

ANSYS Multiphysics

\*\*\* WARNING \*\*\* CP = 0.593 TIME= 12:18:01  
 The requested number of shared-memory processors (8) exceeds the number  
 of available processors (2).  
 The number of processors used will be 2.

```

-----*
| W E L C O M E   T O   T H E   A N S Y S ( R )   P R O G R A M |
|-----*
    
```

```

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*****
    
```

```

***** ANSYS COMMAND LINE ARGUMENTS *****
BATCH MODE REQUESTED (-b) = NOLIST
INPUT FILE COPY MODE (-c) = COPY
2 PARALLEL CPUS REQUESTED
START-UP FILE MODE = NOREAD
STOP FILE MODE = NOREAD

00000000 VERSION=WINDOWS x64 RELEASE= 14.0 UP20111024
CURRENT JOBNAME=file 12:18:02 MAR 15, 2013 CP= 1.716
    
```

```

PARAMETER _DS_PROGRESS = 999.0000000
/INPUT FILE= ds.dat LINE= 0
    
```

DO NOT WRITE ELEMENT RESULTS INTO DATABASE

```
*GET _WALLSTRT FROM ACTI ITEM=TIME WALL VALUE= 12.3005556
```

```
TITLE=
FEM Beleg--Statisch-mechanisch (A5)
```

```
SET PARAMETER DIMENSIONS ON _WB_PROJECTSCRATCH_DIR
TYPE=STRI DIMENSIONS= 248 1 1
```

```
PARAMETER _WB_PROJECTSCRATCH_DIR(1) = C:\Users\Katrin\Desktop\_ProjectScratch\Scr4619\
```

```
SET PARAMETER DIMENSIONS ON _WB_SOLVERFILES_DIR
TYPE=STRI DIMENSIONS= 248 1 1
```

```
PARAMETER _WB_SOLVERFILES_DIR(1) = C:\Users\Katrin\Desktop\FEM Beleg_files\dp0\SYS\MECH\
```

```
SET PARAMETER DIMENSIONS ON _WB_USERFILES_DIR
TYPE=STRI DIMENSIONS= 248 1 1
```

```
PARAMETER _WB_USERFILES_DIR(1) = C:\Users\Katrin\Desktop\FEM Beleg_files\user_files\
--- Data in consistent MKS units.
```

```

MKS UNITS SPECIFIED FOR INTERNAL
LENGTH (l) = METER (M)
MASS (M) = KILOGRAM (KG)
TIME (t) = SECOND (SEC)
TEMPERATURE (T) = CELSIUS (C)
TOFFSET = 273.0
CHARGE (Q) = COULOMB
FORCE (f) = NEWTON (N) (KG-M/SEC2)
HEAT = JOULE (N-M)

PRESSURE = PASCAL (NEWTON/M**2)
ENERGY (W) = JOULE (N-M)
POWER (P) = WATT (N-M/SEC)
CURRENT (i) = AMPERE (COULOMBS/SEC)
CAPACITANCE (C) = FARAD
INDUCTANCE (L) = HENRY
    
```

MAGNETIC FLUX = WEBER  
RESISTANCE (R) = OHM  
ELECTRIC POTENTIAL = VOLT

INPUT UNITS ARE ALSO SET TO MKS

1

\*\*\*\*\* ANSYS - ENGINEERING ANALYSIS SYSTEM RELEASE 14.0 \*\*\*\*\*  
ANSYS Multiphysics  
00000000 VERSION=WINDOWS x64 12:18:02 MAR 15, 2013 CP= 1.716

FEM Beleg--Statisch-mechanisch (A5)

\*\*\*\*\* ANSYS ANALYSIS DEFINITION (PREP7) \*\*\*\*\*  
\*\*\*\*\* Nodes for the whole assembly \*\*\*\*\*  
\*\*\*\*\* Elements for Body 1 "Blecht2L160" \*\*\*\*\*  
\*\*\*\*\* Elements for Body 2 "Stempel" \*\*\*\*\*  
\*\*\*\*\* Elements for Body 3 "Matrize" \*\*\*\*\*  
\*\*\*\*\* Send User Defined Coordinate System(s) \*\*\*\*\*  
\*\*\*\*\* Set Reference Temperature \*\*\*\*\*  
\*\*\*\*\* Send Materials \*\*\*\*\*  
\*\*\*\*\* Create Contact "Reibungsfrei - Blecht2L160 bis Stempel" \*\*\*\*\*  
Real Contact Set For Above Contact Is 5 & 4  
\*\*\*\*\* Create Contact "Reibungsfrei - Blecht2L160 bis Matrize" \*\*\*\*\*  
Real Contact Set For Above Contact Is 7 & 6  
\*\*\*\*\* Fixed Supports \*\*\*\*\*  
\*\*\*\*\* Frictionless Supports X \*\*\*\*\*  
\*\*\*\*\* Create Remote Point "Interner Fernpunkt" \*\*\*\*\*  
\*\*\*\*\* Construct Remote Displacement Using RBE3/CERIG Contact \*\*\*\*\*  
\*\* Created for Use in Spectrum Analysis \*\*  
\*\* Created for Use in Spectrum Analysis \*\*  
\*\*\*\*\* Construct Weak Springs, Prototype 1 \*\*\*\*\*  
\*\*\*\*\* Construct Weak Springs, Prototype 2 \*\*\*\*\*  
\*\*\*\*\* Construct Weak Springs, Prototype 3 \*\*\*\*\*

LIST DATA TABLE BISO FOR MATERIAL 1

1

\*\*\*\*\* ANSYS - ENGINEERING ANALYSIS SYSTEM RELEASE 14.0 \*\*\*\*\*  
ANSYS Multiphysics  
00000000 VERSION=WINDOWS x64 12:18:04 MAR 15, 2013 CP= 4.290

FEM Beleg--Statisch-mechanisch (A5)

BiIso Pl (BISO) Table For Material 1

1  
Temps 20.000  
Yld Strs 0.23500E+09  
Tang Mod 0.50000E+10

\*\*\*\*\* ROUTINE COMPLETED \*\*\*\*\* CP = 4.306

--- Number of total nodes = 198048  
--- Number of contact elements = 27250  
--- Number of spring elements = 72  
--- Number of solid elements = 36800  
--- Number of total elements = 64123

\*GET \_WALLBSOL FROM ACT1 ITEM=TIME WALL VALUE= 12.3011111  
\*\*\*\*\* SOLUTION \*\*\*\*\*

\*\*\*\*\* ANSYS SOLUTION ROUTINE \*\*\*\*\*

PERFORM A STATIC ANALYSIS  
THIS WILL BE A NEW ANALYSIS

LARGE DEFORMATION ANALYSIS

NEW SOLUTION CONTROL OPTION IS ACTIVATED,  
THE FOLLOWING COMMANDS ARE RESET TO NEW DEFAULTS:  
AUTOTS, DELTIM, NSUB, CNVTOL, LNSRCH, PRED, NROPT,  
TINTP, CUTCONTROL, OPNCONTROL, MONITOR, NEQIT, SSTIF, KBC.

CONTACT TIME PREDICTIONS ARE BASED ON ELEMENT KEYOPT(7) SPECIFIED

USE PRECONDITIONED CONJUGATE GRADIENT SOLVER  
CONVERGENCE TOLERANCE = 1.00000E-08  
MAXIMUM ITERATION = NumNode\*DofPerNode\* 1.0000

MEMORY SAVING OPTION TURNED ON FOR PCG SOLVER

CONTACT INFORMATION PRINTOUT LEVEL 1

NLDIAG: Nonlinear diagnostics CONT option is set to ON.  
Writing frequency : each ITERATION.

DEFINE RESTART CONTROL FOR LOADSTEP LAST  
AT FREQUENCY OF LAST AND NUMBER FOR OVERWRITE IS 0

DELETE RESTART FILES OF ENDSTEP  
\*\*\*\*\* SOLVE FOR LS 1 \*\*\*\*\*

SPECIFIED CONSTRAINT UX FOR SELECTED NODES 197976 TO 197976 BY 1  
SET ACCORDING TO TABLE PARAMETER = \_LOADVARI121UX

SPECIFIED CONSTRAINT UY FOR SELECTED NODES 197976 TO 197976 BY 1  
SET ACCORDING TO TABLE PARAMETER = \_LOADVARI121UY

SPECIFIED CONSTRAINT UZ FOR SELECTED NODES 197976 TO 197976 BY 1  
SET ACCORDING TO TABLE PARAMETER = \_LOADVARI121UZ

SPECIFIED CONSTRAINT ROTX FOR SELECTED NODES 197976 TO 197976 BY 1  
SET ACCORDING TO TABLE PARAMETER = \_LOADVARI121ROTX

SPECIFIED CONSTRAINT ROTY FOR SELECTED NODES 197976 TO 197976 BY 1  
SET ACCORDING TO TABLE PARAMETER = \_LOADVARI121ROTY

SPECIFIED CONSTRAINT ROTZ FOR SELECTED NODES 197976 TO 197976 BY 1  
SET ACCORDING TO TABLE PARAMETER = \_LOADVARI121ROTZ

PRINTOUT RESUMED BY /GOP

USE AUTOMATIC TIME STEPPING THIS LOAD STEP

USE 100 SUBSTEPS INITIALLY THIS LOAD STEP FOR ALL DEGREES OF FREEDOM  
FOR AUTOMATIC TIME STEPPING:  
USE 1000 SUBSTEPS AS A MAXIMUM  
USE 100 SUBSTEPS AS A MINIMUM

TIME= 1.0000

ERASE THE CURRENT DATABASE OUTPUT CONTROL TABLE.

WRITE ALL ITEMS TO THE DATABASE WITH A FREQUENCY OF NONE  
FOR ALL APPLICABLE ENTITIES

WRITE NSOL ITEMS TO THE DATABASE WITH A FREQUENCY OF ALL  
FOR ALL APPLICABLE ENTITIES

WRITE RSOL ITEMS TO THE DATABASE WITH A FREQUENCY OF ALL  
FOR ALL APPLICABLE ENTITIES

WRITE STRS ITEMS TO THE DATABASE WITH A FREQUENCY OF ALL  
FOR ALL APPLICABLE ENTITIES

WRITE EPEL ITEMS TO THE DATABASE WITH A FREQUENCY OF ALL  
FOR ALL APPLICABLE ENTITIES

WRITE EPPL ITEMS TO THE DATABASE WITH A FREQUENCY OF ALL  
FOR ALL APPLICABLE ENTITIES

NONLINEAR STABILIZATION CONTROL:  
KEY=OFF

\*GET ANSINTER\_ FROM ACTI ITEM=INT VALUE= 0.00000000

\*IF ANSINTER\_ ( = 0.00000 ) NE  
0 ( = 0.00000 ) THEN

\*ENDIF

\*\*\*\*\* ANSYS SOLVE COMMAND \*\*\*\*\*

\*\*\* WARNING \*\*\* CP = 4.493 TIME= 12:18:04  
Element shape checking is currently inactive. Issue SHPP,ON or  
SHPP,WARN to reactivate, if desired.

\*\*\* WARNING \*\*\* CP = 4.930 TIME= 12:18:04  
SOLID186 wedges are recommended only in regions of relatively low  
stress gradients.

\*\*\* NOTE \*\*\* CP = 5.850 TIME= 12:18:05  
The model data was checked and warning messages were found.  
Please review output or errors file (  
C:\Users\Katrin\Desktop\ProjectScratch\Scr4619\file.err ) for these  
warning messages.

\*\*\* SELECTION OF ELEMENT TECHNOLOGIES FOR APPLICABLE ELEMENTS \*\*\*  
--- GIVE SUGGESTIONS AND RESET THE KEY OPTIONS ---

ELEMENT TYPE 1 IS SOLID186. KEYOPT(2)=0 IS SUGGESTED AND HAS BEEN RESET.  
KEYOPT(1-12)= 0 0 0 0 0 0 0 0 0 0 0 0

ELEMENT TYPE 2 IS SOLID186. KEYOPT(2)=0 IS SUGGESTED AND HAS BEEN RESET.  
KEYOPT(1-12)= 0 0 0 0 0 0 0 0 0 0 0 0

ELEMENT TYPE 3 IS SOLID186. KEYOPT(2)=0 IS SUGGESTED AND HAS BEEN RESET.  
KEYOPT(1-12)= 0 0 0 0 0 0 0 0 0 0 0 0

1

\*\*\*\*\* ANSYS - ENGINEERING ANALYSIS SYSTEM RELEASE 14.0 \*\*\*\*\*  
ANSYS Multiphysics  
00000000 VERSION=WINDOWS x64 12:18:05 MAR 15, 2013 CP= 5.881

FEM Beleg--Statisch-mechanisch (A5)

#### SOLUTION OPTIONS

PROBLEM DIMENSIONALITY . . . . .3-D  
DEGREES OF FREEDOM . . . . . UX UY UZ ROTX ROTY ROTZ  
ANALYSIS TYPE . . . . .STATIC (STEADY-STATE)  
OFFSET TEMPERATURE FROM ABSOLUTE ZERO . . . . . 273.15  
NONLINEAR GEOMETRIC EFFECTS . . . . .ON  
EQUATION SOLVER OPTION . . . . .PCG  
MEMORY SAVING OPTION . . . . .ON  
TOLERANCE . . . . .1.00000E-08  
PLASTIC MATERIAL PROPERTIES INCLUDED . . . . .YES  
NEWTON-RAPHSON OPTION . . . . .PROGRAM CHOSEN  
GLOBALLY ASSEMBLED MATRIX . . . . .SYMMETRIC

\*\*\* WARNING \*\*\* CP = 5.944 TIME= 12:18:05  
Material number 4 (used by element 36802 ) should normally have at  
least one MP or one TB type command associated with it. Output of  
energy by material may not be available.

\*\*\* NOTE \*\*\* CP = 6.037 TIME= 12:18:05  
The step data was checked and warning messages were found.  
Please review output or errors file (  
C:\Users\Katrin\Desktop\ProjectScratch\Scr4619\file.err ) for these  
warning messages.

\*\*\* NOTE \*\*\* CP = 6.037 TIME= 12:18:05  
This nonlinear analysis defaults to using the full Newton-Raphson  
solution procedure. This can be modified using the NROPT command.

\*\*\* NOTE \*\*\* CP = 6.209 TIME= 12:18:05  
Internal nodes from 198049 to 198049 are created.  
1 internal nodes are used for handling degrees of freedom on pilot  
nodes of rigid target surfaces.

#### LOAD STEP OPTIONS

LOAD STEP NUMBER . . . . . 1  
TIME AT END OF THE LOAD STEP . . . . . 1.0000  
AUTOMATIC TIME STEPPING . . . . . ON  
INITIAL NUMBER OF SUBSTEPS . . . . . 100  
MAXIMUM NUMBER OF SUBSTEPS . . . . . 1000  
MINIMUM NUMBER OF SUBSTEPS . . . . . 100  
MAXIMUM NUMBER OF EQUILIBRIUM ITERATIONS . . . . . 15  
STEP CHANGE BOUNDARY CONDITIONS . . . . . NO  
STRESS-STIFFENING . . . . . ON  
TERMINATE ANALYSIS IF NOT CONVERGED . . . . .YES (EXIT)  
CONVERGENCE CONTROLS . . . . .USE DEFAULTS  
COPY INTEGRATION POINT VALUES TO NODE . . . . .YES, FOR ELEMENTS WITH  
ACTIVE MAT. NONLINEARITIES  
PRINT OUTPUT CONTROLS . . . . .NO PRINTOUT  
DATABASE OUTPUT CONTROLS  
ITEM FREQUENCY COMPONENT  
ALL NONE  
NSOL ALL  
RSOL ALL  
STRS ALL

EPEL ALL  
EPPL ALL

SOLUTION MONITORING INFO IS WRITTEN TO FILE=  
file.mntr

\*\*\* NOTE \*\*\* CP = 8.018 TIME= 12:18:07  
The default contact stiffness starting from Release 12.0 is no longer  
affected by defined plasticities input by the TB commands. You should  
confirm that the appropriate contact stiffness was used.

\*\*\* NOTE \*\*\* CP = 11.123 TIME= 12:18:10  
It is highly recommended to use the auto contact setting option by  
issuing CNCHECK,AUTO command for this problem in order to achieve  
better convergence.

\*\*\* NOTE \*\*\* CP = 11.123 TIME= 12:18:10  
Deformable-deformable contact pair identified by real constant set 4  
and contact element type 4 has been set up.  
Contact algorithm: Augmented Lagrange method  
Contact detection at: Gauss integration point  
Contact stiffness factor FKN 1.0000  
The resulting contact stiffness 0.13347E+16  
Default penetration tolerance factor FTOLN 0.10000  
The resulting penetration tolerance 0.10000E-03  
Frictionless contact pair is defined  
Update contact stiffness at each iteration  
Average contact surface length 0.10000E-02  
Average contact pair depth 0.10000E-02  
Default pinball region factor PINB 2.0000  
The resulting pinball region 0.20000E-02  
\*WARNING\*: Initial penetration is included.

\*\*\* NOTE \*\*\* CP = 11.123 TIME= 12:18:10  
Min. Initial gap 1.899305634E-06 was detected between contact element  
43199 and target element 49645.  
You may move entire target surface by: x= -1.235538777E-21, y=  
-3.429308995E-35, z= -1.899305634E-06, to bring it in contact.  
\*\*\*\*\*

\*\*\* NOTE \*\*\* CP = 11.123 TIME= 12:18:10  
Deformable-deformable contact pair identified by real constant set 6  
and contact element type 6 has been set up.  
Contact algorithm: Augmented Lagrange method  
Contact detection at: Gauss integration point  
Contact stiffness factor FKN 1.0000  
The resulting contact stiffness 0.13347E+16  
Default penetration tolerance factor FTOLN 0.10000  
The resulting penetration tolerance 0.10000E-03  
Frictionless contact pair is defined  
Update contact stiffness at each iteration  
Average contact surface length 0.10000E-02  
Average contact pair depth 0.10000E-02  
Default pinball region factor PINB 2.0000  
The resulting pinball region 0.20000E-02  
\*WARNING\*: Initial penetration is included.

\*\*\* NOTE \*\*\* CP = 11.123 TIME= 12:18:10  
Max. Initial penetration 0 was detected between contact element 53832  
and target element 63631.  
\*\*\*\*\*

\*\*\* NOTE \*\*\* CP = 11.123 TIME= 12:18:10  
Rigid-constraint surface identified by real constant set 8 and contact  
element type 8 has been set up. The degrees of freedom of rigid  
surface are driven by the pilot node 197976. Internal MPC will be  
built.  
The used degrees of freedom set is UX UY UZ ROTX ROTY ROTZ  
\*WARNING\*: Boundary conditions, coupling, and/or constrain equations  
have been applied on certain contact nodes (for example 21894).  
Overconstraint may occur.  
Please verify constraints (including rotational degrees of freedom)  
on the pilot node by yourself.

\*\*\* WARNING \*\*\* CP = 11.123 TIME= 12:18:10  
Overconstraint may occur for Lagrange multiplier or MPC based contact  
algorithm.  
The reasons for possible overconstraint are:  
\*Boundary conditions, coupling, and/or constraint equations have been  
applied on certain contact nodes (for example 21894).  
\*\*\*\*\*  
MAXIMUM NUMBER OF EQUILIBRIUM ITERATIONS HAS BEEN MODIFIED  
TO BE, NEQIT = 26, BY SOLUTION CONTROL LOGIC.

\*\*\* WARNING \*\*\* CP = 11.310 TIME= 12:18:10  
Multiple constraints have been applied on degree of freedom 1 of  
contact node 4203. The program will remove certain internal MPCs.  
Please check the model carefully.

\*\*\* WARNING \*\*\* CP = 11.341 TIME= 12:18:10  
17 MPC equations were released for the rigid constraint surface  
identified by real constant set 8 due to overconstraint detection  
logic.

\*\*\* NOTE \*\*\* CP = 16.942 TIME= 12:18:16  
The PCG solver has automatically set the level of difficulty for this  
model to 2.

\*\*\* NOTE \*\*\* CP = 17.628 TIME= 12:18:16  
The initial memory allocation (-m) has been exceeded.  
Supplemental memory allocations are being used.

The FEA model contains 0 external CE equations and 3934 internal CE  
equations.

\*\*\*\*\*  
SUMMARY FOR CONTACT PAIR IDENTIFIED BY REAL CONSTANT SET 4  
Min. Gap of 1.899305634E-06 has been detected between contact element  
43199 and target element 49645.  
Max. Pinball distance 2.E-03.  
One of the contact searching regions contains at least 25 target  
elements.  
\*\*\*\*\*

\*\*\*\*\*  
SUMMARY FOR CONTACT PAIR IDENTIFIED BY REAL CONSTANT SET 6  
Max. Penetration of 0 has been detected between contact element 53832  
and target element 63631.  
For total 12800 contact elements, there are 1280 elements are in  
contact.  
Contacting area 1.2E-03.  
Max. Pinball distance 2.E-03.  
One of the contact searching regions contains at least 25 target

elements.  
Max. Pressure/force 1.185479975E-03.  
Max. Normal stiffness 1.334731794E+15.  
Min. Normal stiffness 1.334731794E+15.  
\*\*\*\*\*

\*\*\*\* CENTER OF MASS, MASS, AND MASS MOMENTS OF INERTIA \*\*\*\*

CALCULATIONS ASSUME ELEMENT MASS AT ELEMENT CENTROID

TOTAL MASS = 11.093

CENTER OF MASS	MOM. OF INERTIA ABOUT ORIGIN	MOM. OF INERTIA ABOUT CENTER OF MASS
XC = 0.50000E-01	IXX = 0.1251	IXX = 0.1239
YC = -0.70844E-02	IYY = 0.1567	IYY = 0.1284
ZC = 0.74083E-02	IZZ = 0.4216E-01	IZZ = 0.1387E-01
	IXY = 0.3929E-02	IXY = -0.4588E-15
	IYZ = 0.7645E-02	IYZ = 0.7063E-02
	IZX = -0.4109E-02	IZX = 0.1751E-14

\*\*\* MASS SUMMARY BY ELEMENT TYPE \*\*\*

TYPE	MASS
1	0.200960
2	4.58094
3	6.31100

Range of element maximum matrix coefficients in global coordinates  
Maximum = 7.449400437E+10 at element 2768.  
Minimum = 0.21 at element 64074.

\*\*\* WARNING \*\*\* CP = 48.126 TIME= 12:18:36  
Coefficient ratio exceeds 1.0e8 - Check results.

\*\*\* ELEMENT MATRIX FORMULATION TIMES

TYPE NUMBER	ENAME	TOTAL CP	AVE CP
1	25600 SOLID186	32.885	0.001285
2	5900 SOLID186	6.880	0.001166
3	5300 SOLID186	5.756	0.001086
4	12800 CONTAL74	3.510	0.000274
5	550 TARGE170	0.125	0.000227
6	12800 CONTAL74	4.867	0.000380
7	700 TARGE170	0.047	0.000067
8	400 CONTAL74	0.094	0.000234
9	1 TARGE170	0.000	0.000000
10	72 COMBIN14	0.000	0.000000

Time at end of element matrix formulation CP = 48.1263084.

ALL CURRENT ANSYS DATA WRITTEN TO FILE NAME= file.rdb

FOR POSSIBLE RESUME FROM THIS POINT

FORCE CONVERGENCE VALUE = 0.8957E-07 CRITERION= 0.5102E-04  
curEqn= 46250 totEqn= 46250 Job CP sec= 52.167  
Factor Done= 100% Factor Wall sec= 1.584 rate= 5677.3 Mflops  
Iteration= 10 Ratio= 7.935709E-02 Limit= 1.000000E-08 Wall= 1.5  
Iteration= 45 Ratio= 5.039004E-04 Limit= 1.000000E-08 Wall= 8.4  
Iteration= 95 Ratio= 2.959071E-06 Limit= 1.000000E-08 Wall= 18.0

PRECONDITIONED SOLVER CP TIME = 94.069

PRECONDITIONED SOLVER ELAPSED TIME = 53.028

EQUIL ITER 1 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.5000E-04  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = -0.2500E-05  
FORCE CONVERGENCE VALUE = 683.4 CRITERION= 0.5206E-04  
EQUIL ITER 2 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.4791E-04  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = -0.2396E-05  
FORCE CONVERGENCE VALUE = 1343. CRITERION= 0.1357  
EQUIL ITER 3 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.5222E-02  
LINE SEARCH PARAMETER = 0.6307 SCALED MAX DOF INC = -0.3294E-02  
FORCE CONVERGENCE VALUE = 714.6 CRITERION= 1.913  
EQUIL ITER 4 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.1769E-02  
LINE SEARCH PARAMETER = 0.5859E-01 SCALED MAX DOF INC = 0.1037E-03  
FORCE CONVERGENCE VALUE = 750.0 CRITERION= 1.838  
EQUIL ITER 5 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.2167E-02  
LINE SEARCH PARAMETER = 0.4062 SCALED MAX DOF INC = 0.8802E-03  
FORCE CONVERGENCE VALUE = 1616. CRITERION= 1.523  
EQUIL ITER 6 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.2280E-02  
LINE SEARCH PARAMETER = 0.1901 SCALED MAX DOF INC = 0.4334E-03  
FORCE CONVERGENCE VALUE = 3359. CRITERION= 1.358  
EQUIL ITER 7 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.2888E-03  
LINE SEARCH PARAMETER = 0.8997E-01 SCALED MAX DOF INC = 0.2599E-04  
FORCE CONVERGENCE VALUE = 963.5 CRITERION= 1.347  
EQUIL ITER 8 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.2181E-03  
LINE SEARCH PARAMETER = 0.3603 SCALED MAX DOF INC = 0.7858E-04  
FORCE CONVERGENCE VALUE = 629.9 CRITERION= 1.040  
EQUIL ITER 9 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.1362E-02  
LINE SEARCH PARAMETER = 0.1808 SCALED MAX DOF INC = 0.2462E-03  
FORCE CONVERGENCE VALUE = 572.8 CRITERION= 0.8692  
EQUIL ITER 10 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.1415E-02  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = 0.7074E-04  
FORCE CONVERGENCE VALUE = 1923. CRITERION= 0.8560  
EQUIL ITER 11 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.4082E-02  
LINE SEARCH PARAMETER = 0.1094 SCALED MAX DOF INC = 0.4465E-03  
FORCE CONVERGENCE VALUE = 0.1056E+05 CRITERION= 0.8376  
EQUIL ITER 12 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.2922E-02  
LINE SEARCH PARAMETER = 0.8849 SCALED MAX DOF INC = 0.2586E-02  
FORCE CONVERGENCE VALUE = 0.1920E+05 CRITERION= 1.076  
EQUIL ITER 13 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.8334E-02

\*\*\* WARNING \*\*\* CP = 23640.734 TIME= 15:43:17  
Contact element 59192 (real ID 6) status changes abruptly from contact  
(with target element 63057) -> no-contact.

LINE SEARCH PARAMETER = 0.3642 SCALED MAX DOF INC = 0.3035E-02  
FORCE CONVERGENCE VALUE = -0.2670E+05 CRITERION= 1.213  
EQUIL ITER 14 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.8139E-02  
LINE SEARCH PARAMETER = 0.4263 SCALED MAX DOF INC = 0.3470E-02  
FORCE CONVERGENCE VALUE = 0.1683E+05 CRITERION= 1.633  
EQUIL ITER 15 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1615E-01  
LINE SEARCH PARAMETER = 0.5068E-01 SCALED MAX DOF INC = -0.8187E-03  
FORCE CONVERGENCE VALUE = 6739. CRITERION= 1.675  
EQUIL ITER 16 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2087E-02  
LINE SEARCH PARAMETER = 0.1737 SCALED MAX DOF INC = -0.3627E-03  
FORCE CONVERGENCE VALUE = 6056. CRITERION= 1.412  
EQUIL ITER 17 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.5312E-02  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = -0.2656E-03  
FORCE CONVERGENCE VALUE = 0.2305E+05 CRITERION= 1.406  
EQUIL ITER 18 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1208E-01  
LINE SEARCH PARAMETER = 0.1194 SCALED MAX DOF INC = -0.1442E-02  
FORCE CONVERGENCE VALUE = 0.1939E+05 CRITERION= 1.573  
EQUIL ITER 19 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2579E-02  
LINE SEARCH PARAMETER = 0.9163 SCALED MAX DOF INC = -0.2363E-02  
FORCE CONVERGENCE VALUE = 6673. CRITERION= 3.354  
EQUIL ITER 20 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.3551E-02  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = 0.1776E-03

FORCE CONVERGENCE VALUE = 6198. CRITERION= 3.303  
EQUIL ITER 21 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2210E-02  
LINE SEARCH PARAMETER = 0.1891 SCALED MAX DOF INC = -0.4178E-03  
FORCE CONVERGENCE VALUE = 5001. CRITERION= 2.733  
EQUIL ITER 22 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1532E-02  
LINE SEARCH PARAMETER = 0.2947 SCALED MAX DOF INC = -0.4515E-03  
FORCE CONVERGENCE VALUE = 3742. CRITERION= 1.967  
EQUIL ITER 23 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.2447E-02  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = 0.1223E-03  
FORCE CONVERGENCE VALUE = 7723. CRITERION= 1.933  
EQUIL ITER 24 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.5935E-02  
LINE SEARCH PARAMETER = 0.4701 SCALED MAX DOF INC = 0.2790E-02  
FORCE CONVERGENCE VALUE = 0.1660E+05 CRITERION= 1.853  
EQUIL ITER 25 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.8072E-02  
LINE SEARCH PARAMETER = 0.3966 SCALED MAX DOF INC = 0.3201E-02  
FORCE CONVERGENCE VALUE = 0.1779E+05 CRITERION= 1.884  
EQUIL ITER 26 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.4946E-02  
LINE SEARCH PARAMETER = 0.5095 SCALED MAX DOF INC = 0.2520E-02  
FORCE CONVERGENCE VALUE = 0.1776E+05 CRITERION= 2.224  
>>> SOLUTION NOT CONVERGED AFTER 26 EQUILIBRIUM ITERATIONS  
\*\*\* LOAD STEP 1 SUBSTEP 1 NOT COMPLETED. CUM ITER = 26  
\*\*\* BEGIN BISECTION NUMBER 1 NEW TIME INCREMENT= 0.50000E-02

\*\*\* WARNING \*\*\* CP = 39460.234 TIME= 18:02:03  
Multiple constraints have been applied on degree of freedom 1 of  
contact node 4203. The program will remove certain internal MPCs.  
Please check the model carefully.

\*\*\* WARNING \*\*\* CP = 39460.266 TIME= 18:02:03  
17 MPC equations were released for the rigid constraint surface  
identified by real constant set 8 due to overconstraint detection  
logic.

The FEA model contains 0 external CE equations and 3934 internal CE  
equations.

\*\*\*\*\*  
SUMMARY FOR CONTACT PAIR IDENTIFIED BY REAL CONSTANT SET 4  
Min. Gap of 1.899305634E-06 has been detected between contact element  
43199 and target element 49645.  
Max. Pinball distance 2.E-03.  
One of the contact searching regions contains at least 25 target  
elements.  
\*\*\*\*\*

\*\*\*\*\*  
SUMMARY FOR CONTACT PAIR IDENTIFIED BY REAL CONSTANT SET 6  
Max. Penetration of 0 has been detected between contact element 53832  
and target element 63631.  
For total 12800 contact elements, there are 1280 elements are in  
contact.  
Contacting area 1.2E-03.  
Max. Pinball distance 2.E-03.  
One of the contact searching regions contains at least 25 target  
elements.  
Max. Pressure/force 2.370959986E-04.  
Max. Normal stiffness 2.669463627E+14.  
Min. Normal stiffness 2.669463627E+14.  
\*\*\*\*\*

Range of element maximum matrix coefficients in global coordinates  
Maximum = 7.449400437E+10 at element 2768.  
Minimum = 0.21 at element 64074.

\*\*\* WARNING \*\*\* CP = 39502.465 TIME= 18:02:40  
Coefficient ratio exceeds 1.0e8 - Check results.  
FORCE CONVERGENCE VALUE = 0.3290E-07 CRITERION= 0.5102E-04  
EQUIL ITER 1 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2500E-04  
LINE SEARCH PARAMETER = 1.000 SCALED MAX DOF INC = -0.2500E-04  
FORCE CONVERGENCE VALUE = 0.2628E+05 CRITERION= 0.5206E-04  
EQUIL ITER 2 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2217E-04  
LINE SEARCH PARAMETER = 0.9926 SCALED MAX DOF INC = -0.2201E-04  
FORCE CONVERGENCE VALUE = 2582. CRITERION= 1.338  
EQUIL ITER 3 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.5490E-03  
LINE SEARCH PARAMETER = 0.9899 SCALED MAX DOF INC = -0.5435E-03  
FORCE CONVERGENCE VALUE = 1993. CRITERION= 1.376  
EQUIL ITER 4 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.2574E-02  
LINE SEARCH PARAMETER = 0.4724 SCALED MAX DOF INC = 0.1216E-02  
FORCE CONVERGENCE VALUE = 608.5 CRITERION= 1.176  
EQUIL ITER 5 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2946E-03  
LINE SEARCH PARAMETER = 0.7625 SCALED MAX DOF INC = -0.2247E-03  
FORCE CONVERGENCE VALUE = 2372. CRITERION= 0.2850  
EQUIL ITER 6 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2649E-02  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = -0.1325E-03  
FORCE CONVERGENCE VALUE = 0.1963E+05 CRITERION= 0.2866  
EQUIL ITER 7 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1006E-01

\*\*\* WARNING \*\*\* CP = 54658.367 TIME= 20:14:34  
Contact element 59192 (real ID 6) status changes abruptly from contact  
(with target element 63057) -> no-contact.  
LINE SEARCH PARAMETER = 0.3783 SCALED MAX DOF INC = -0.3807E-02  
FORCE CONVERGENCE VALUE = 4414. CRITERION= 0.5263  
EQUIL ITER 8 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.2588E-02  
LINE SEARCH PARAMETER = 0.7244E-01 SCALED MAX DOF INC = 0.1875E-03  
FORCE CONVERGENCE VALUE = 5903. CRITERION= 0.4982  
EQUIL ITER 9 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.9740E-02  
LINE SEARCH PARAMETER = 0.1010 SCALED MAX DOF INC = 0.9837E-03  
FORCE CONVERGENCE VALUE = 4639. CRITERION= 0.4831  
EQUIL ITER 10 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.2583E-02  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = 0.1292E-03  
FORCE CONVERGENCE VALUE = 0.1535E+05 CRITERION= 0.4896  
EQUIL ITER 11 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.8400E-02  
LINE SEARCH PARAMETER = 0.2798 SCALED MAX DOF INC = 0.2350E-02  
FORCE CONVERGENCE VALUE = 6026. CRITERION= 0.7180  
EQUIL ITER 12 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2040E-02  
LINE SEARCH PARAMETER = 0.9956 SCALED MAX DOF INC = -0.2031E-02  
FORCE CONVERGENCE VALUE = 372.7 CRITERION= 1.176  
EQUIL ITER 13 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.1458E-02  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = 0.7291E-04  
FORCE CONVERGENCE VALUE = 3250. CRITERION= 1.140  
EQUIL ITER 14 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2150E-02  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = -0.1075E-03  
FORCE CONVERGENCE VALUE = 492.0 CRITERION= 1.131  
EQUIL ITER 15 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.1447E-02  
LINE SEARCH PARAMETER = 0.2281 SCALED MAX DOF INC = 0.3302E-03  
FORCE CONVERGENCE VALUE = 4405. CRITERION= 0.8907  
EQUIL ITER 16 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.3196E-02  
LINE SEARCH PARAMETER = 1.000 SCALED MAX DOF INC = 0.3196E-02  
FORCE CONVERGENCE VALUE = 8108. CRITERION= 0.6847  
EQUIL ITER 17 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.9703E-02  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = -0.4852E-03  
FORCE CONVERGENCE VALUE = 0.1124E+05 CRITERION= 0.6683  
EQUIL ITER 18 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1691E-01  
LINE SEARCH PARAMETER = 0.5318E-01 SCALED MAX DOF INC = -0.8995E-03  
FORCE CONVERGENCE VALUE = 5268. CRITERION= 0.7247  
EQUIL ITER 19 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1265E-02  
LINE SEARCH PARAMETER = 0.4763 SCALED MAX DOF INC = -0.6027E-03

FORCE CONVERGENCE VALUE = 5409. CRITERION= 0.9446  
EQUIL ITER 20 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.4608E-02  
LINE SEARCH PARAMETER = 1.000 SCALED MAX DOF INC = 0.4608E-02  
FORCE CONVERGENCE VALUE = 3717. CRITERION= 1.476  
EQUIL ITER 21 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2935E-02  
LINE SEARCH PARAMETER = 0.6615E-01 SCALED MAX DOF INC = -0.1942E-03  
FORCE CONVERGENCE VALUE = 827.9 CRITERION= 1.461  
EQUIL ITER 22 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.9608E-03  
LINE SEARCH PARAMETER = 0.1094 SCALED MAX DOF INC = -0.1051E-03  
FORCE CONVERGENCE VALUE = 755.2 CRITERION= 1.328  
EQUIL ITER 23 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1125E-02  
LINE SEARCH PARAMETER = 0.7797E-01 SCALED MAX DOF INC = -0.8770E-04  
FORCE CONVERGENCE VALUE = 711.5 CRITERION= 1.250  
EQUIL ITER 24 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1188E-02  
LINE SEARCH PARAMETER = 0.9154 SCALED MAX DOF INC = -0.1087E-02  
FORCE CONVERGENCE VALUE = 277.1 CRITERION= 0.6146  
EQUIL ITER 25 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1332E-02  
LINE SEARCH PARAMETER = 0.7579 SCALED MAX DOF INC = -0.1009E-02  
FORCE CONVERGENCE VALUE = 76.25 CRITERION= 0.1488  
EQUIL ITER 26 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.6141E-03  
LINE SEARCH PARAMETER = 0.1161 SCALED MAX DOF INC = -0.7128E-04  
FORCE CONVERGENCE VALUE = 66.77 CRITERION= 0.1315  
>>> SOLUTION NOT CONVERGED AFTER 26 EQUILIBRIUM ITERATIONS  
\*\*\* LOAD STEP 1 SUBSTEP 1 NOT COMPLETED. CUM ITER = 52  
\*\*\* BEGIN BISECTION NUMBER 2 NEW TIME INCREMENT= 0.25000E-02

\*\*\* WARNING \*\*\* CP = 98963.570 TIME= 02:40:40  
Multiple constraints have been applied on degree of freedom 1 of  
contact node 4203. The program will remove certain internal MPCs.  
Please check the model carefully.

\*\*\* WARNING \*\*\* CP = 98963.617 TIME= 02:40:40  
17 MPC equations were released for the rigid constraint surface  
identified by real constant set 8 due to overconstraint detection  
logic.

The FEA model contains 0 external CE equations and 3934 internal CE  
equations.

\*\*\*\*\*  
SUMMARY FOR CONTACT PAIR IDENTIFIED BY REAL CONSTANT SET 4  
Min. Gap of 1.899305634E-06 has been detected between contact element  
43199 and target element 49645.  
Max. Pinball distance 2.E-03.  
One of the contact searching regions contains at least 25 target  
elements.  
\*\*\*\*\*

\*\*\*\*\*  
SUMMARY FOR CONTACT PAIR IDENTIFIED BY REAL CONSTANT SET 6  
Max. Penetration of 0 has been detected between contact element 53832  
and target element 63631.  
For total 12800 contact elements, there are 1280 elements are in  
contact.  
Contacting area 1.2E-03.  
Max. Pinball distance 2.E-03.  
One of the contact searching regions contains at least 25 target  
elements.  
Max. Pressure/force 4.741920237E-05.  
Max. Normal stiffness 5.338927553E+13.  
Min. Normal stiffness 5.338927553E+13.  
\*\*\*\*\*

Range of element maximum matrix coefficients in global coordinates  
Maximum = 7.449400437E+10 at element 2768.  
Minimum = 0.21 at element 64074.

\*\*\* WARNING \*\*\* CP = 99006.297 TIME= 02:40:38  
Coefficient ratio exceeds 1.0e8 - Check results.  
FORCE CONVERGENCE VALUE = 0.2836E-07 CRITERION= 0.5102E-04  
EQUIL ITER 1 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1250E-04  
LINE SEARCH PARAMETER = 1.000 SCALED MAX DOF INC = -0.1250E-04  
FORCE CONVERGENCE VALUE = 0.1206E+05 CRITERION= 0.5206E-04  
EQUIL ITER 2 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1016E-04  
LINE SEARCH PARAMETER = 0.9956 SCALED MAX DOF INC = -0.1012E-04  
FORCE CONVERGENCE VALUE = 758.1 CRITERION= 0.6380  
EQUIL ITER 3 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2116E-03  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = -0.1058E-04  
FORCE CONVERGENCE VALUE = 751.2 CRITERION= 0.6415  
EQUIL ITER 4 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.3090E-03  
LINE SEARCH PARAMETER = 1.000 SCALED MAX DOF INC = -0.3090E-03  
FORCE CONVERGENCE VALUE = 111.2 CRITERION= 0.6325  
EQUIL ITER 5 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.8559E-04  
LINE SEARCH PARAMETER = 0.8268 SCALED MAX DOF INC = 0.7076E-04  
FORCE CONVERGENCE VALUE = 24.99 CRITERION= 0.1118  
EQUIL ITER 6 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.1853E-03  
LINE SEARCH PARAMETER = 0.6380 SCALED MAX DOF INC = 0.1182E-03  
FORCE CONVERGENCE VALUE = 1441. CRITERION= 0.4130E-01  
EQUIL ITER 7 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.1901E-03  
LINE SEARCH PARAMETER = 0.7321 SCALED MAX DOF INC = 0.1392E-03  
FORCE CONVERGENCE VALUE = 0.1338E+05 CRITERION= 0.4174E-01  
EQUIL ITER 8 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.1703E-02  
LINE SEARCH PARAMETER = 0.7680 SCALED MAX DOF INC = -0.1308E-02  
FORCE CONVERGENCE VALUE = 9043. CRITERION= 0.4547  
EQUIL ITER 9 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.6454E-03  
LINE SEARCH PARAMETER = 0.9958 SCALED MAX DOF INC = 0.6427E-03  
FORCE CONVERGENCE VALUE = 186.1 CRITERION= 0.1972E-02  
EQUIL ITER 10 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.1050E-02  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = 0.5248E-04  
FORCE CONVERGENCE VALUE = 3943. CRITERION= 0.1911E-02  
EQUIL ITER 11 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.1088E-02  
LINE SEARCH PARAMETER = 0.2064 SCALED MAX DOF INC = 0.2245E-03  
FORCE CONVERGENCE VALUE = 6201. CRITERION= 0.4092E-01  
EQUIL ITER 12 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2294E-03  
LINE SEARCH PARAMETER = 0.9981 SCALED MAX DOF INC = -0.2289E-03  
FORCE CONVERGENCE VALUE = 36.33 CRITERION= 0.4503  
EQUIL ITER 13 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.3102E-03  
LINE SEARCH PARAMETER = 0.1094 SCALED MAX DOF INC = 0.3392E-04  
FORCE CONVERGENCE VALUE = 681.8 CRITERION= 0.4093  
EQUIL ITER 14 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.5038E-03  
LINE SEARCH PARAMETER = 0.9867 SCALED MAX DOF INC = 0.4971E-03  
FORCE CONVERGENCE VALUE = 47.87 CRITERION= 0.3925  
EQUIL ITER 15 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2065E-03  
LINE SEARCH PARAMETER = 0.8954 SCALED MAX DOF INC = -0.1849E-03  
FORCE CONVERGENCE VALUE = 12.03 CRITERION= 0.4190E-01

\*\*\* ERROR \*\*\* CP = 140871.781 TIME= 08:43:55  
Preconditioned conjugate gradient solver error level 1. Possibly, the  
model is unconstrained or additional iterations may be needed. Try  
running setting the multiplier MULT on the EQSLV command to greater  
than 1.0 (but less than 3.0).  
>>> NEGATIVE PIVOT ENCOUNTERED  
\*\*\* LOAD STEP 1 SUBSTEP 1 NOT COMPLETED. CUM ITER = 68  
\*\*\* BEGIN BISECTION NUMBER 3 NEW TIME INCREMENT= 0.10000E-02

\*\*\* WARNING \*\*\* CP = 140872.016 TIME= 08:43:55

Multiple constraints have been applied on degree of freedom 1 of contact node 4203. The program will remove certain internal MPCs. Please check the model carefully.

\*\*\* WARNING \*\*\* CP = 140872.062 TIME= 08:43:52  
17 MPC equations were released for the rigid constraint surface identified by real constant set 8 due to overconstraint detection logic.

The FEA model contains 0 external CE equations and 3934 internal CE equations.

\*\*\*\*\*  
SUMMARY FOR CONTACT PAIR IDENTIFIED BY REAL CONSTANT SET 4  
Min. Gap of 1.899305634E-06 has been detected between contact element 43199 and target element 49645.  
Max. Pinball distance 2.E-03.  
One of the contact searching regions contains at least 25 target elements.  
\*\*\*\*\*

\*\*\*\*\*  
SUMMARY FOR CONTACT PAIR IDENTIFIED BY REAL CONSTANT SET 6  
Max. Penetration of 0 has been detected between contact element 53832 and target element 63631.  
For total 12800 contact elements, there are 1280 elements are in contact.  
Contacting area 1.2E-03.  
Max. Pinball distance 2.E-03.  
One of the contact searching regions contains at least 25 target elements.  
Max. Pressure/force 9.483840253E-06.  
Max. Normal stiffness 1.067785486E+13.  
Min. Normal stiffness 1.067785486E+13.  
\*\*\*\*\*

Range of element maximum matrix coefficients in global coordinates  
Maximum = 7.449400437E+10 at element 2768.  
Minimum = 0.21 at element 64074.

\*\*\* WARNING \*\*\* CP = 140936.094 TIME= 08:44:46  
Coefficient ratio exceeds 1.0e8 - Check results.  
FORCE CONVERGENCE VALUE = 0.2817E-07 CRITERION= 0.5102E-04  
EQUIL ITER 1 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.5000E-05  
LINE SEARCH PARAMETER = 0.4062 SCALED MAX DOF INC = -0.2031E-05  
FORCE CONVERGENCE VALUE = 149.7 CRITERION= 0.5206E-04  
EQUIL ITER 2 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.2997E-05  
LINE SEARCH PARAMETER = 0.3287 SCALED MAX DOF INC = -0.9850E-06  
FORCE CONVERGENCE VALUE = 127.1 CRITERION= 0.6031E-01  
EQUIL ITER 3 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.3766E-05  
LINE SEARCH PARAMETER = 1.000 SCALED MAX DOF INC = 0.3766E-05  
FORCE CONVERGENCE VALUE = 24.49 CRITERION= 0.1735  
EQUIL ITER 4 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.4071E-05  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = -0.2036E-06  
FORCE CONVERGENCE VALUE = 164.1 CRITERION= 0.1682  
EQUIL ITER 5 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.8368E-04  
LINE SEARCH PARAMETER = 1.000 SCALED MAX DOF INC = -0.8368E-04  
FORCE CONVERGENCE VALUE = 35.42 CRITERION= 0.1118  
EQUIL ITER 6 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.5317E-04  
LINE SEARCH PARAMETER = 0.7625 SCALED MAX DOF INC = 0.4054E-04  
FORCE CONVERGENCE VALUE = 24.46 CRITERION= 0.2710E-01  
EQUIL ITER 7 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.5186E-04  
LINE SEARCH PARAMETER = 0.5000E-01 SCALED MAX DOF INC = 0.2593E-05  
FORCE CONVERGENCE VALUE = 119.4 CRITERION= 0.2665E-01  
EQUIL ITER 8 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.5778E-04  
LINE SEARCH PARAMETER = 0.9849E-01 SCALED MAX DOF INC = 0.5691E-05  
FORCE CONVERGENCE VALUE = 454.8 CRITERION= 0.2572E-01  
EQUIL ITER 9 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.7071E-04  
LINE SEARCH PARAMETER = 1.000 SCALED MAX DOF INC = 0.7071E-04  
FORCE CONVERGENCE VALUE = 4538. CRITERION= 0.2386E-01  
EQUIL ITER 10 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.3880E-04  
LINE SEARCH PARAMETER = 0.6744E-01 SCALED MAX DOF INC = 0.2616E-05  
FORCE CONVERGENCE VALUE = 4496. CRITERION= 0.2618E-01  
EQUIL ITER 11 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= -0.5141E-03  
LINE SEARCH PARAMETER = 1.000 SCALED MAX DOF INC = -0.5141E-03  
FORCE CONVERGENCE VALUE = 139.5 CRITERION= 0.2354  
EQUIL ITER 12 COMPLETED. NEW TRIANG MATRIX. MAX DOF INC= 0.3770E-03  
LINE SEARCH PARAMETER = 1.000 SCALED MAX DOF INC = 0.3770E-03  
FORCE CONVERGENCE VALUE = 2.300 CRITERION= 0.6502E-04

\*\*\* ERROR \*\*\* CP = 173748.000 TIME= 13:31:35  
Preconditioned conjugate gradient solver error level 1. Possibly, the model is unconstrained or additional iterations may be needed. Try running setting the multiplier MULT on the EQSLV command to greater than 1.0 (but less than 3.0).

\*\*\*\*\*  
SUMMARY FOR CONTACT PAIR IDENTIFIED BY REAL CONSTANT SET 4  
Min. Gap of 7.422935343E-07 has been detected between contact element 43201 and target element 49646.  
Contact element 43122 has the highest number of status changes (total 6) during this substep.  
Max. Pinball distance 2.E-03.  
One of the contact searching regions contains at least 20 target elements.  
\*\*\*\*\*

\*\*\*\*\*  
SUMMARY FOR CONTACT PAIR IDENTIFIED BY REAL CONSTANT SET 6  
Max. Penetration of -5.030887491E-10 has been detected between contact element 53992 and target element 63630.  
For total 12800 contact elements, there are 214 elements are in contact.  
Contacting area 1.852500521E-04.  
Contact element 54392 has the highest number of status changes (total 7) during this substep.  
Max. Total sliding distance 9.140882463E-05.  
Max. Pinball distance 2.E-03.  
One of the contact searching regions contains at least 14 target elements.  
Max. Pressure/force 67148.8548.  
Max. Normal stiffness 1.334731794E+14.  
Min. Normal stiffness 1.334731794E+14.  
\*\*\*\*\*

\*\*\* WARNING \*\*\* CP = 173748.062 TIME= 13:31:35  
The unconverged solution (identified as time 1 substep 999999) is output for analysis debug purposes. Results should not be used for any other purpose.

#### RESTART INFORMATION

REASON FOR TERMINATION. . . . .NEGATIVE PIVOT  
RESTART BY RE-RUNNING THE ANALYSIS



ALL CURRENT ANSYS DATA WRITTEN TO FILE NAME= file.db  
FOR POSSIBLE RESUME FROM THIS POINT

\*\*\* NOTE \*\*\* CP = 173789.344 TIME= 13:32:14  
During this loadstep the PCG iterative solver took more than 1000  
iterations to solve the system of equations. In the future it may be  
more efficient to choose a direct solver, such as the SPARSE solver,  
for this analysis.

NUMBER OF WARNING MESSAGES ENCOUNTERED= 20  
NUMBER OF ERROR MESSAGES ENCOUNTERED= 2

\*\*\*\*\* PROBLEM TERMINATED BY INDICATED ERROR(S) OR BY END OF INPUT DATA \*\*\*\*\*

+----- A N S Y S S T A T I S T I C S -----+

Release: 14.0 Build: UP20111024 Platform: WINDOWS x64  
Date Run: 03/16/2013 Time: 13:32  
Windows Process ID: 1568

Compiler: Intel(R) FORTRAN Compiler Version 11.1.0 (Build: 20100414)  
Microsoft(R) Visual C/C++ Compiler Version 15.0 (Build: 30729)  
Intel(R) Math Kernel Library Version 10.3.3 Product Build 20110314

Number of cores: 2 (Shared Memory Parallel)

GPU Acceleration: Not Requested

Job Name: file  
Working Directory: C:\Users\KatrIn\Desktop\\_ProjectScratch\Scr4619

Elapsed time spent pre-processing model (/PREP7) : 1.8 seconds  
Elapsed time spent solution - preprocessing : 1.8 seconds  
Elapsed time spent computing solution : 90846.9 seconds  
Elapsed time spent solution - postprocessing : 0.0 seconds  
Elapsed time spent post-processing model (/POST1) : 0.0 seconds

Equation solver computational rate : 2658.8 Mflops

Maximum total memory used : 1735.0 Mbytes  
Maximum total memory allocated : 2082.0 Mbytes

+----- E N D A N S Y S S T A T I S T I C S -----+

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|                                     |
|               ANSYS RUN COMPLETED |
|                                     |
|-----|
| Release 14.0      UP20111024      WINDOWS x64 |
|-----|
| Database Requested(-db) 512 MB   Scratch Memory Requested      512 MB |
| Maximum Database Used   119 MB   Maximum Scratch Memory Used  1220 MB |
|-----|
| CP Time (sec) = 173789.500      Time = 13:32:14 |
| Elapsed Time (sec) = 90856.000   Date = 03/16/2013 |
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|                                     |
|-----*

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