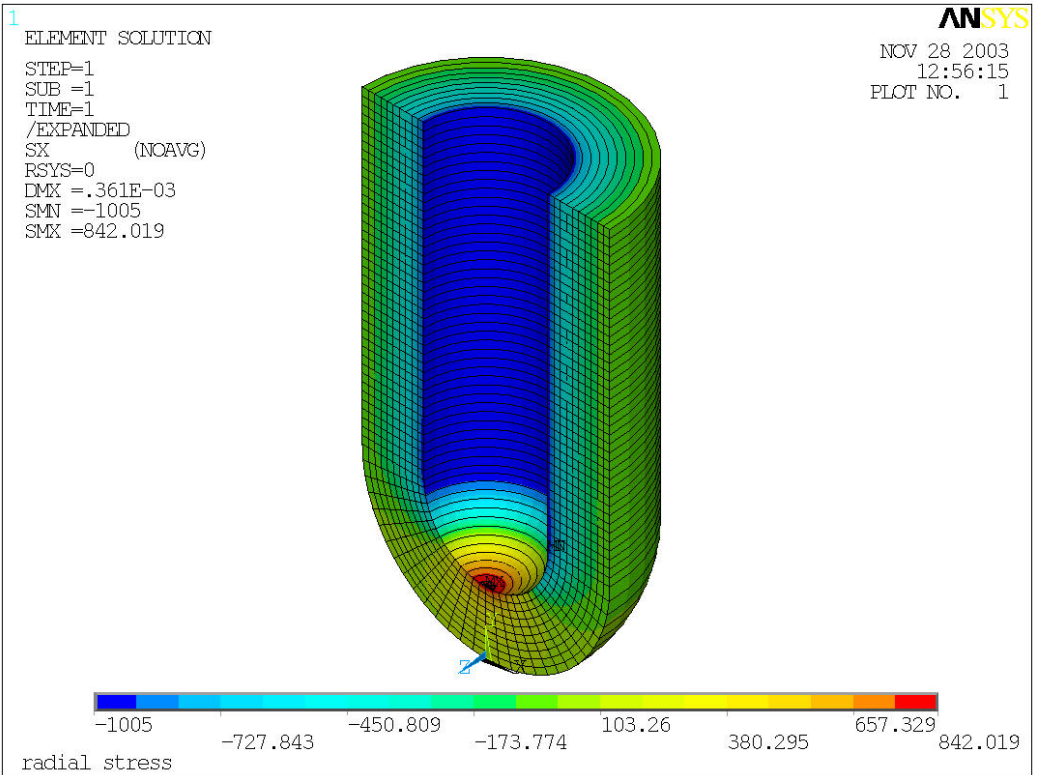
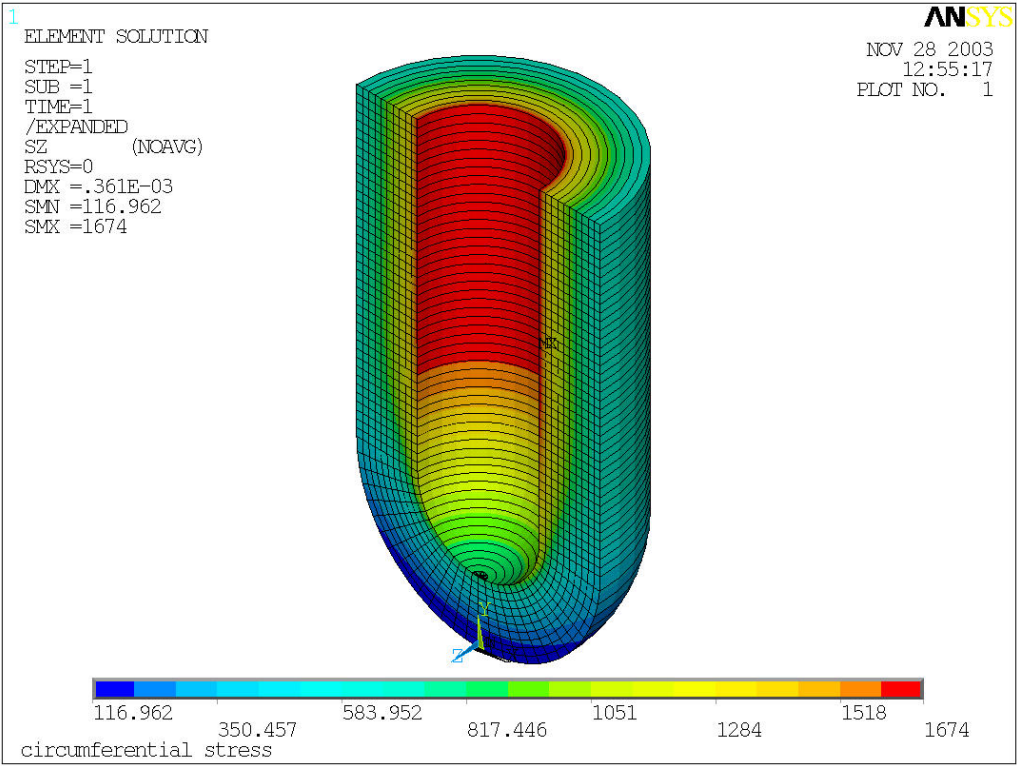


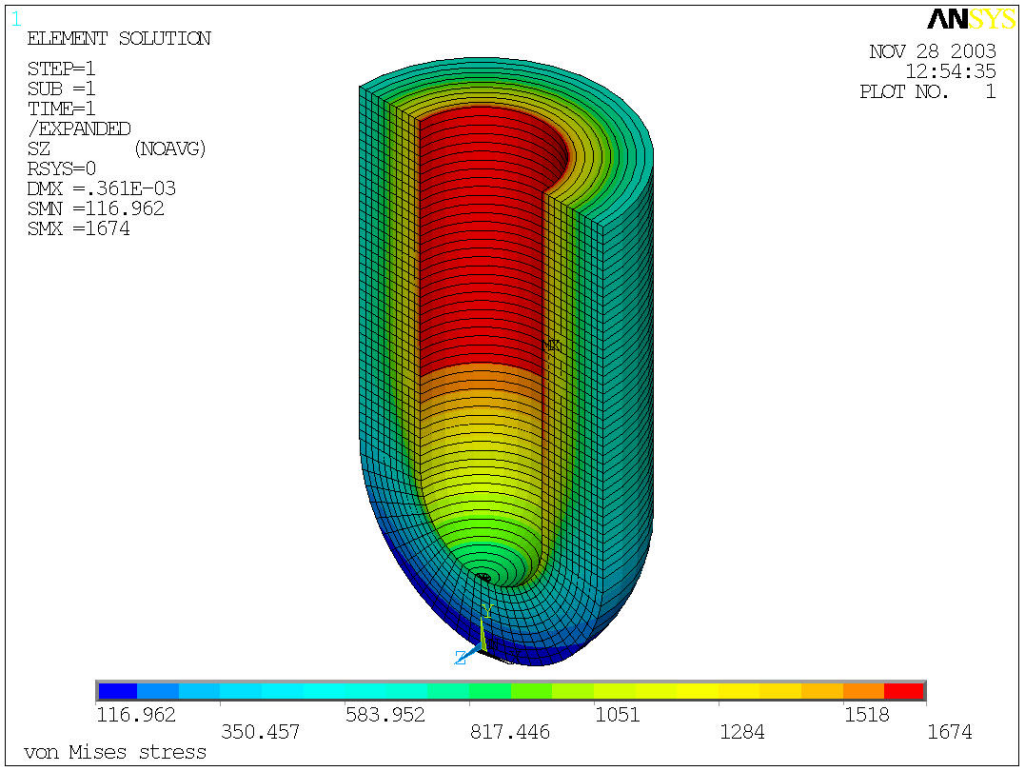
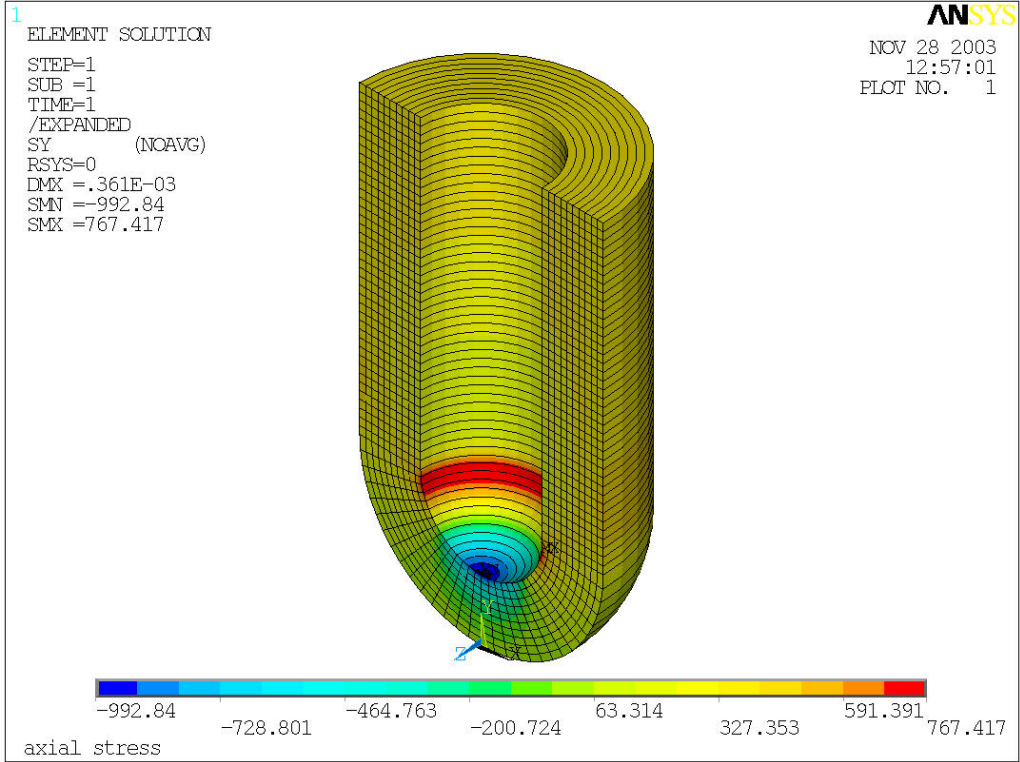
More detailed FEA of thick walled cylinder

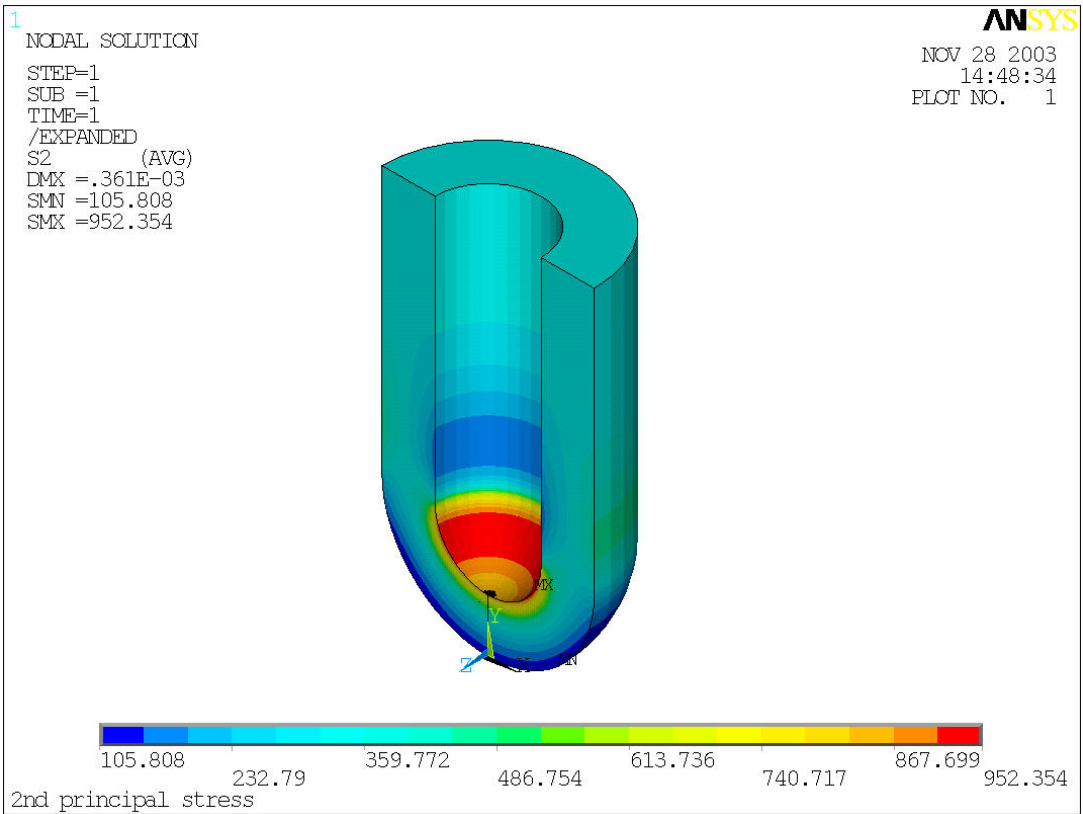
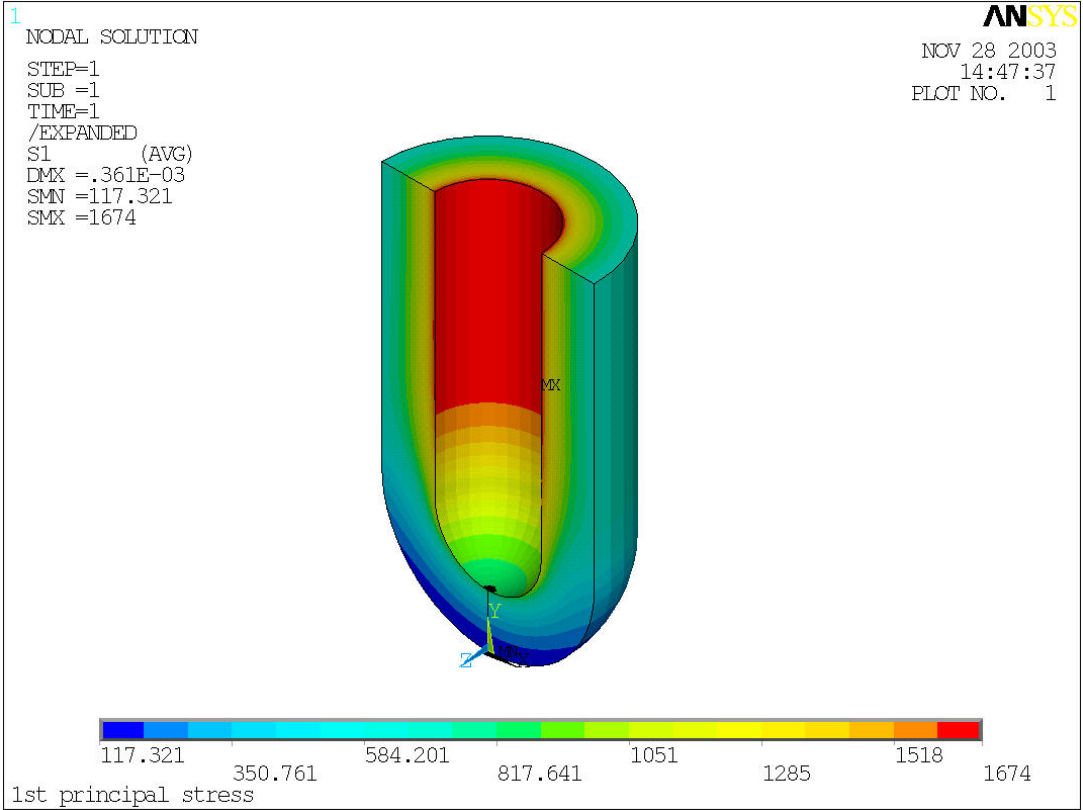
The standard analysis of the thick walled cylinder ignores all effects at the ends of a closed cylinder. The FEA analysis below shows what happens if the end is closed with a hemi-spherical cap with the same dimensions as the cylinder. The cylinder has an inner radius of 2.0" and an outer radius of 4.0".the internal pressure is 1000 psi.

Note that, far from the ends, the results are essential identical to those from Lamé's equations. The last three figures show the distribution of the circumferential, radial and axial stresses across the wall.

The stress distributions are much more complex at the ends but the stresses are generally lower. In particular, the von Mises stress is lower at the ends. This is important as this value is used in both fatigue and static load design of such cylinders. Note that the views of the three principal stress distributions are more useful at the ends as these correspond to the two, equal circumferential stresses and the radial stress in the hemispheres. For example, note that the radial stress at the inner surface is -1000 psi, as it must be.

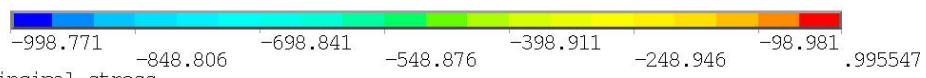
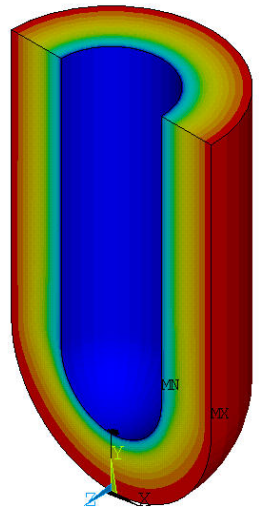




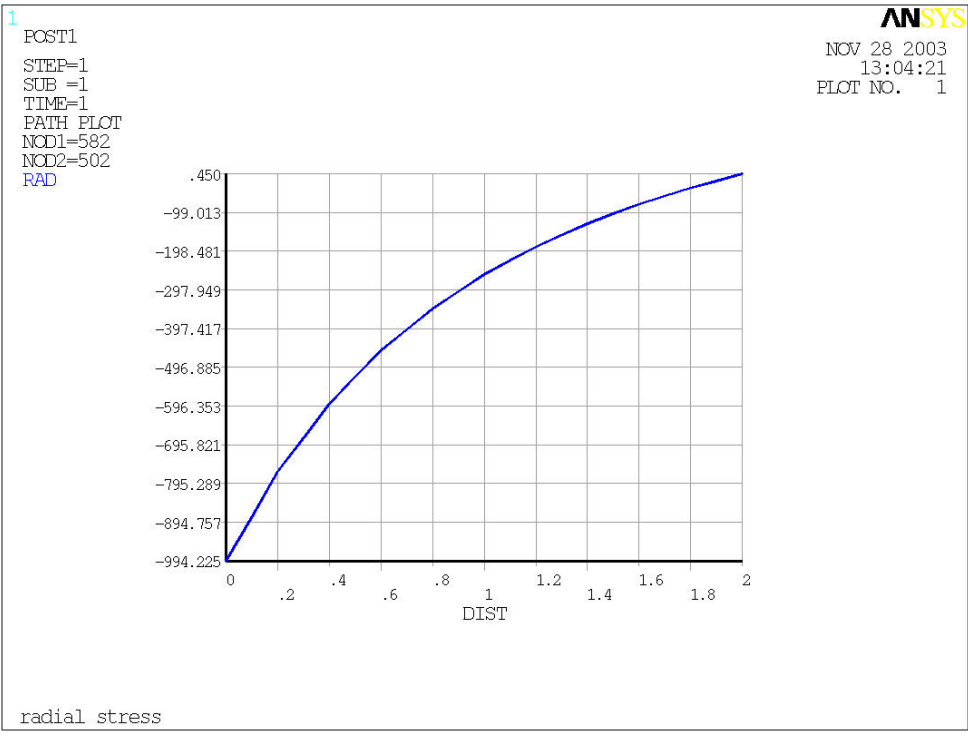
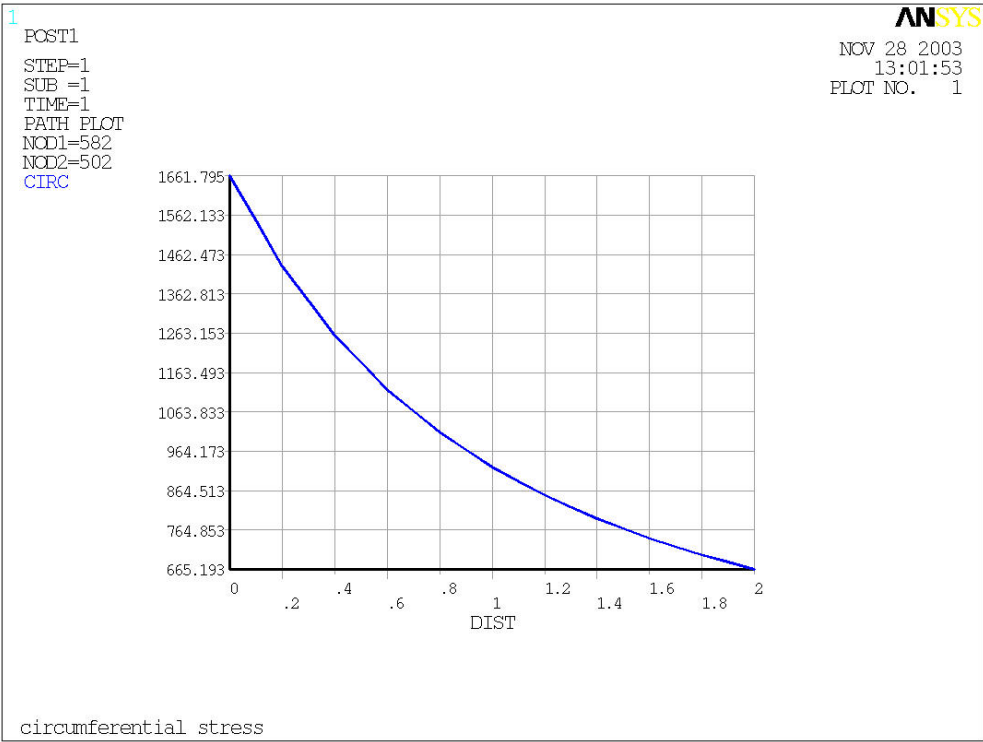


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/EXPANDED
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SMN =-998.771
SMX =.995547

ANSYS
NOV 28 2003
14:46:43
PLOT NO. 1



3rd principal stress

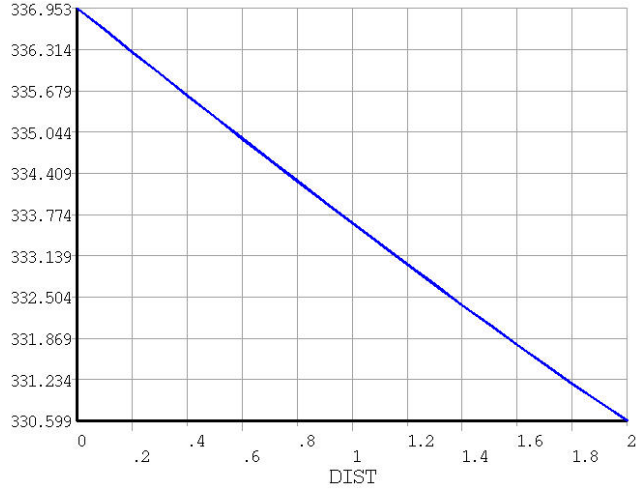


1

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NOD1=582
NOD2=502
AXIAL

ANSYS

NOV 28 2003
13:05:43
PLOT NO. 1



axial stress