04
2	1		-1.5852E+06	4.7613E+05	-6.7429E+05	4204.	2.5225E+04
3	1		-2.0960E+06	1.3437E+05	-4.8968E+05	4052.	1.8247E+04
4	1		-2.2674E+06	-2.4037E+04	-3.3491E+05	2764.	1.2785E+04
5	1		-2.2416E+06	-6.1569E+04	-2.2402E+05	1558.	8882.
6	1		-2.1123E+06	-5.7197E+04	-1.4895E+05	692.2	6208.
7	1		-1.9329E+06	-4.3914E+04	-9.9155E+04	125.8	4397.
8	1		-1.7339E+06	-3.1565E+04	-6.6347E+04	-228.5	3170.
9	1		-1.5325E+06	-2.2098E+04	-4.4764E+04	-442.7	2333.
10	1		-1.3384E+06	-1.5310E+04	-3.0557E+04	-567.0	1757.
11	1		-1.1569E+06	-1.0581E+04	-2.1196E+04	-634.5	1355.
12	1		-9.9059E+05	-7332.	-1.5023E+04	-666.6	1070.
13	1		-8.4048E+05	-5118.	-1.0950E+04	-677.2	863.5
14	1		-7.0666E+05	-3617.	-8264.	-674.9	711.0
15	1		-5.8861E+05	-2604.	-6496.	-665.8	595.8
16	1		-4.8551E+05	-1925.	-5333.	-653.4	506.8
17	1		-3.9629E+05	-1474.	-4571.	-640.6	436.5
18	1		-3.1980E+05	-1183.	-4071.	-629.1	380.0
19	1		-2.5483E+05	-1003.	-3742.	-620.6	333.8
20	1		-2.0011E+05	-906.1	-3523.	-616.8	295.7
21	1		-1.5438E+05	-873.2	-3371.	-619.3	264.1
22	1		-1.1637E+05	-896.9	-3258.	-630.9	237.8
23	1		-8.4811E+04	-985.9	-3158.	-655.4	215.9
24	1		-5.8412E+04	-1223.	-3051.	-699.3	197.7
25	1		-3.5853E+04	-1997.	-2912.	-774.1	182.4
26	1		-1.5719E+04	-4288.	-2704.	-900.6	168.9
27	1		3669.	-5526.	-2354.	-1166.	155.9
MAXIMUM			3669.	4.7613E+05	-2354.	4204.	3.4010E+04
ELEMENT			27	2	27	2	1
MINIMUM			-2.2674E+06	-6.1569E+04	-6.7429E+05	-1166.	155.9
ELEMENT			4	5	2	27	27

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-B

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1001	1		1.2642E+06	-1.5396E+05	3.3058E+05	2903.	2.9765E+04
1002	1		3.8525E+06	-3.1630E+05	3.8325E+05	2082.	1.0254E+04
1003	1		4.6153E+06	-5.4320E+04	2.9265E+05	1149.	4633.
1004	1		4.7521E+06	3.2303E+04	2.1116E+05	585.1	1809.
1005	1		4.5746E+06	4.7539E+04	1.4911E+05	222.1	302.8
1006	1		4.2401E+06	4.2082E+04	1.0452E+05	-10.29	-468.5
1007	1		3.8360E+06	3.2487E+04	7.3089E+04	-156.4	-848.4
1008	1		3.4114E+06	2.3667E+04	5.1080E+04	-246.2	-1012.
1009	1		2.9938E+06	1.6735E+04	3.5707E+04	-299.6	-1055.
1010	1		2.5983E+06	1.1624E+04	2.4977E+04	-329.1	-1031.

1011	1	2.2328E+06	7968.	1.7491E+04	-343.2	-970.8
1012	1	1.9006E+06	5397.	1.2267E+04	-347.3	-892.5
1013	1	1.6028E+06	3604.	8623.	-344.9	-806.5
1014	1	1.3388E+06	2362.	6079.	-338.5	-719.1
1015	1	1.1071E+06	1505.	4304.	-329.7	-634.1
1016	1	9.0577E+05	915.7	3065.	-319.8	-553.5
1017	1	7.3254E+05	510.8	2200.	-309.7	-478.6
1018	1	5.8495E+05	232.5	1595.	-300.2	-410.2
1019	1	4.6047E+05	39.96	1173.	-292.0	-348.6
1020	1	3.5655E+05	-95.74	877.2	-286.1	-294.1
1021	1	2.7062E+05	-195.2	670.4	-283.4	-246.8
1022	1	2.0015E+05	-273.0	525.6	-285.7	-206.7
1023	1	1.4258E+05	-341.2	424.1	-295.6	-174.2
1024	1	9.5366E+04	-441.6	353.3	-317.9	-149.5
1025	1	5.5897E+04	-814.8	305.7	-362.2	-133.5
1026	1	2.1496E+04	-2140.	278.5	-452.0	-125.8
1027	1	-1.1067E+04	335.1	286.4	-691.2	-147.5
MAXIMUM		4.7521E+06	4.7539E+04	3.8325E+05	2903.	2.9765E+04
ELEMENT		1004	1005	1002	1001	1001
MINIMUM		-1.1067E+04	-3.1630E+05	278.5	-691.2	-1055.
ELEMENT		1027	1002	1026	1027	1009

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-C

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
2001	1		-6.6387E+05	1.1179E+05	-5.8700E+04	-1493.	-7493.
2002	1		-1.7655E+06	2.4293E+05	-9.0306E+04	-2629.	-6020.
2003	1		-2.2085E+06	9.8383E+04	-9.6609E+04	-2305.	-4719.
2004	1		-2.3089E+06	1.7374E+04	-8.8878E+04	-1611.	-3585.
2005	1		-2.2336E+06	-1.2801E+04	-7.5359E+04	-982.3	-2628.
2006	1		-2.0717E+06	-2.0509E+04	-6.0768E+04	-513.5	-1846.
2007	1		-1.8715E+06	-1.9907E+04	-4.7264E+04	-189.7	-1229.
2008	1		-1.6600E+06	-1.6795E+04	-3.5717E+04	26.37	-757.0
2009	1		-1.4519E+06	-1.3359E+04	-2.6307E+04	168.2	-406.7
2010	1		-1.2551E+06	-1.0333E+04	-1.8882E+04	260.6	-154.5
2011	1		-1.0736E+06	-7889.	-1.3153E+04	320.7	21.26
2012	1		-9.0921E+05	-5997.	-8803.	359.8	139.0
2013	1		-7.6225E+05	-4565.	-5537.	385.5	213.9
2014	1		-6.3243E+05	-3495.	-3105.	403.1	257.6
2015	1		-5.1895E+05	-2703.	-1307.	416.0	279.2
2016	1		-4.2078E+05	-2122.	16.55	426.7	285.7
2017	1		-3.3674E+05	-1697.	986.2	437.0	282.1
2018	1		-2.6557E+05	-1391.	1693.	448.4	272.0
2019	1		-2.0599E+05	-1173.	2205.	462.5	258.4
2020	1		-1.5671E+05	-1023.	2572.	480.8	243.0
2021	1		-1.1644E+05	-927.0	2829.	505.3	227.4
2022	1		-8.3889E+04	-878.6	3000.	538.9	212.4
2023	1		-5.7783E+04	-905.7	3101.	585.9	198.7
2024	1		-3.6834E+04	-1182.	3139.	653.6	186.5
2025	1		-1.9722E+04	-2368.	3112.	754.7	176.1
2026	1		-5034.	-5775.	3008.	911.9	167.4
2027	1		8927.	-7806.	2767.	1178.	159.5
MAXIMUM			8927.	2.4293E+05	3139.	1178.	285.7
ELEMENT			2027	2002	2024	2027	2016

```
MINIMUM            -2.3089E+06 -2.0509E+04 -9.6609E+04  -2629.      -7493.
ELEMENT               2004        2006        2003        2002        2001
```

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE S4R
AND ELSET DECK

ELEMENT	PT FOOT-NOTE	SM1	SM2	SM3	SF4	SF5
MAXIMUM		6.260	285.6	5.058	64.87	101.4
ELEMENT		10011	10026	10028	10006	10005
MINIMUM		-14.68	-276.4	-5.388	-54.34	-19.46
ELEMENT		10005	10005	10021	10005	10032

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET STIFF

ELEMENT	PT FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
MAXIMUM		2.2458E+07	8.0318E+05	9.9351E+06	2.4799E+04	2.9366E+04
ELEMENT		20005	20021	20022	20011	20005
MINIMUM		-1.1178E+07	-4.3594E+05	-9.7342E+06	-3.4458E+04	-3.3085E+04
ELEMENT		20011	20025	20028	20005	20006

N O D E O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR NSET DECK

NODE	FOOT-NOTE	U3
MAXIMUM		6.531
AT NODE		1401
MINIMUM		-25.50
AT NODE		501

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-A

NODE	FOOT-NOTE	U3
2		-1.0658E-02

```
       3      -6.9038E-03
       4       5.8808E-03
       5       2.3562E-02
       6       4.2700E-02
       7       6.0982E-02
       8       7.7077E-02
       9       9.0330E-02
      10        .1005
      11        .1077
      12        .1120
      13        .1138
      14        .1133
      15        .1109
      16        .1068
      17        .1013
      18       9.4693E-02
      19       8.7126E-02
      20       7.8811E-02
      21       6.9908E-02
      22       6.0550E-02
      23       5.0849E-02
      24       4.0898E-02
      25       3.0775E-02
      26       2.0546E-02
      27       1.0268E-02

MAXIMUM        .1138
AT NODE          13

MINIMUM      -1.0658E-02
AT NODE            2


 THE FOLLOWING TABLE IS PRINTED FOR NSET  GIRDER-B


   NODE FOOT-   U3
        NOTE

   1002       -.1605
   1003       -.2732
   1004       -.3617
   1005       -.4308
   1006       -.4830
   1007       -.5207
   1008       -.5457
   1009       -.5598
   1010       -.5644
   1011       -.5609
   1012       -.5504
   1013       -.5339
   1014       -.5126
   1015       -.4870
   1016       -.4581
   1017       -.4264
   1018       -.3924
   1019       -.3567
   1020       -.3195
   1021       -.2813
   1022       -.2422
   1023       -.2026
   1024       -.1624
   1025       -.1220
```

1026	-8.1446E-02
1027	-4.0753E-02
MAXIMUM	.0000
AT NODE	1001
MINIMUM	-.5644
AT NODE	1010

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-C

NODE	FOOT-NOTE	U3
2002		6.2435E-02
2003		.1183
2004		.1656
2005		.2039
2006		.2336
2007		.2553
2008		.2700
2009		.2786
2010		.2818
2011		.2806
2012		.2755
2013		.2674
2014		.2566
2015		.2437
2016		.2290
2017		.2130
2018		.1958
2019		.1778
2020		.1591
2021		.1399
2022		.1204
2023		.1006
2024		8.0605E-02
2025		6.0503E-02
2026		4.0340E-02
2027		2.0159E-02
MAXIMUM		.2818
AT NODE		2010
MINIMUM		.0000
AT NODE		2001

TAB. 2 – DISPLACEMENTS AND STRESSES, LOAD CONDITION 2, ULTIMATE LIMIT STATE

INPUT FILE (LOAD CONDITION 2 - U.L.S.)

```
*HEADING
*PREPRINT, ECHO=YES, MODEL=YES
**
** BASE NODES
**
*NODE
1,0.,0., 0.
1001, 3000., 0., 0.
2001, 6000., 0., 0.
28, 0., 8100., 0.
1028, 3000., 8100., 0.
2028, 6000., 8100., 0.
*NGEN, NSET=GIRDER-A
1,28,1
*NGEN, NSET=GIRDER-B
1001,1028,1
*NGEN, NSET=GIRDER-C
2001,2028,1
*NFILL, NSET=DECK
GIRDER-A, GIRDER-B, 10, 100
GIRDER-B, GIRDER-C, 10, 100
*NSET, NSET=RES
1, 28, 1001, 1028, 2001, 2028
**
**
** ELEMENTS
**
**
*ELEMENT, TYPE=S4R
10001, 1, 101, 102, 2
*ELGEN, ELSET=DECK
10001,20,100,1,27,1,20
*ELSET,ELSET=ELPR1
1
*ELEMENT, TYPE=B31
20001, 1, 101
*ELGEN, ELSET=STIFF
20001, 20, 100, 1, 28, 1, 20
**
**
**GIRDERS
**
*ELEMENT, TYPE=B31
1, 1, 2
*ELGEN, ELSET=GIRDER-A
1, 27, 1, 1
*ELEMENT, TYPE=B31
1001, 1001, 1002
*ELGEN, ELSET=GIRDER-B
1001, 27, 1, 1
*ELEMENT, TYPE=B31
2001, 2001, 2002
*ELGEN, ELSET=GIRDER-C
2001, 27, 1, 1
**
**   MATERIAL PROPERTIES
**
**
*BEAM SECTION, SECTION=I, ELSET=GIRDER-A, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
```

```
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-B, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-C, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*SHELL SECTION, ELSET=DECK, MATERIAL=ALLOY3
4., 5
*BEAM SECTION, SECTION=BOX, ELSET=STIFF, MATERIAL=ALLOY2
200., 125., 4.5, 4., 4.5, 6.5
0.,-1.,0.
*MATERIAL, NAME=ALLOY1
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY2
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY3
*ELASTIC, TYPE=ENGINEERING COSTANTS
70000., 1890000., 70000., .01, .3, .01, 27000., 27000.
27000.
**
**   BOUNDARY CONDITIONS
**
*BOUNDARY
RES, 1
RES, 2
RES, 3
*RESTART, W, F=1
**
**   STEP(S)
**
*STEP, INC=1
*STATIC
1.,,,,,
*CLOAD
507,3,-116000.
**MONITOR, NODE=501, DOF=3
*MONITOR, NODE=507, DOF=3
**MONITOR, NODE=513, DOF=3
*NODE PRINT, NSET=DECK, F=1
U3
*NODE PRINT, NSET=GIRDER-A, F=1
U3
*NODE PRINT, NSET=GIRDER-B, F=1
U3
*NODE PRINT, NSET=GIRDER-C, F=1
U3
*EL PRINT, ELSET=GIRDER-A
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-B
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-C
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=DECK, F=1
SM1, SM2, SM3, SF4, SF5
*EL PRINT, ELSET=STIFF, F=1
SM1, SM2, SM3, SF1, SF2
*RESTART, WRITE, F=1
*ENDSTEP
```

E L E M E N T O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-A

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1	1		6.2284E+06	-2.0549E+04	5.2916E+04	-1233.	3.5966E+04
2	1		1.8574E+07	1.6207E+04	1.1854E+05	50.63	3.3566E+04
3	1		3.0992E+07	-3.6441E+04	1.9805E+05	730.5	3.0720E+04
4	1		4.3500E+07	-3.3833E+04	2.9452E+05	1339.	2.7133E+04
5	1		5.6145E+07	4.6785E+04	3.8750E+05	1793.	2.2918E+04
6	1		6.8520E+07	3.0541E+05	2.1590E+05	1233.	1.7645E+04
7	1		7.3283E+07	3.0577E+05	-2.0976E+05	1233.	1.1490E+04
8	1		7.0423E+07	4.6823E+04	-3.8359E+05	1790.	6230.
9	1		6.7258E+07	-3.9085E+04	-2.9553E+05	1323.	2057.
10	1		6.4169E+07	-6.2214E+04	-2.0751E+05	731.0	-1429.
11	1		6.1082E+07	-5.7001E+04	-1.4289E+05	262.9	-4070.
12	1		5.7944E+07	-4.3367E+04	-9.8611E+04	-40.77	-5992.
13	1		5.4728E+07	-3.0439E+04	-6.9031E+04	-219.5	-7394.
14	1		5.1422E+07	-2.0616E+04	-4.9353E+04	-319.4	-8436.
15	1		4.8023E+07	-1.3752E+04	-3.6185E+04	-374.3	-9230.
16	1		4.4531E+07	-9135.	-2.7261E+04	-406.2	-9851.
17	1		4.0951E+07	-6100.	-2.1098E+04	-428.4	-1.0350E+04
18	1		3.7291E+07	-4145.	-1.6734E+04	-449.0	-1.0760E+04
19	1		3.3556E+07	-2924.	-1.3546E+04	-473.0	-1.1101E+04
20	1		2.9755E+07	-2209.	-1.1126E+04	-503.6	-1.1389E+04
21	1		2.5895E+07	-1857.	-9200.	-543.5	-1.1632E+04
22	1		2.1985E+07	-1780.	-7565.	-595.5	-1.1839E+04
23	1		1.8033E+07	-1904.	-6052.	-663.6	-1.2015E+04
24	1		1.4048E+07	-2057.	-4478.	-754.7	-1.2165E+04
25	1		1.0038E+07	-1806.	-2614.	-884.2	-1.2298E+04
26	1		6.0145E+06	-1091.	212.9	-1090.	-1.2420E+04
27	1		1.9895E+06	-9628.	4878.	-1507.	-1.2570E+04
MAXIMUM			7.3283E+07	3.0577E+05	3.8750E+05	1793.	3.5966E+04
ELEMENT			7	7	5	5	1
MINIMUM			1.9895E+06	-6.2214E+04	-3.8359E+05	-1507.	-1.2570E+04
ELEMENT			27	10	8	27	27

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-B

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1001	1		7.0827E+06	7750.	-6.8799E+04	619.2	4.4159E+04
1002	1		2.2097E+07	-1.7571E+04	-1.0073E+05	401.9	4.2990E+04
1003	1		3.7039E+07	2.5506E+04	-1.4211E+05	316.1	4.2224E+04
1004	1		5.1907E+07	2.9561E+04	-1.9084E+05	322.3	4.0815E+04
1005	1		6.6561E+07	-1.2835E+04	-2.3459E+05	337.0	3.7353E+04
1006	1		8.0078E+07	-2.0420E+05	-1.3497E+05	-436.8	2.3879E+04
1007	1		8.4492E+07	-2.0439E+05	1.0101E+05	-474.4	2010.
1008	1		7.9832E+07	-1.2787E+04	2.0227E+05	221.5	-1.1287E+04
1009	1		7.4124E+07	3.2551E+04	1.6196E+05	120.0	-1.4386E+04

1010	1	6.8352E+07	4.0728E+04	1.1870E+05	7.458	-1.5218E+04
1011	1	6.2717E+07	3.5694E+04	8.5589E+04	-74.91	-1.5270E+04
1012	1	5.7303E+07	2.7259E+04	6.2269E+04	-128.3	-1.4896E+04
1013	1	5.2146E+07	1.9534E+04	4.6493E+04	-158.6	-1.4322E+04
1014	1	4.7257E+07	1.3530E+04	3.6103E+04	-172.7	-1.3667E+04
1015	1	4.2632E+07	9154.	2.9456E+04	-175.8	-1.2991E+04
1016	1	3.8260E+07	6061.	2.5370E+04	-171.4	-1.2331E+04
1017	1	3.4124E+07	3915.	2.3011E+04	-161.9	-1.1706E+04
1018	1	3.0207E+07	2445.	2.1797E+04	-148.9	-1.1129E+04
1019	1	2.6487E+07	1453.	2.1322E+04	-133.2	-1.0605E+04
1020	1	2.2944E+07	792.8	2.1300E+04	-115.4	-1.0139E+04
1021	1	1.9555E+07	363.2	2.1534E+04	-95.48	-9733.
1022	1	1.6299E+07	89.04	2.1884E+04	-73.45	-9389.
1023	1	1.3155E+07	-87.44	2.2251E+04	-48.70	-9108.
1024	1	1.0101E+07	-237.4	2.2564E+04	-19.86	-8896.
1025	1	7.1122E+06	-618.8	2.2760E+04	16.48	-8762.
1026	1	4.1670E+06	-2399.	2.2802E+04	75.46	-8685.
1027	1	1.2363E+06	-5753.	2.2370E+04	152.5	-8897.
MAXIMUM		8.4492E+07	4.0728E+04	2.0227E+05	619.2	4.4159E+04
ELEMENT		1007	1010	1008	1001	1001
MINIMUM		1.2363E+06	-2.0439E+05	-2.3459E+05	-474.4	-1.5270E+04
ELEMENT		1027	1007	1005	1007	1011

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-C

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
2001	1		2.9994E+05	-3050.	-6.3946E+04	-333.3	-3784.
2002	1		-1.4541E+04	2.5590E+04	-5.8263E+04	-536.8	-3287.
2003	1		-2.9550E+05	9526.	-4.7478E+04	-551.1	-2757.
2004	1		-5.4764E+05	5277.	-3.8409E+04	-514.2	-2200.
2005	1		-7.1313E+05	1.2392E+04	-3.6750E+04	-456.9	-1622.
2006	1		-6.3947E+05	2.1176E+04	-4.6814E+04	-399.2	-1029.
2007	1		-1.5841E+05	2.0265E+04	-6.2889E+04	-316.7	-451.3
2008	1		7.1204E+05	8863.	-7.2150E+04	-205.6	62.59
2009	1		1.7673E+06	-3911.	-6.8814E+04	-86.66	482.8
2010	1		2.8175E+06	-1.2185E+04	-5.6921E+04	46.46	803.8
2011	1		3.7642E+06	-1.5767E+04	-4.1883E+04	162.0	1027.
2012	1		4.5625E+06	-1.6133E+04	-2.6664E+04	247.1	1155.
2013	1		5.1937E+06	-1.4796E+04	-1.2647E+04	301.1	1198.
2014	1		5.6539E+06	-1.2794E+04	-385.6	328.8	1168.
2015	1		5.9469E+06	-1.0697E+04	1.0011E+04	336.3	1080.
2016	1		6.0810E+06	-8764.	1.8654E+04	329.0	952.0
2017	1		6.0669E+06	-7085.	2.5745E+04	311.3	796.7
2018	1		5.9169E+06	-5669.	3.1508E+04	286.5	627.1
2019	1		5.6439E+06	-4485.	3.6151E+04	257.0	453.3
2020	1		5.2611E+06	-3487.	3.9851E+04	224.5	283.2
2021	1		4.7820E+06	-2624.	4.2742E+04	190.5	122.5
2022	1		4.2200E+06	-1838.	4.4917E+04	156.0	-24.94
2023	1		3.5887E+06	-1114.	4.6417E+04	122.4	-156.9
2024	1		2.9018E+06	-663.5	4.7226E+04	91.18	-273.3
2025	1		2.1734E+06	-1596.	4.7229E+04	62.54	-375.8
2026	1		1.4185E+06	-6485.	4.6184E+04	25.50	-470.4
2027	1		6.5493E+05	-7356.	4.2829E+04	-77.56	-576.0

MAXIMUM	6.0810E+06	2.5590E+04	4.7229E+04	336.3	1198.
ELEMENT	2016	2002	2025	2015	2013
MINIMUM	-7.1313E+05	-1.6133E+04	-7.2150E+04	-551.1	-3784.
ELEMENT	2005	2012	2008	2003	2001

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE S4R
AND ELSET DECK

ELEMENT	PT FOOT-NOTE	SM1	SM2	SM3	SF4	SF5
MAXIMUM		2.796	144.2	3.265	42.35	70.30
ELEMENT		10111	10086	10081	10106	10125
MINIMUM		-12.71	-524.4	-3.134	-38.91	-70.56
ELEMENT		10125	10125	10141	10125	10105

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET STIFF

ELEMENT	PT FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
MAXIMUM		1.3677E+07	2.6088E+05	5.7499E+06	5487.	2.0246E+04
ELEMENT		20125	20105	20108	20131	20125
MINIMUM		-5.1535E+06	-2.5850E+05	-6.0219E+06	-1.6312E+04	-2.1223E+04
ELEMENT		20131	20145	20101	20125	20126

N O D E O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR NSET DECK

NODE	FOOT-NOTE	U3
MAXIMUM		1.292
AT NODE		1401
MINIMUM		-25.02
AT NODE		507

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-A

NODE	FOOT-NOTE	U3
2		-1.874
3		-3.706

```
       4       -5.460
       5       -7.098
       6       -8.580
       7       -9.868
       8       -10.94
       9       -11.78
      10       -12.42
      11       -12.85
      12       -13.10
      13       -13.17
      14       -13.07
      15       -12.81
      16       -12.40
      17       -11.86
      18       -11.19
      19       -10.41
      20       -9.515
      21       -8.532
      22       -7.467
      23       -6.331
      24       -5.136
      25       -3.894
      26       -2.616
      27       -1.314

MAXIMUM        .0000
AT NODE           1

MINIMUM       -13.17
AT NODE           13


 THE FOLLOWING TABLE IS PRINTED FOR NSET  GIRDER-B


   NODE FOOT-   U3
        NOTE

   1002       -1.996
   1003       -3.946
   1004       -5.808
   1005       -7.537
   1006       -9.085
   1007       -10.39
   1008       -11.41
   1009       -12.16
   1010       -12.68
   1011       -12.98
   1012       -13.10
   1013       -13.04
   1014       -12.81
   1015       -12.45
   1016       -11.95
   1017       -11.34
   1018       -10.62
   1019       -9.814
   1020       -8.921
   1021       -7.956
   1022       -6.930
   1023       -5.853
   1024       -4.732
   1025       -3.578
   1026       -2.399
```

```
   1027       -1.204

MAXIMUM        .0000
AT NODE        1001

MINIMUM       -13.10
AT NODE        1012


 THE FOLLOWING TABLE IS PRINTED FOR NSET  GIRDER-C


   NODE FOOT-   U3
        NOTE

   2002      -7.6458E-02
   2003       -.1535
   2004       -.2321
   2005       -.3131
   2006       -.3972
   2007       -.4845
   2008       -.5741
   2009       -.6640
   2010       -.7511
   2011       -.8321
   2012       -.9040
   2013       -.9639
   2014       -1.010
   2015       -1.039
   2016       -1.052
   2017       -1.046
   2018       -1.023
   2019       -.9813
   2020       -.9225
   2021       -.8474
   2022       -.7572
   2023       -.6535
   2024       -.5380
   2025       -.4128
   2026       -.2799
   2027       -.1416

MAXIMUM        .0000
AT NODE        2001

MINIMUM       -1.052
AT NODE        2016
```

TAB. 3 – DISPLACEMENTS AND STRESSES, LOAD CONDITION 3, ULTIMATE LIMIT STATE

INPUT FILE (LOAD CONDITION 3 - U.L.S.)

```
*HEADING
*PREPRINT, ECHO=YES, MODEL=YES
**
** BASE NODES
**
*NODE
1,0.,0., 0.
1001, 3000., 0., 0.
2001, 6000., 0., 0.
28, 0., 8100., 0.
1028, 3000., 8100., 0.
2028, 6000., 8100., 0.
*NGEN, NSET=GIRDER-A
1,28,1
*NGEN, NSET=GIRDER-B
1001,1028,1
*NGEN, NSET=GIRDER-C
2001,2028,1
*NFILL, NSET=DECK
GIRDER-A, GIRDER-B, 10, 100
GIRDER-B, GIRDER-C, 10, 100
*NSET, NSET=RES
1, 28, 1001, 1028, 2001, 2028
**
**
** ELEMENTS
**
**
*ELEMENT, TYPE=S4R
10001, 1, 101, 102, 2
*ELGEN, ELSET=DECK
10001,20,100,1,27,1,20
*ELSET,ELSET=ELPR1
1
*ELEMENT, TYPE=B31
20001, 1, 101
*ELGEN, ELSET=STIFF
20001, 20, 100, 1, 28, 1, 20
**
**
**GIRDERS
**
*ELEMENT, TYPE=B31
1, 1, 2
*ELGEN, ELSET=GIRDER-A
1, 27, 1, 1
*ELEMENT, TYPE=B31
1001, 1001, 1002
*ELGEN, ELSET=GIRDER-B
1001, 27, 1, 1
*ELEMENT, TYPE=B31
2001, 2001, 2002
*ELGEN, ELSET=GIRDER-C
2001, 27, 1, 1
**
**   MATERIAL PROPERTIES
**
**
*BEAM SECTION, SECTION=I, ELSET=GIRDER-A, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
```

```
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-B, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-C, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*SHELL SECTION, ELSET=DECK, MATERIAL=ALLOY3
4., 5
*BEAM SECTION, SECTION=BOX, ELSET=STIFF, MATERIAL=ALLOY2
200., 125., 4.5, 4., 4.5, 6.5
0.,-1.,0.
*MATERIAL, NAME=ALLOY1
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY2
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY3
*ELASTIC, TYPE=ENGINEERING COSTANTS
70000., 1890000., 70000., .01, .3, .01, 27000., 27000.
27000.
**
**   BOUNDARY CONDITIONS
**
*BOUNDARY
RES, 1
RES, 2
RES, 3
*RESTART, W, F=1
**
**   STEP(S)
**
*STEP, INC=1
*STATIC
1.,,,,,
*CLOAD
513,3,-58000.
514,3,-58000.
**MONITOR, NODE=501, DOF=3
**MONITOR, NODE=507, DOF=3
*MONITOR, NODE=513, DOF=3
*NODE PRINT, NSET=DECK, F=1
U3
*NODE PRINT, NSET=GIRDER-A, F=1
U3
*NODE PRINT, NSET=GIRDER-B, F=1
U3
*NODE PRINT, NSET=GIRDER-C, F=1
U3
*EL PRINT, ELSET=GIRDER-A
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-B
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-C
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=DECK, F=1
SM1, SM2, SM3, SF4, SF5
*EL PRINT, ELSET=STIFF, F=1
SM1, SM2, SM3, SF1, SF2
*RESTART, WRITE, F=1
*ENDSTEP
```

E L E M E N T O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-A

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1	1		4.5930E+06	-9996.	-600.9	-1600.	2.8277E+04
2	1		1.3782E+07	4962.	1.3298E+04	-1070.	2.7804E+04
3	1		2.2966E+07	-6147.	2.4062E+04	-845.2	2.7357E+04
4	1		3.2117E+07	-1.3144E+04	3.4432E+04	-703.4	2.6818E+04
5	1		4.1212E+07	-1.9062E+04	4.7164E+04	-573.9	2.6132E+04
6	1		5.0235E+07	-2.6821E+04	6.4589E+04	-421.8	2.5221E+04
7	1		5.9175E+07	-3.7547E+04	8.9816E+04	-214.6	2.3983E+04
8	1		6.8026E+07	-5.0237E+04	1.2709E+05	88.56	2.2278E+04
9	1		7.6798E+07	-5.9104E+04	1.8168E+05	530.6	1.9925E+04
10	1		8.5518E+07	-4.9579E+04	2.5792E+05	1110.	1.6762E+04
11	1		9.4238E+07	5553.	3.4560E+05	1681.	1.2807E+04
12	1		1.0279E+08	1.7863E+05	3.0190E+05	1667.	7945.
13	1		1.0732E+08	3.0845E+05	631.9	1404.	2082.
14	1		1.0416E+08	1.7869E+05	-3.0063E+05	1681.	-3786.
15	1		9.6964E+07	5678.	-3.4430E+05	1711.	-8661.
16	1		8.9600E+07	-4.9364E+04	-2.5658E+05	1156.	-1.2638E+04
17	1		8.2229E+07	-5.8766E+04	-1.8032E+05	592.0	-1.5830E+04
18	1		7.4796E+07	-4.9726E+04	-1.2575E+05	166.5	-1.8219E+04
19	1		6.7269E+07	-3.6801E+04	-8.8601E+04	-119.4	-1.9966E+04
20	1		5.9639E+07	-2.5792E+04	-6.3679E+04	-308.2	-2.1248E+04
21	1		5.1905E+07	-1.7871E+04	-4.6871E+04	-440.3	-2.2202E+04
22	1		4.4075E+07	-1.2636E+04	-3.5284E+04	-544.4	-2.2924E+04
23	1		3.6163E+07	-9327.	-2.6909E+04	-640.1	-2.3481E+04
24	1		2.8182E+07	-6863.	-2.0282E+04	-743.2	-2.3921E+04
25	1		2.0150E+07	-3198.	-1.4224E+04	-876.3	-2.4283E+04
26	1		1.2087E+07	3631.	-6904.	-1096.	-2.4597E+04
27	1		4.0198E+06	-9980.	3770.	-1592.	-2.4951E+04
MAXIMUM			1.0732E+08	3.0845E+05	3.4560E+05	1711.	2.8277E+04
ELEMENT			13	13	11	15	1
MINIMUM			4.0198E+06	-5.9104E+04	-3.4430E+05	-1600.	-2.4951E+04
ELEMENT			27	9	15	1	27

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-B

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1001	1		3.7765E+06	-9630.	-4.4106E+04	529.0	2.5543E+04
1002	1		1.2304E+07	-3589.	-4.7737E+04	278.6	2.5070E+04
1003	1		2.0872E+07	3589.	-5.1454E+04	129.6	2.5257E+04
1004	1		2.9547E+07	7594.	-5.6047E+04	42.57	2.5558E+04
1005	1		3.8381E+07	1.1568E+04	-6.2308E+04	-17.88	2.6011E+04
1006	1		4.7422E+07	1.6662E+04	-7.1295E+04	-58.21	2.6564E+04
1007	1		5.6710E+07	2.3306E+04	-8.4442E+04	-78.62	2.7161E+04
1008	1		6.6271E+07	3.1105E+04	-1.0366E+05	-75.62	2.7707E+04
1009	1		7.6112E+07	3.7514E+04	-1.3113E+05	-44.48	2.8029E+04
1010	1		8.6205E+07	3.5571E+04	-1.6813E+05	17.17	2.7835E+04

1011	1	9.6436E+07	8394.	-2.0824E+05	88.32	2.6205E+04
1012	1	1.0624E+08	-1.1051E+05	-1.7553E+05	-246.0	1.8432E+04
1013	1	1.1116E+08	-2.0654E+05	-3975.	-615.1	1368.
1014	1	1.0717E+08	-1.1056E+05	1.6761E+05	-254.3	-1.5687E+04
1015	1	9.8301E+07	8298.	2.0044E+05	71.59	-2.3430E+04
1016	1	8.9020E+07	3.5423E+04	1.6051E+05	-8.334	-2.5011E+04
1017	1	7.9897E+07	3.7311E+04	1.2378E+05	-79.33	-2.5135E+04
1018	1	7.1053E+07	3.0844E+04	9.6658E+04	-120.7	-2.4724E+04
1019	1	6.2524E+07	2.2993E+04	7.7893E+04	-135.5	-2.4065E+04
1020	1	5.4311E+07	1.6329E+04	6.5302E+04	-129.2	-2.3332E+04
1021	1	4.6394E+07	1.1315E+04	5.6998E+04	-107.0	-2.2614E+04
1022	1	3.8744E+07	7723.	5.1573E+04	-71.86	-2.1962E+04
1023	1	3.1323E+07	5177.	4.8014E+04	-24.53	-2.1408E+04
1024	1	2.4090E+07	3255.	4.5598E+04	37.26	-2.0976E+04
1025	1	1.6999E+07	1226.	4.3793E+04	121.1	-2.0695E+04
1026	1	1.0001E+07	-3140.	4.2211E+04	260.5	-2.0524E+04
1027	1	3.0387E+06	-9856.	4.0200E+04	491.0	-2.0940E+04
MAXIMUM		1.1116E+08	3.7514E+04	2.0044E+05	529.0	2.8029E+04
ELEMENT		1013	1009	1015	1001	1009
MINIMUM		3.0387E+06	-2.0654E+05	-2.0824E+05	-615.1	-2.5135E+04
ELEMENT		1027	1013	1011	1013	1017

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-C

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
2001	1		1.0067E+06	-1.2707E+04	-8.3213E+04	-395.4	-573.3
2002	1		1.9455E+06	-9895.	-8.7274E+04	-172.1	-683.1
2003	1		2.8602E+06	-5181.	-8.5670E+04	-70.44	-759.8
2004	1		3.7084E+06	-6483.	-8.0915E+04	3.212	-825.0
2005	1		4.4554E+06	-9470.	-7.3329E+04	63.13	-879.1
2006	1		5.0711E+06	-1.2449E+04	-6.3108E+04	105.4	-913.8
2007	1		5.5295E+06	-1.4802E+04	-5.0441E+04	123.8	-918.2
2008	1		5.8117E+06	-1.5790E+04	-3.5776E+04	113.2	-881.2
2009	1		5.9102E+06	-1.4210E+04	-2.0152E+04	72.23	-793.9
2010	1		5.8381E+06	-8620.	-5782.	9.244	-651.8
2011	1		5.6482E+06	1571.	3128.	-51.41	-453.7
2012	1		5.4656E+06	1.3240E+04	1847.	-94.29	-202.5
2013	1		5.4685E+06	1.8678E+04	-8736.	-108.6	83.35
2014	1		5.7481E+06	1.3169E+04	-1.9278E+04	-81.93	364.3
2015	1		6.2090E+06	1423.	-2.0434E+04	-26.49	601.0
2016	1		6.6687E+06	-8860.	-1.1310E+04	47.11	775.2
2017	1		6.9981E+06	-1.4569E+04	3378.	123.6	884.0
2018	1		7.1397E+06	-1.6315E+04	1.9443E+04	178.9	929.3
2019	1		7.0760E+06	-1.5570E+04	3.4703E+04	204.8	916.3
2020	1		6.8099E+06	-1.3588E+04	4.8172E+04	202.4	855.0
2021	1		6.3554E+06	-1.1135E+04	5.9483E+04	176.4	758.8
2022	1		5.7328E+06	-8572.	6.8569E+04	132.1	641.1
2023	1		4.9661E+06	-6050.	7.5481E+04	74.57	514.3
2024	1		4.0818E+06	-3913.	8.0256E+04	8.047	387.3
2025	1		3.1083E+06	-3810.	8.2785E+04	-66.70	264.7
2026	1		2.0768E+06	-9896.	8.2751E+04	-169.1	142.4
2027	1		1.0248E+06	-1.1696E+04	7.7874E+04	-401.7	-5.204
MAXIMUM			7.1397E+06	1.8678E+04	8.2785E+04	204.8	929.3
ELEMENT			2018	2013	2025	2019	2018

```
MINIMUM            1.0067E+06 -1.6315E+04 -8.7274E+04  -401.7      -918.2
ELEMENT              2001        2018        2002        2027        2007


 THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE S4R
 AND ELSET DECK


ELEMENT  PT FOOT-       SM1         SM2         SM3         SF4         SF5
            NOTE


MAXIMUM             2.138       105.1       2.851       41.75       49.03
ELEMENT             10251       10205       10201       10246       10265

MINIMUM            -13.01      -536.5      -2.827      -39.36      -49.15
ELEMENT             10245       10245       10281       10245       10225


 THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
 AND ELSET STIFF


ELEMENT  PT FOOT-       SM1         SM2         SM3         SF1         SF2
            NOTE


MAXIMUM            1.2001E+07  2.0402E+05  5.2227E+06   3866.      1.0872E+04
ELEMENT              20265       20225       20281       20251       20265

MINIMUM           -3.7126E+06 -2.0267E+05 -5.2836E+06 -1.4082E+04 -1.1533E+04
ELEMENT              20251       20285       20221       20265       20246


                                    N O D E   O U T P U T


 THE FOLLOWING TABLE IS PRINTED FOR NSET  DECK


   NODE FOOT-   U3
        NOTE


MAXIMUM       1.0713E-02
AT NODE        1101

MINIMUM       -34.70
AT NODE          514


 THE FOLLOWING TABLE IS PRINTED FOR NSET  GIRDER-A


   NODE FOOT-   U3
        NOTE

      2       -2.346
      3       -4.664
      4       -6.927
```

5	-9.108
6	-11.18
7	-13.12
8	-14.89
9	-16.47
10	-17.84
11	-18.96
12	-19.81
13	-20.36
14	-20.59
15	-20.50
16	-20.10
17	-19.42
18	-18.48
19	-17.31
20	-15.92
21	-14.35
22	-12.61
23	-10.72
24	-8.722
25	-6.625
26	-4.457
27	-2.241

MAXIMUM	.0000
AT NODE	1
MINIMUM	-20.59
AT NODE	14

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-B

NODE	FOOT-NOTE	U3
1002		-2.294
1003		-4.563
1004		-6.784
1005		-8.932
1006		-10.98
1007		-12.91
1008		-14.68
1009		-16.27
1010		-17.66
1011		-18.80
1012		-19.68
1013		-20.24
1014		-20.45
1015		-20.30
1016		-19.84
1017		-19.09
1018		-18.10
1019		-16.89
1020		-15.48
1021		-13.91
1022		-12.18
1023		-10.34
1024		-8.390
1025		-6.362
1026		-4.274
1027		-2.147

```
MAXIMUM        .0000
AT NODE        1001

MINIMUM       -20.45
AT NODE        1014


 THE FOLLOWING TABLE IS PRINTED FOR NSET  GIRDER-C


   NODE FOOT-   U3
        NOTE

   2002       -.1868
   2003       -.3691
   2004       -.5442
   2005       -.7094
   2006       -.8626
   2007       -1.002
   2008       -1.125
   2009       -1.232
   2010       -1.322
   2011       -1.396
   2012       -1.452
   2013       -1.493
   2014       -1.518
   2015       -1.528
   2016       -1.520
   2017       -1.494
   2018       -1.448
   2019       -1.382
   2020       -1.295
   2021       -1.187
   2022       -1.059
   2023       -.9139
   2024       -.7525
   2025       -.5776
   2026       -.3919
   2027       -.1984

MAXIMUM        .0000
AT NODE        2001

MINIMUM       -1.528
AT NODE        2015
```

TAB. 4 – DISPLACEMENTS AND STRESSES, LOAD CONDITION 1, SERVICEABILITY LIMIT STATE

INPUT FILE (LOAD CONDITION 1 - S.L.S.)

```
*HEADING
*PREPRINT, ECHO=YES, MODEL=YES
**
** BASE NODES
**
*NODE
1,0.,0., 0.
1001, 3000., 0., 0.
2001, 6000., 0., 0.
28, 0., 8100., 0.
1028, 3000., 8100., 0.
2028, 6000., 8100., 0.
*NGEN, NSET=GIRDER-A
1,28,1
*NGEN, NSET=GIRDER-B
1001,1028,1
*NGEN, NSET=GIRDER-C
2001,2028,1
*NFILL, NSET=DECK
GIRDER-A, GIRDER-B, 10, 100
GIRDER-B, GIRDER-C, 10, 100
*NSET, NSET=RES
1, 28, 1001, 1028, 2001, 2028
**
**
** ELEMENTS
**
**
*ELEMENT, TYPE=S4R
10001, 1, 101, 102, 2
*ELGEN, ELSET=DECK
10001,20,100,1,27,1,20
*ELSET,ELSET=ELPR1
1
*ELEMENT, TYPE=B31
20001, 1, 101
*ELGEN, ELSET=STIFF
20001, 20, 100, 1, 28, 1, 20
**
**
**GIRDERS
**
*ELEMENT, TYPE=B31
1, 1, 2
*ELGEN, ELSET=GIRDER-A
1, 27, 1, 1
*ELEMENT, TYPE=B31
1001, 1001, 1002
*ELGEN, ELSET=GIRDER-B
1001, 27, 1, 1
*ELEMENT, TYPE=B31
2001, 2001, 2002
*ELGEN, ELSET=GIRDER-C
2001, 27, 1, 1
**
**   MATERIAL PROPERTIES
**
**
*BEAM SECTION, SECTION=I, ELSET=GIRDER-A, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
```

```
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-B, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-C, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*SHELL SECTION, ELSET=DECK, MATERIAL=ALLOY3
4., 5
*BEAM SECTION, SECTION=BOX, ELSET=STIFF, MATERIAL=ALLOY2
200., 125., 4.5, 4., 4.5, 6.5
0.,-1.,0.
*MATERIAL, NAME=ALLOY1
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY2
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY3
*ELASTIC, TYPE=ENGINEERING COSTANTS
70000., 1890000., 70000., .01, .3, .01, 27000., 27000.
27000.
**
**   BOUNDARY CONDITIONS
**
*BOUNDARY
RES, 1
RES, 2
RES, 3
*RESTART, W, F=1
**
**   STEP(S)
**
*STEP, INC=1
*STATIC
1.,,,,,
*CLOAD
501,3,-70000.
*MONITOR, NODE=501, DOF=3
**MONITOR, NODE=507, DOF=3
**MONITOR, NODE=513, DOF=3
*NODE PRINT, NSET=DECK, F=1
U3
*NODE PRINT, NSET=GIRDER-A, F=1
U3
*NODE PRINT, NSET=GIRDER-B, F=1
U3
*NODE PRINT, NSET=GIRDER-C, F=1
U3
*EL PRINT, ELSET=GIRDER-A
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-B
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-C
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=DECK, F=1
SM1, SM2, SM3, SF4, SF5
*EL PRINT, ELSET=STIFF, F=1
SM1, SM2, SM3, SF1, SF2
*RESTART, WRITE, F=1
*ENDSTEP
```

E L E M E N T O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-A

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1	1		-5.8991E+05	1.4348E+05	-3.6744E+05	-139.4	2.0524E+04
2	1		-9.5659E+05	2.8732E+05	-4.0690E+05	2537.	1.5222E+04
3	1		-1.2648E+06	8.1085E+04	-2.9550E+05	2445.	1.1011E+04
4	1		-1.3683E+06	-1.4505E+04	-2.0210E+05	1668.	7715.
5	1		-1.3527E+06	-3.7154E+04	-1.3518E+05	940.1	5360.
6	1		-1.2747E+06	-3.4515E+04	-8.9885E+04	417.7	3746.
7	1		-1.1664E+06	-2.6500E+04	-5.9835E+04	75.94	2653.
8	1		-1.0463E+06	-1.9048E+04	-4.0037E+04	-137.9	1913.
9	1		-9.2477E+05	-1.3335E+04	-2.7013E+04	-267.2	1408.
10	1		-8.0765E+05	-9239.	-1.8440E+04	-342.2	1060.
11	1		-6.9813E+05	-6385.	-1.2791E+04	-382.9	817.8
12	1		-5.9777E+05	-4425.	-9065.	-402.3	645.6
13	1		-5.0719E+05	-3089.	-6608.	-408.6	521.1
14	1		-4.2643E+05	-2183.	-4987.	-407.3	429.1
15	1		-3.5520E+05	-1571.	-3920.	-401.8	359.6
16	1		-2.9298E+05	-1161.	-3218.	-394.3	305.8
17	1		-2.3914E+05	-889.7	-2758.	-386.6	263.4
18	1		-1.9299E+05	-713.8	-2456.	-379.6	229.3
19	1		-1.5378E+05	-605.5	-2258.	-374.5	201.4
20	1		-1.2076E+05	-546.8	-2126.	-372.2	178.4
21	1		-9.3160E+04	-526.9	-2034.	-373.7	159.3
22	1		-7.0224E+04	-541.2	-1966.	-380.7	143.5
23	1		-5.1179E+04	-595.0	-1906.	-395.5	130.3
24	1		-3.5249E+04	-738.0	-1841.	-422.0	119.3
25	1		-2.1635E+04	-1205.	-1757.	-467.1	110.1
26	1		-9486.	-2588.	-1631.	-543.5	101.9
27	1		2214.	-3335.	-1421.	-703.9	94.09
MAXIMUM			2214.	2.8732E+05	-1421.	2537.	2.0524E+04
ELEMENT			27	2	27	2	1
MINIMUM			-1.3683E+06	-3.7154E+04	-4.0690E+05	-703.9	94.09
ELEMENT			4	5	2	27	27

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-B

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1001	1		7.6286E+05	-9.2907E+04	1.9949E+05	1752.	1.7962E+04
1002	1		2.3248E+06	-1.9087E+05	2.3127E+05	1256.	6188.
1003	1		2.7851E+06	-3.2780E+04	1.7660E+05	693.3	2796.
1004	1		2.8677E+06	1.9493E+04	1.2743E+05	353.1	1092.
1005	1		2.7606E+06	2.8688E+04	8.9978E+04	134.0	182.7
1006	1		2.5587E+06	2.5394E+04	6.3074E+04	-6.207	-282.7
1007	1		2.3148E+06	1.9604E+04	4.4106E+04	-94.37	-512.0
1008	1		2.0586E+06	1.4282E+04	3.0824E+04	-148.6	-610.8
1009	1		1.8066E+06	1.0099E+04	2.1547E+04	-180.8	-636.7
1010	1		1.5680E+06	7014.	1.5072E+04	-198.6	-622.1

1011	1	1.3474E+06	4809.	1.0555E+04	-207.1	-585.8
1012	1	1.1469E+06	3257.	7403.	-209.6	-538.5
1013	1	9.6719E+05	2175.	5203.	-208.1	-486.7
1014	1	8.0787E+05	1426.	3669.	-204.3	-434.0
1015	1	6.6807E+05	908.4	2597.	-199.0	-382.6
1016	1	5.4659E+05	552.6	1850.	-193.0	-334.0
1017	1	4.4205E+05	308.2	1327.	-186.9	-288.8
1018	1	3.5299E+05	140.3	962.5	-181.1	-247.5
1019	1	2.7787E+05	24.12	707.6	-176.2	-210.4
1020	1	2.1516E+05	-57.77	529.4	-172.6	-177.5
1021	1	1.6331E+05	-117.8	404.6	-171.0	-148.9
1022	1	1.2078E+05	-164.7	317.2	-172.4	-124.8
1023	1	8.6040E+04	-205.9	255.9	-178.4	-105.1
1024	1	5.7548E+04	-266.5	213.2	-191.8	-90.20
1025	1	3.3731E+04	-491.7	184.5	-218.6	-80.58
1026	1	1.2972E+04	-1291.	168.1	-272.8	-75.91
1027	1	-6678.	202.2	172.8	-417.1	-88.99
MAXIMUM		2.8677E+06	2.8688E+04	2.3127E+05	1752.	1.7962E+04
ELEMENT		1004	1005	1002	1001	1001
MINIMUM		-6678.	-1.9087E+05	168.1	-417.1	-636.7
ELEMENT		1027	1002	1026	1027	1009

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-C

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
2001	1		-4.0061E+05	6.7460E+04	-3.5422E+04	-901.0	-4522.
2002	1		-1.0654E+06	1.4659E+05	-5.4495E+04	-1587.	-3633.
2003	1		-1.3327E+06	5.9369E+04	-5.8298E+04	-1391.	-2848.
2004	1		-1.3933E+06	1.0484E+04	-5.3633E+04	-972.3	-2164.
2005	1		-1.3479E+06	-7725.	-4.5475E+04	-592.8	-1586.
2006	1		-1.2501E+06	-1.2376E+04	-3.6671E+04	-309.9	-1114.
2007	1		-1.1294E+06	-1.2013E+04	-2.8522E+04	-114.5	-741.7
2008	1		-1.0018E+06	-1.0135E+04	-2.1553E+04	15.91	-456.8
2009	1		-8.7617E+05	-8062.	-1.5875E+04	101.5	-245.4
2010	1		-7.5741E+05	-6236.	-1.1395E+04	157.3	-93.22
2011	1		-6.4789E+05	-4761.	-7937.	193.5	12.83
2012	1		-5.4866E+05	-3619.	-5312.	217.1	83.90
2013	1		-4.5998E+05	-2755.	-3341.	232.7	129.0
2014	1		-3.8164E+05	-2109.	-1874.	243.3	155.4
2015	1		-3.1316E+05	-1631.	-788.7	251.1	168.5
2016	1		-2.5392E+05	-1280.	9.989	257.5	172.4
2017	1		-2.0320E+05	-1024.	595.1	263.7	170.2
2018	1		-1.6026E+05	-839.3	1022.	270.6	164.2
2019	1		-1.2430E+05	-707.9	1331.	279.1	155.9
2020	1		-9.4567E+04	-617.6	1552.	290.1	146.7
2021	1		-7.0264E+04	-559.4	1707.	304.9	137.2
2022	1		-5.0622E+04	-530.2	1810.	325.2	128.2
2023	1		-3.4869E+04	-546.6	1872.	353.5	119.9
2024	1		-2.2227E+04	-713.0	1894.	394.4	112.6
2025	1		-1.1901E+04	-1429.	1878.	455.4	106.3
2026	1		-3038.	-3485.	1815.	550.3	101.0
2027	1		5387.	-4710.	1670.	710.9	96.23
MAXIMUM			5387.	1.4659E+05	1894.	710.9	172.4
ELEMENT			2027	2002	2024	2027	2016

MINIMUM	-1.3933E+06	-1.2376E+04	-5.8298E+04	-1587.	-4522.
ELEMENT	2004	2006	2003	2002	2001

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE S4R
AND ELSET DECK

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF4	SF5
MAXIMUM			3.777	172.3	3.052	39.15	61.18
ELEMENT			10011	10026	10028	10006	10005
MINIMUM			-8.858	-166.8	-3.252	-32.79	-11.74
ELEMENT			10005	10005	10021	10005	10032

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET STIFF

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
MAXIMUM			1.3552E+07	4.8468E+05	5.9953E+06	1.4965E+04	1.7721E+04
ELEMENT			20005	20021	20022	20011	20005
MINIMUM			-6.7454E+06	-2.6307E+05	-5.8741E+06	-2.0793E+04	-1.9965E+04
ELEMENT			20011	20025	20028	20005	20006

N O D E O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR NSET DECK

NODE	FOOT-NOTE	U3
MAXIMUM		3.941
AT NODE		1401
MINIMUM		-15.39
AT NODE		501

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-A

NODE	FOOT-NOTE	U3
2		-6.4314E-03

```
       3      -4.1661E-03
       4       3.5488E-03
       5       1.4218E-02
       6       2.5767E-02
       7       3.6800E-02
       8       4.6512E-02
       9       5.4509E-02
      10       6.0659E-02
      11       6.4986E-02
      12       6.7606E-02
      13       6.8682E-02
      14       6.8393E-02
      15       6.6926E-02
      16       6.4455E-02
      17       6.1145E-02
      18       5.7142E-02
      19       5.2576E-02
      20       4.7558E-02
      21       4.2186E-02
      22       3.6539E-02
      23       3.0685E-02
      24       2.4680E-02
      25       1.8571E-02
      26       1.2398E-02
      27       6.1964E-03

MAXIMUM        6.8682E-02
AT NODE           13

MINIMUM       -6.4314E-03
AT NODE            2


 THE FOLLOWING TABLE IS PRINTED FOR NSET  GIRDER-B


   NODE FOOT-   U3
        NOTE

   1002       -9.6857E-02
   1003        -.1648
   1004        -.2183
   1005        -.2599
   1006        -.2915
   1007        -.3142
   1008        -.3293
   1009        -.3378
   1010        -.3406
   1011        -.3385
   1012        -.3321
   1013        -.3222
   1014        -.3093
   1015        -.2939
   1016        -.2764
   1017        -.2573
   1018        -.2368
   1019        -.2152
   1020        -.1928
   1021        -.1697
   1022        -.1462
   1023        -.1222
   1024       -9.8029E-02
   1025       -7.3646E-02
```

1026	-4.9148E-02
1027	-2.4592E-02
MAXIMUM	.0000
AT NODE	1001
MINIMUM	-.3406
AT NODE	1010

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-C

NODE	FOOT-NOTE	U3
2002		3.7676E-02
2003		7.1364E-02
2004		9.9910E-02
2005		.1230
2006		.1410
2007		.1541
2008		.1630
2009		.1681
2010		.1701
2011		.1693
2012		.1663
2013		.1613
2014		.1548
2015		.1470
2016		.1382
2017		.1285
2018		.1182
2019		.1073
2020		9.6023E-02
2021		8.4451E-02
2022		7.2656E-02
2023		6.0703E-02
2024		4.8641E-02
2025		3.6511E-02
2026		2.4343E-02
2027		1.2165E-02
MAXIMUM		.1701
AT NODE		2010
MINIMUM		.0000
AT NODE		2001

TAB. 5 – DISPLACEMENTS AND STRESSES, LOAD CONDITION 2, SERVICEABILITY LIMIT STATE

INPUT FILE (LOAD CONDITION 2 - S.L.S.)

```
*HEADING
*PREPRINT, ECHO=YES, MODEL=YES
**
** BASE NODES
**
*NODE
1,0.,0., 0.
1001, 3000., 0., 0.
2001, 6000., 0., 0.
28, 0., 8100., 0.
1028, 3000., 8100., 0.
2028, 6000., 8100., 0.
*NGEN, NSET=GIRDER-A
1,28,1
*NGEN, NSET=GIRDER-B
1001,1028,1
*NGEN, NSET=GIRDER-C
2001,2028,1
*NFILL, NSET=DECK
GIRDER-A, GIRDER-B, 10, 100
GIRDER-B, GIRDER-C, 10, 100
*NSET, NSET=RES
1, 28, 1001, 1028, 2001, 2028
**
**
** ELEMENTS
**
**
*ELEMENT, TYPE=S4R
10001, 1, 101, 102, 2
*ELGEN, ELSET=DECK
10001,20,100,1,27,1,20
*ELSET,ELSET=ELPR1
1
*ELEMENT, TYPE=B31
20001, 1, 101
*ELGEN, ELSET=STIFF
20001, 20, 100, 1, 28, 1, 20
**
**
**GIRDERS
**
*ELEMENT, TYPE=B31
1, 1, 2
*ELGEN, ELSET=GIRDER-A
1, 27, 1, 1
*ELEMENT, TYPE=B31
1001, 1001, 1002
*ELGEN, ELSET=GIRDER-B
1001, 27, 1, 1
*ELEMENT, TYPE=B31
2001, 2001, 2002
*ELGEN, ELSET=GIRDER-C
2001, 27, 1, 1
**
**   MATERIAL PROPERTIES
**
**
*BEAM SECTION, SECTION=I, ELSET=GIRDER-A, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
```

```
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-B, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-C, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*SHELL SECTION, ELSET=DECK, MATERIAL=ALLOY3
4., 5
*BEAM SECTION, SECTION=BOX, ELSET=STIFF, MATERIAL=ALLOY2
200., 125., 4.5, 4., 4.5, 6.5
0.,-1.,0.
*MATERIAL, NAME=ALLOY1
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY2
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY3
*ELASTIC, TYPE=ENGINEERING COSTANTS
70000., 1890000., 70000., .01, .3, .01, 27000., 27000.
27000.
**
**   BOUNDARY CONDITIONS
**
*BOUNDARY
RES, 1
RES, 2
RES, 3
*RESTART, W, F=1
**
**   STEP(S)
**
*STEP, INC=1
*STATIC
1.,,,,,
*CLOAD
507,3,-70000.
**MONITOR, NODE=501, DOF=3
*MONITOR, NODE=507, DOF=3
**MONITOR, NODE=513, DOF=3
*NODE PRINT, NSET=DECK, F=1
U3
*NODE PRINT, NSET=GIRDER-A, F=1
U3
*NODE PRINT, NSET=GIRDER-B, F=1
U3
*NODE PRINT, NSET=GIRDER-C, F=1
U3
*EL PRINT, ELSET=GIRDER-A
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-B
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-C
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=DECK, F=1
SM1, SM2, SM3, SF4, SF5
*EL PRINT, ELSET=STIFF, F=1
SM1, SM2, SM3, SF1, SF2
*RESTART, WRITE, F=1
*ENDSTEP
```

E L E M E N T O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-A

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1	1		3.7585E+06	-1.2400E+04	3.1932E+04	-744.1	2.1704E+04
2	1		1.1208E+07	9780.	7.1535E+04	30.55	2.0255E+04
3	1		1.8702E+07	-2.1990E+04	1.1952E+05	440.8	1.8538E+04
4	1		2.6250E+07	-2.0417E+04	1.7773E+05	807.8	1.6373E+04
5	1		3.3881E+07	2.8232E+04	2.3384E+05	1082.	1.3830E+04
6	1		4.1348E+07	1.8430E+05	1.3029E+05	743.8	1.0648E+04
7	1		4.4223E+07	1.8452E+05	-1.2658E+05	743.9	6934.
8	1		4.2497E+07	2.8255E+04	-2.3148E+05	1080.	3760.
9	1		4.0587E+07	-2.3586E+04	-1.7833E+05	798.7	1241.
10	1		3.8723E+07	-3.7543E+04	-1.2522E+05	441.1	-862.6
11	1		3.6860E+07	-3.4397E+04	-8.6228E+04	158.6	-2456.
12	1		3.4966E+07	-2.6170E+04	-5.9507E+04	-24.60	-3616.
13	1		3.3026E+07	-1.8369E+04	-4.1657E+04	-132.5	-4462.
14	1		3.1031E+07	-1.2440E+04	-2.9782E+04	-192.7	-5091.
15	1		2.8979E+07	-8298.	-2.1836E+04	-225.9	-5570.
16	1		2.6872E+07	-5513.	-1.6451E+04	-245.1	-5945.
17	1		2.4712E+07	-3681.	-1.2731E+04	-258.5	-6246.
18	1		2.2503E+07	-2501.	-1.0098E+04	-271.0	-6493.
19	1		2.0249E+07	-1765.	-8174.	-285.4	-6699.
20	1		1.7955E+07	-1333.	-6714.	-303.9	-6873.
21	1		1.5626E+07	-1120.	-5551.	-328.0	-7020.
22	1		1.3267E+07	-1074.	-4565.	-359.3	-7144.
23	1		1.0882E+07	-1149.	-3652.	-400.4	-7250.
24	1		8.4771E+06	-1241.	-2702.	-455.5	-7341.
25	1		6.0576E+06	-1090.	-1577.	-533.6	-7421.
26	1		3.6294E+06	-658.1	128.5	-657.9	-7495.
27	1		1.2006E+06	-5810.	2944.	-909.3	-7585.
MAXIMUM			4.4223E+07	1.8452E+05	2.3384E+05	1082.	2.1704E+04
ELEMENT			7	7	5	5	1
MINIMUM			1.2006E+06	-3.7543E+04	-2.3148E+05	-909.3	-7585.
ELEMENT			27	10	8	27	27

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-B

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1001	1		4.2740E+06	4677.	-4.1516E+04	373.6	2.6647E+04
1002	1		1.3334E+07	-1.0603E+04	-6.0787E+04	242.5	2.5942E+04
1003	1		2.2351E+07	1.5392E+04	-8.5755E+04	190.7	2.5480E+04
1004	1		3.1323E+07	1.7838E+04	-1.1516E+05	194.5	2.4629E+04
1005	1		4.0166E+07	-7745.	-1.4156E+05	203.4	2.2540E+04
1006	1		4.8323E+07	-1.2323E+05	-8.1446E+04	-263.6	1.4410E+04
1007	1		5.0987E+07	-1.2334E+05	6.0956E+04	-286.3	1213.
1008	1		4.8174E+07	-7716.	1.2206E+05	133.7	-6811.
1009	1		4.4730E+07	1.9643E+04	9.7734E+04	72.40	-8681.
1010	1		4.1247E+07	2.4577E+04	7.1631E+04	4.500	-9183.

1011	1	3.7847E+07	2.1539E+04	5.1648E+04	-45.20	-9215.
1012	1	3.4580E+07	1.6449E+04	3.7576E+04	-77.41	-8989.
1013	1	3.1468E+07	1.1788E+04	2.8056E+04	-95.72	-8643.
1014	1	2.8517E+07	8165.	2.1786E+04	-104.2	-8247.
1015	1	2.5726E+07	5524.	1.7775E+04	-106.1	-7839.
1016	1	2.3088E+07	3658.	1.5309E+04	-103.4	-7441.
1017	1	2.0592E+07	2362.	1.3886E+04	-97.72	-7064.
1018	1	1.8228E+07	1476.	1.3153E+04	-89.86	-6716.
1019	1	1.5984E+07	876.5	1.2866E+04	-80.39	-6400.
1020	1	1.3845E+07	478.4	1.2853E+04	-69.61	-6118.
1021	1	1.1800E+07	219.2	1.2995E+04	-57.62	-5873.
1022	1	9.8359E+06	53.73	1.3206E+04	-44.32	-5666.
1023	1	7.9386E+06	-52.77	1.3427E+04	-29.39	-5496.
1024	1	6.0951E+06	-143.2	1.3616E+04	-11.99	-5368.
1025	1	4.2919E+06	-373.4	1.3735E+04	9.946	-5287.
1026	1	2.5146E+06	-1448.	1.3760E+04	45.54	-5241.
1027	1	7.4602E+05	-3471.	1.3499E+04	92.03	-5369.
MAXIMUM		5.0987E+07	2.4577E+04	1.2206E+05	373.6	2.6647E+04
ELEMENT		1007	1010	1008	1001	1001
MINIMUM		7.4602E+05	-1.2334E+05	-1.4156E+05	-286.3	-9215.
ELEMENT		1027	1007	1005	1007	1011

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-C

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
2001	1		1.8100E+05	-1840.	-3.8588E+04	-201.2	-2283.
2002	1		-8775.	1.5442E+04	-3.5159E+04	-323.9	-1984.
2003	1		-1.7832E+05	5748.	-2.8650E+04	-332.6	-1664.
2004	1		-3.3047E+05	3184.	-2.3178E+04	-310.3	-1328.
2005	1		-4.3034E+05	7478.	-2.2177E+04	-275.7	-978.8
2006	1		-3.8588E+05	1.2779E+04	-2.8250E+04	-240.9	-620.8
2007	1		-9.5593E+04	1.2229E+04	-3.7950E+04	-191.1	-272.4
2008	1		4.2968E+05	5348.	-4.3539E+04	-124.1	37.77
2009	1		1.0665E+06	-2360.	-4.1526E+04	-52.30	291.3
2010	1		1.7002E+06	-7353.	-3.4349E+04	28.04	485.0
2011	1		2.2715E+06	-9515.	-2.5274E+04	97.79	619.6
2012	1		2.7532E+06	-9736.	-1.6090E+04	149.1	697.1
2013	1		3.1341E+06	-8928.	-7632.	181.7	722.8
2014	1		3.4118E+06	-7721.	-232.7	198.4	704.6
2015	1		3.5886E+06	-6455.	6041.	202.9	652.0
2016	1		3.6695E+06	-5289.	1.1257E+04	198.5	574.5
2017	1		3.6611E+06	-4276.	1.5536E+04	187.9	480.8
2018	1		3.5706E+06	-3421.	1.9013E+04	172.9	378.4
2019	1		3.4058E+06	-2706.	2.1816E+04	155.1	273.6
2020	1		3.1748E+06	-2105.	2.4048E+04	135.5	170.9
2021	1		2.8857E+06	-1583.	2.5793E+04	115.0	73.89
2022	1		2.5465E+06	-1109.	2.7105E+04	94.14	-15.05
2023	1		2.1656E+06	-672.1	2.8010E+04	73.85	-94.70
2024	1		1.7511E+06	-400.4	2.8498E+04	55.02	-164.9
2025	1		1.3115E+06	-963.3	2.8500E+04	37.74	-226.8
2026	1		8.5597E+05	-3913.	2.7870E+04	15.39	-283.9
2027	1		3.9521E+05	-4439.	2.5845E+04	-46.81	-347.6
MAXIMUM			3.6695E+06	1.5442E+04	2.8500E+04	202.9	722.8
ELEMENT			2016	2002	2025	2015	2013

MINIMUM	-4.3034E+05	-9736.	-4.3539E+04	-332.6	-2283.
ELEMENT	2005	2012	2008	2003	2001

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE S4R
AND ELSET DECK

ELEMENT	PT FOOT-NOTE	SM1	SM2	SM3	SF4	SF5
MAXIMUM		1.687	87.01	1.970	25.55	42.42
ELEMENT		10111	10086	10081	10106	10125
MINIMUM		-7.672	-316.5	-1.891	-23.48	-42.58
ELEMENT		10125	10125	10141	10125	10105

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET STIFF

ELEMENT	PT FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
MAXIMUM		8.2531E+06	1.5743E+05	3.4698E+06	3311.	1.2218E+04
ELEMENT		20125	20105	20108	20131	20125
MINIMUM		-3.1099E+06	-1.5599E+05	-3.6339E+06	-9843.	-1.2807E+04
ELEMENT		20131	20145	20101	20125	20126

N O D E O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR NSET DECK

NODE	FOOT-NOTE	U3
MAXIMUM		.7795
AT NODE		1401
MINIMUM		-15.10
AT NODE		507

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-A

NODE	FOOT-NOTE	U3
2		-1.131
3		-2.237

```
       4       -3.295
       5       -4.283
       6       -5.178
       7       -5.955
       8       -6.599
       9       -7.110
      10       -7.494
      11       -7.756
      12       -7.905
      13       -7.946
      14       -7.885
      15       -7.729
      16       -7.484
      17       -7.157
      18       -6.753
      19       -6.279
      20       -5.742
      21       -5.149
      22       -4.506
      23       -3.820
      24       -3.099
      25       -2.350
      26       -1.578
      27       -.7928

MAXIMUM         .0000
AT NODE            1

MINIMUM        -7.946
AT NODE           13


 THE FOLLOWING TABLE IS PRINTED FOR NSET  GIRDER-B


   NODE FOOT-    U3
        NOTE

   1002        -1.204
   1003        -2.381
   1004        -3.505
   1005        -4.548
   1006        -5.482
   1007        -6.270
   1008        -6.884
   1009        -7.337
   1010        -7.649
   1011        -7.834
   1012        -7.903
   1013        -7.866
   1014        -7.733
   1015        -7.513
   1016        -7.214
   1017        -6.844
   1018        -6.411
   1019        -5.922
   1020        -5.383
   1021        -4.801
   1022        -4.182
   1023        -3.532
   1024        -2.856
   1025        -2.159
   1026        -1.448
```

1027	-.7264
MAXIMUM	.0000
AT NODE	1001
MINIMUM	-7.903
AT NODE	1012

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-C

NODE	FOOT-NOTE	U3
2002		-4.6139E-02
2003		-9.2644E-02
2004		-.1401
2005		-.1890
2006		-.2397
2007		-.2923
2008		-.3464
2009		-.4007
2010		-.4532
2011		-.5021
2012		-.5455
2013		-.5817
2014		-.6092
2015		-.6271
2016		-.6347
2017		-.6314
2018		-.6172
2019		-.5922
2020		-.5567
2021		-.5114
2022		-.4569
2023		-.3943
2024		-.3247
2025		-.2491
2026		-.1689
2027		-8.5446E-02
MAXIMUM		.0000
AT NODE		2001
MINIMUM		-.6347
AT NODE		2016

TAB. 6 – DISPLACEMENTS AND STRESSES, LOAD CONDITION 3, SERVICEABILITY LIMIT STATE

INPUT FILE (LOAD CONDITION 3 - S.L.S.)

```
*HEADING
*PREPRINT, ECHO=YES, MODEL=YES
**
** BASE NODES
**
*NODE
1,0.,0., 0.
1001, 3000., 0., 0.
2001, 6000., 0., 0.
28, 0., 8100., 0.
1028, 3000., 8100., 0.
2028, 6000., 8100., 0.
*NGEN, NSET=GIRDER-A
1,28,1
*NGEN, NSET=GIRDER-B
1001,1028,1
*NGEN, NSET=GIRDER-C
2001,2028,1
*NFILL, NSET=DECK
GIRDER-A, GIRDER-B, 10, 100
GIRDER-B, GIRDER-C, 10, 100
*NSET, NSET=RES
1, 28, 1001, 1028, 2001, 2028
**
**
** ELEMENTS
**
**
*ELEMENT, TYPE=S4R
10001, 1, 101, 102, 2
*ELGEN, ELSET=DECK
10001,20,100,1,27,1,20
*ELSET,ELSET=ELPR1
1
*ELEMENT, TYPE=B31
20001, 1, 101
*ELGEN, ELSET=STIFF
20001, 20, 100, 1, 28, 1, 20
**
**
**GIRDERS
**
*ELEMENT, TYPE=B31
1, 1, 2
*ELGEN, ELSET=GIRDER-A
1, 27, 1, 1
*ELEMENT, TYPE=B31
1001, 1001, 1002
*ELGEN, ELSET=GIRDER-B
1001, 27, 1, 1
*ELEMENT, TYPE=B31
2001, 2001, 2002
*ELGEN, ELSET=GIRDER-C
2001, 27, 1, 1
**
**   MATERIAL PROPERTIES
**
**
*BEAM SECTION, SECTION=I, ELSET=GIRDER-A, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
```

```
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-B, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*BEAM SECTION, SECTION=I, ELSET=GIRDER-C, MATERIAL=ALLOY1
225., 450., 200., 200., 20., 20., 12.
1.,0.,0.
*SHELL SECTION, ELSET=DECK, MATERIAL=ALLOY3
4., 5
*BEAM SECTION, SECTION=BOX, ELSET=STIFF, MATERIAL=ALLOY2
200., 125., 4.5, 4., 4.5, 6.5
0.,-1.,0.
*MATERIAL, NAME=ALLOY1
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY2
*ELASTIC
70000.,.3
*MATERIAL, NAME=ALLOY3
*ELASTIC, TYPE=ENGINEERING COSTANTS
70000., 1890000., 70000., .01, .3, .01, 27000., 27000.
27000.
**
**   BOUNDARY CONDITIONS
**
*BOUNDARY
RES, 1
RES, 2
RES, 3
*RESTART, W, F=1
**
**   STEP(S)
**
*STEP, INC=1
*STATIC
1.,,,,,
*CLOAD
513,3,-35000.
514,3,-35000.
**MONITOR, NODE=501, DOF=3
**MONITOR, NODE=507, DOF=3
*MONITOR, NODE=513, DOF=3
*NODE PRINT, NSET=DECK, F=1
U3
*NODE PRINT, NSET=GIRDER-A, F=1
U3
*NODE PRINT, NSET=GIRDER-B, F=1
U3
*NODE PRINT, NSET=GIRDER-C, F=1
U3
*EL PRINT, ELSET=GIRDER-A
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-B
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=GIRDER-C
SM1, SM2, SM3, SF1, SF2
*EL PRINT, ELSET=DECK, F=1
SM1, SM2, SM3, SF4, SF5
*EL PRINT, ELSET=STIFF, F=1
SM1, SM2, SM3, SF1, SF2
*RESTART, WRITE, F=1
*ENDSTEP
```

E L E M E N T O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-A

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1	1		2.7716E+06	-6032.	-362.6	-965.4	1.7064E+04
2	1		8.3165E+06	2994.	8025.	-645.8	1.6778E+04
3	1		1.3859E+07	-3710.	1.4520E+04	-510.0	1.6508E+04
4	1		1.9381E+07	-7932.	2.0778E+04	-424.5	1.6183E+04
5	1		2.4869E+07	-1.1503E+04	2.8461E+04	-346.3	1.5769E+04
6	1		3.0314E+07	-1.6185E+04	3.8976E+04	-254.5	1.5219E+04
7	1		3.5709E+07	-2.2658E+04	5.4199E+04	-129.5	1.4472E+04
8	1		4.1050E+07	-3.0316E+04	7.6690E+04	53.44	1.3443E+04
9	1		4.6343E+07	-3.5666E+04	1.0963E+05	320.2	1.2024E+04
10	1		5.1605E+07	-2.9918E+04	1.5564E+05	670.1	1.0115E+04
11	1		5.6868E+07	3351.	2.0855E+05	1015.	7728.
12	1		6.2031E+07	1.0779E+05	1.8218E+05	1006.	4794.
13	1		6.4763E+07	1.8613E+05	381.3	847.3	1256.
14	1		6.2854E+07	1.0783E+05	-1.8141E+05	1015.	-2285.
15	1		5.8513E+07	3427.	-2.0777E+05	1033.	-5227.
16	1		5.4069E+07	-2.9789E+04	-1.5483E+05	697.6	-7626.
17	1		4.9621E+07	-3.5462E+04	-1.0881E+05	357.2	-9553.
18	1		4.5135E+07	-3.0007E+04	-7.5883E+04	100.5	-1.0994E+04
19	1		4.0594E+07	-2.2207E+04	-5.3466E+04	-72.03	-1.2048E+04
20	1		3.5989E+07	-1.5564E+04	-3.8427E+04	-186.0	-1.2822E+04
21	1		3.1322E+07	-1.0784E+04	-2.8284E+04	-265.7	-1.3398E+04
22	1		2.6597E+07	-7625.	-2.1292E+04	-328.5	-1.3834E+04
23	1		2.1822E+07	-5628.	-1.6238E+04	-386.3	-1.4170E+04
24	1		1.7006E+07	-4141.	-1.2239E+04	-448.5	-1.4435E+04
25	1		1.2159E+07	-1930.	-8584.	-528.8	-1.4653E+04
26	1		7.2937E+06	2191.	-4166.	-661.4	-1.4843E+04
27	1		2.4258E+06	-6022.	2275.	-960.6	-1.5056E+04
MAXIMUM			6.4763E+07	1.8613E+05	2.0855E+05	1033.	1.7064E+04
ELEMENT			13	13	11	15	1
MINIMUM			2.4258E+06	-3.5666E+04	-2.0777E+05	-965.4	-1.5056E+04
ELEMENT			27	9	15	1	27

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-B

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
1001	1		2.2789E+06	-5811.	-2.6616E+04	319.2	1.5414E+04
1002	1		7.4251E+06	-2166.	-2.8807E+04	168.1	1.5128E+04
1003	1		1.2595E+07	2166.	-3.1050E+04	78.20	1.5241E+04
1004	1		1.7830E+07	4583.	-3.3822E+04	25.69	1.5423E+04
1005	1		2.3161E+07	6981.	-3.7600E+04	-10.79	1.5696E+04
1006	1		2.8617E+07	1.0055E+04	-4.3023E+04	-35.13	1.6030E+04
1007	1		3.4221E+07	1.4064E+04	-5.0957E+04	-47.44	1.6390E+04
1008	1		3.9991E+07	1.8770E+04	-6.2551E+04	-45.63	1.6720E+04
1009	1		4.5930E+07	2.2638E+04	-7.9129E+04	-26.84	1.6914E+04
1010	1		5.2020E+07	2.1465E+04	-1.0146E+05	10.36	1.6797E+04

1011	1	5.8194E+07	5066.	-1.2566E+05	53.30	1.5813E+04
1012	1	6.4113E+07	-6.6689E+04	-1.0592E+05	-148.5	1.1123E+04
1013	1	6.7076E+07	-1.2464E+05	-2399.	-371.2	825.5
1014	1	6.4674E+07	-6.6717E+04	1.0115E+05	-153.5	-9466.
1015	1	5.9320E+07	5007.	1.2095E+05	43.20	-1.4139E+04
1016	1	5.3719E+07	2.1376E+04	9.6862E+04	-5.029	-1.5093E+04
1017	1	4.8214E+07	2.2515E+04	7.4694E+04	-47.87	-1.5168E+04
1018	1	4.2877E+07	1.8613E+04	5.8328E+04	-72.85	-1.4919E+04
1019	1	3.7730E+07	1.3875E+04	4.7004E+04	-81.74	-1.4522E+04
1020	1	3.2774E+07	9854.	3.9406E+04	-77.95	-1.4080E+04
1021	1	2.7996E+07	6828.	3.4396E+04	-64.55	-1.3646E+04
1022	1	2.3380E+07	4661.	3.1122E+04	-43.36	-1.3253E+04
1023	1	1.8902E+07	3124.	2.8974E+04	-14.80	-1.2919E+04
1024	1	1.4537E+07	1964.	2.7516E+04	22.48	-1.2658E+04
1025	1	1.0258E+07	739.7	2.6427E+04	73.09	-1.2488E+04
1026	1	6.0354E+06	-1895.	2.5472E+04	157.2	-1.2385E+04
1027	1	1.8337E+06	-5947.	2.4258E+04	296.3	-1.2636E+04
MAXIMUM		6.7076E+07	2.2638E+04	1.2095E+05	319.2	1.6914E+04
ELEMENT		1013	1009	1015	1001	1009
MINIMUM		1.8337E+06	-1.2464E+05	-1.2566E+05	-371.2	-1.5168E+04
ELEMENT		1027	1013	1011	1013	1017

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET GIRDER-C

ELEMENT	PT	FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
2001	1		6.0747E+05	-7668.	-5.0215E+04	-238.6	-346.0
2002	1		1.1740E+06	-5971.	-5.2665E+04	-103.9	-412.2
2003	1		1.7260E+06	-3126.	-5.1698E+04	-42.50	-458.5
2004	1		2.2378E+06	-3912.	-4.8828E+04	1.938	-497.9
2005	1		2.6886E+06	-5715.	-4.4250E+04	38.10	-530.5
2006	1		3.0601E+06	-7512.	-3.8083E+04	63.63	-551.4
2007	1		3.3367E+06	-8932.	-3.0439E+04	74.73	-554.1
2008	1		3.5071E+06	-9528.	-2.1589E+04	68.30	-531.7
2009	1		3.5665E+06	-8575.	-1.2161E+04	43.59	-479.1
2010	1		3.5230E+06	-5201.	-3489.	5.578	-393.3
2011	1		3.4084E+06	947.7	1887.	-31.02	-273.8
2012	1		3.2982E+06	7989.	1115.	-56.90	-122.2
2013	1		3.2999E+06	1.1271E+04	-5272.	-65.53	50.30
2014	1		3.4687E+06	7947.	-1.1634E+04	-49.44	219.8
2015	1		3.7468E+06	858.5	-1.2331E+04	-15.99	362.7
2016	1		4.0242E+06	-5347.	-6825.	28.43	467.8
2017	1		4.2230E+06	-8792.	2039.	74.61	533.5
2018	1		4.3084E+06	-9845.	1.1733E+04	108.0	560.8
2019	1		4.2700E+06	-9396.	2.0941E+04	123.6	552.9
2020	1		4.1094E+06	-8200.	2.9070E+04	122.1	516.0
2021	1		3.8352E+06	-6720.	3.5895E+04	106.4	457.9
2022	1		3.4594E+06	-5173.	4.1378E+04	79.73	386.9
2023	1		2.9968E+06	-3651.	4.5549E+04	45.00	310.4
2024	1		2.4631E+06	-2362.	4.8431E+04	4.856	233.7
2025	1		1.8757E+06	-2299.	4.9956E+04	-40.25	159.7
2026	1		1.2533E+06	-5972.	4.9936E+04	-102.1	85.93
2027	1		6.1841E+05	-7058.	4.6993E+04	-242.4	-3.140
MAXIMUM			4.3084E+06	1.1271E+04	4.9956E+04	123.6	560.8
ELEMENT			2018	2013	2025	2019	2018

MINIMUM	6.0747E+05	-9845.	-5.2665E+04	-242.4	-554.1
ELEMENT	2001	2018	2002	2027	2007

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE S4R
AND ELSET DECK

ELEMENT	PT FOOT-NOTE	SM1	SM2	SM3	SF4	SF5
MAXIMUM		1.290	63.43	1.720	25.20	29.59
ELEMENT		10251	10205	10201	10246	10265
MINIMUM		-7.849	-323.8	-1.706	-23.75	-29.66
ELEMENT		10245	10245	10281	10245	10225

THE FOLLOWING TABLE IS PRINTED FOR ELEMENT TYPE B31
AND ELSET STIFF

ELEMENT	PT FOOT-NOTE	SM1	SM2	SM3	SF1	SF2
MAXIMUM		7.2417E+06	1.2311E+05	3.1517E+06	2333.	6560.
ELEMENT		20265	20225	20281	20251	20265
MINIMUM		-2.2403E+06	-1.2230E+05	-3.1884E+06	-8497.	-6959.
ELEMENT		20251	20285	20221	20265	20246

N O D E O U T P U T

THE FOLLOWING TABLE IS PRINTED FOR NSET DECK

NODE	FOOT-NOTE	U3
MAXIMUM		6.4647E-03
AT NODE		1101
MINIMUM		-20.94
AT NODE		514

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-A

NODE	FOOT-NOTE	U3
2		-1.416

3	-2.814
4	-4.180
5	-5.496
6	-6.747
7	-7.915
8	-8.985
9	-9.941
10	-10.76
11	-11.44
12	-11.95
13	-12.29
14	-12.42
15	-12.37
16	-12.13
17	-11.72
18	-11.15
19	-10.44
20	-9.607
21	-8.657
22	-7.607
23	-6.471
24	-5.263
25	-3.998
26	-2.689
27	-1.352

MAXIMUM	.0000
AT NODE	1
MINIMUM	-12.42
AT NODE	14

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-B

NODE	FOOT-NOTE	U3
1002		-1.384
1003		-2.754
1004		-4.094
1005		-5.390
1006		-6.627
1007		-7.788
1008		-8.858
1009		-9.819
1010		-10.66
1011		-11.35
1012		-11.88
1013		-12.21
1014		-12.34
1015		-12.25
1016		-11.97
1017		-11.52
1018		-10.92
1019		-10.19
1020		-9.343
1021		-8.392
1022		-7.353
1023		-6.239
1024		-5.063
1025		-3.839

1026	-2.579
1027	-1.296
MAXIMUM	.0000
AT NODE	1001
MINIMUM	-12.34
AT NODE	1014

THE FOLLOWING TABLE IS PRINTED FOR NSET GIRDER-C

NODE	FOOT-NOTE	U3
2002		-.1127
2003		-.2227
2004		-.3284
2005		-.4281
2006		-.5206
2007		-.6045
2008		-.6791
2009		-.7437
2010		-.7980
2011		-.8421
2012		-.8763
2013		-.9010
2014		-.9163
2015		-.9220
2016		-.9175
2017		-.9018
2018		-.8741
2019		-.8340
2020		-.7812
2021		-.7161
2022		-.6392
2023		-.5515
2024		-.4541
2025		-.3486
2026		-.2365
2027		-.1197
MAXIMUM		.0000
AT NODE		2001
MINIMUM		-.9220
AT NODE		2015