

LOWER BELLOWS MAGNETIC DISRUPTION CHECK

These calculations were performed using a sequence of ANSYS prep7 runs:

* Using “BellDisrupt02.txt” “elect2.db” was created and saved with data for 40 time steps for restart in the next phase of the process. This data is then used in the “Static01.txt” to create the “struct2PR.db” for further static processing.

Note: All the necessary data is located at:
asalehz-64pc,G:\ANSYS_PR\BellowsEM1

1
MODAL SOLUTION

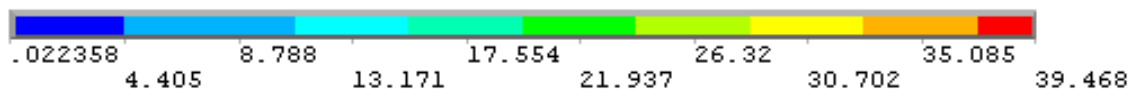
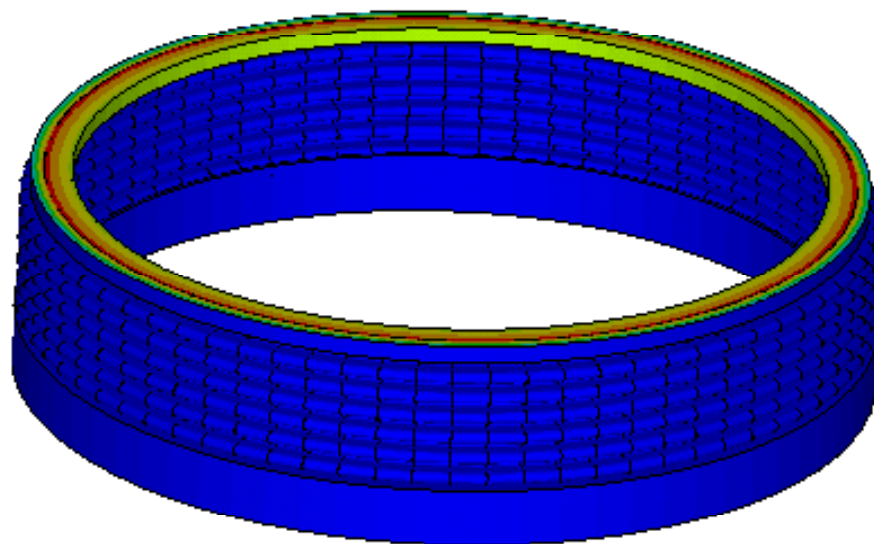
ANSYS

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12:17:44

STEP=7
SUB =1
TIME=100.007
FMAGSUM (AVG)
SMN =.022358
SMX =39.468

Step =7



1
MODAL SOLUTION

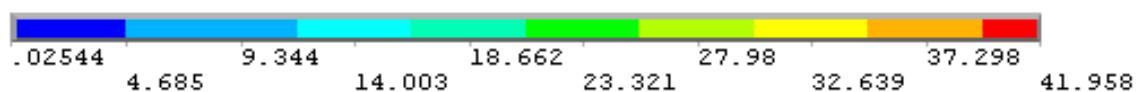
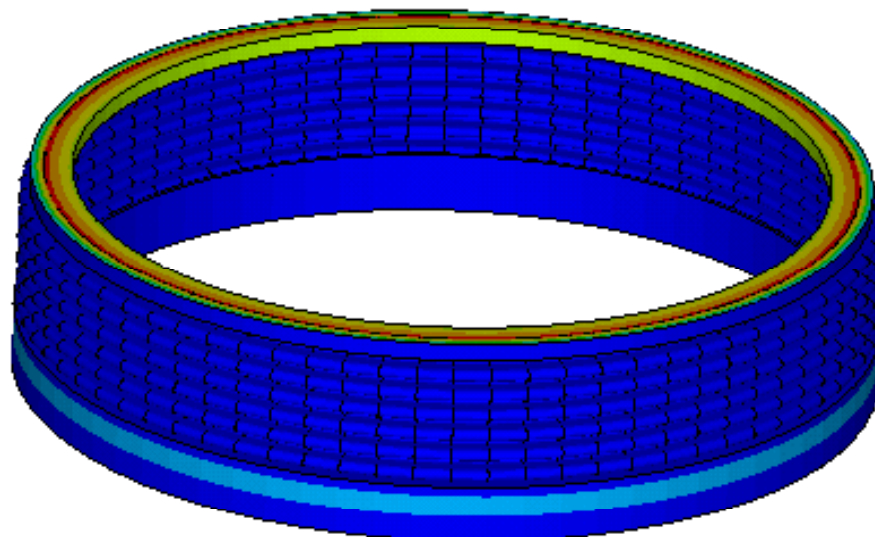
ANSYS

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12:18:10

STEP=8
SUB =1
TIME=100.008
FMAGSUM (AVG)
SMN =.02544
SMX =41.958

Step = 8



1

NODAL SOLUTION

STEP=9

SUB =1

TIME=100.008

RMAGSUM (AVG)

SMN =.024193

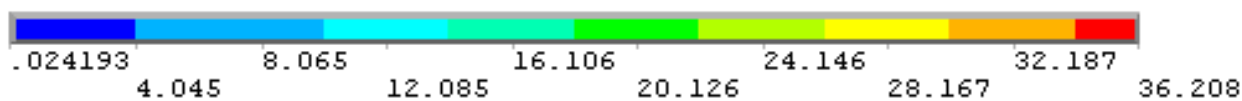
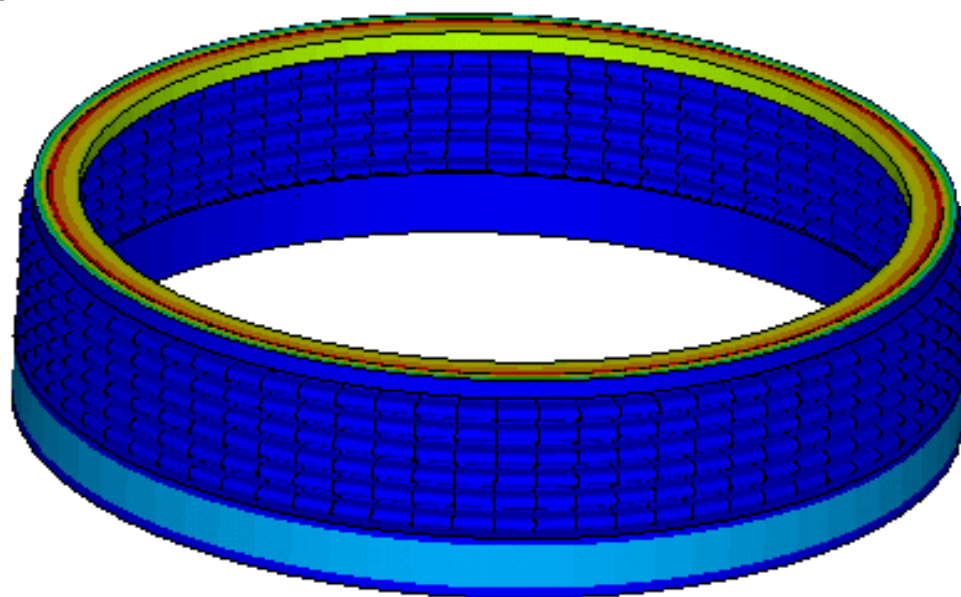
SMX =36.208

ANSYS

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12:18:36

Step = 9



Displacements and VonMises stresses

From “struct2PR.db”
Input data “Static01.txt”

Due to the disruption magnetic forces at the lower bellows. General input data provided by A. Brooks and P. Titus in ANSYS Prep7 format.

Maximum displacements and stresses are calculated at iteration “step = 8”, i.e., stress = 3.37 MPa (about 500. psi), therefore, adding small increase to the Inconel bellows.

Steps #7 and #9 are shown in order to help verify the maximum load and reaction conditions.

Conclusion: Stresses due to the magnetic disruption at the lower bellows are insignificant.

1

NODAL SOLUTION

STEP=7

SUB =1

TIME=7

USUM (AVG)

RSYS=0

DMX =.631E-05

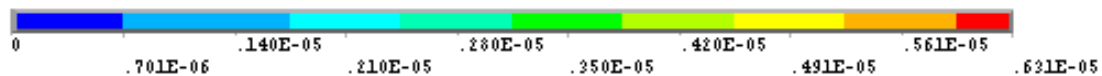
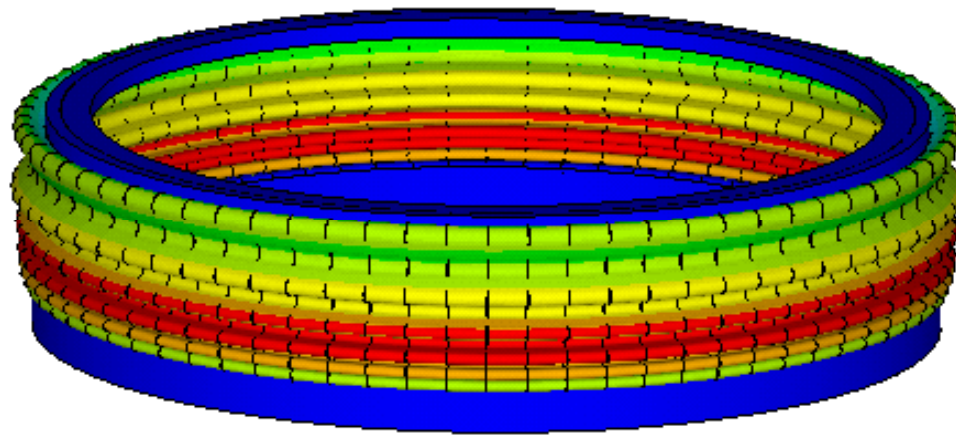
SMX =.631E-05

ANSYS

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09:55:33

step = 7



1

NODAL SOLUTION

STEP=7

SUB =1

TIME=7

SEQV (AVG)

DMX =.631E-05

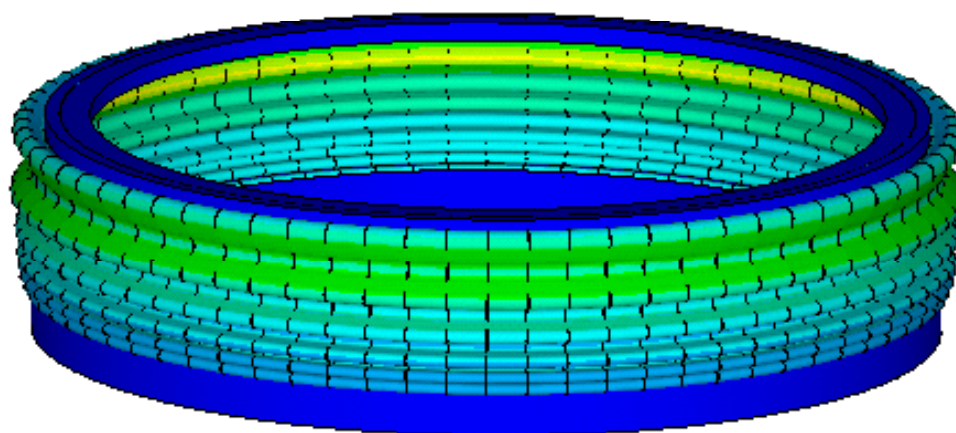
SMX =.284E+07

ANSYS

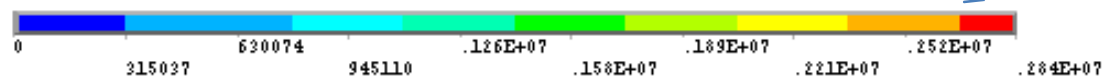
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09:55:59

step = 7



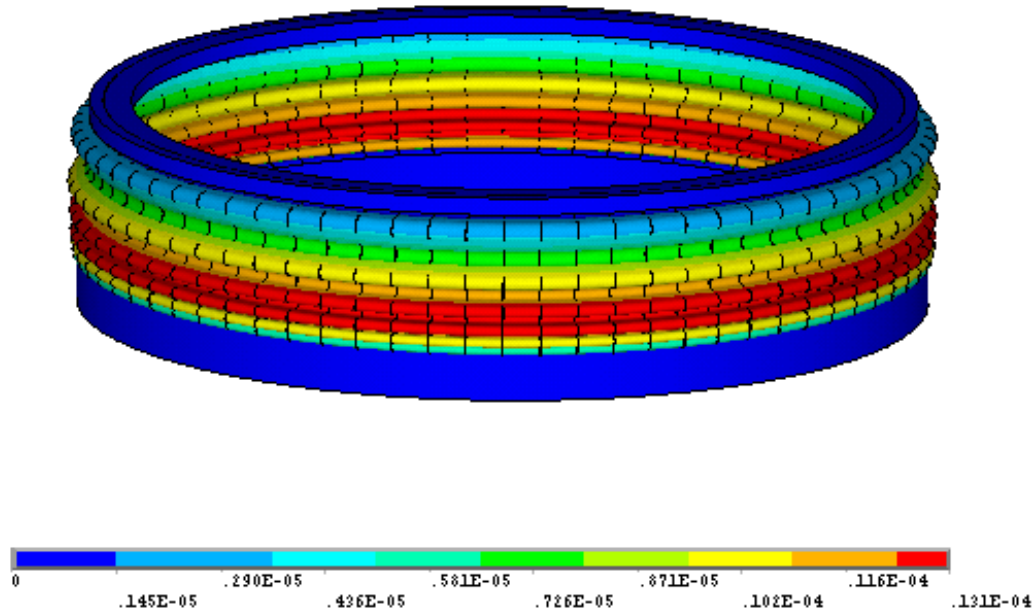
2.84 MPa



1
NODAL SOLUTION
STEP=8
SUB =1
TIME=8
USUM (AVG)
RSYS=0
DMX =.131E-04
SMX =.131E-04

ANSYS
FEB 16 2011
09:53:12

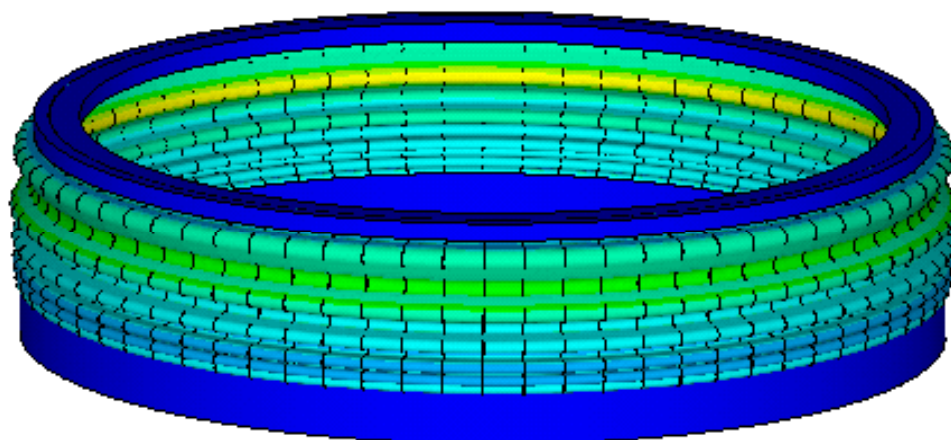
step = 8



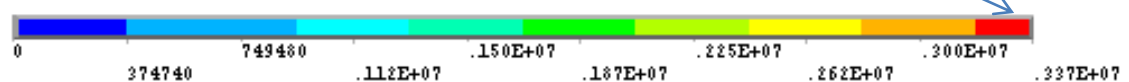
1
NODAL SOLUTION
STEP=8
SUB =1
TIME=8
SEQV (AVG)
DMX =.131E-04
SMX =.337E+07

ANSYS
FEB 16 2011
09:53:36

step = 8



Maximum for the total calculation 3.37 MPa



1

NODAL SOLUTION

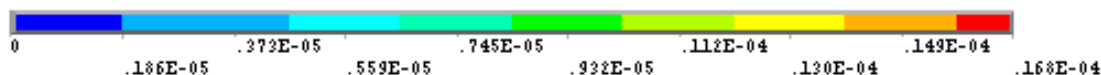
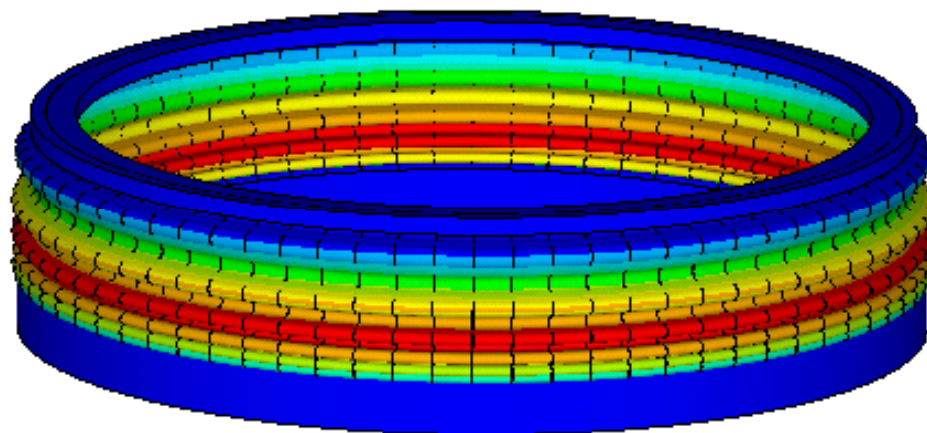
STEP=9
SUB =1
TIME=9
USUM (AVG)
RSYS=0
DMX =.168E-04
SMX =.168E-04

ANSYS

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09:54:34

step = 9



1

NODAL SOLUTION

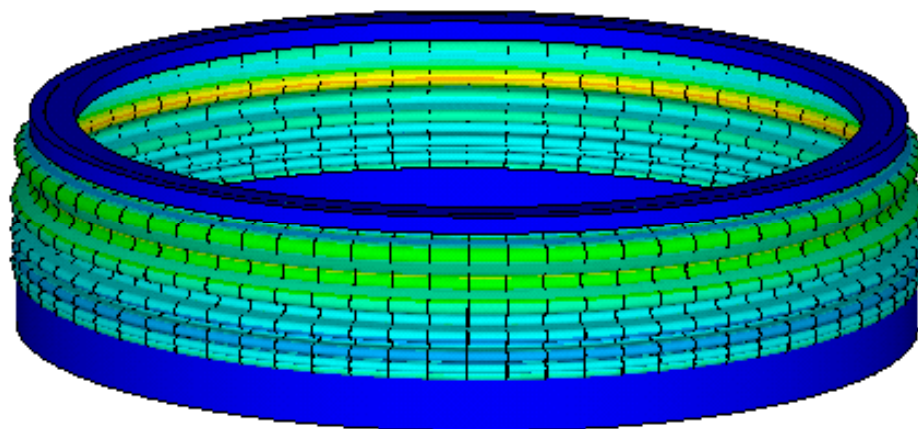
STEP=9
SUB =1
TIME=9
SEQV (AVG)
DMX =.168E-04
SMX =.325E+07

ANSYS

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09:54:53

step = 9



3.25 MPa

