

OS-E: 0180 3-Point Bending using RBODY

Demonstrates RBODY which is used in this nonlinear large displacement implicit analysis involving contacts using OptiStruct.

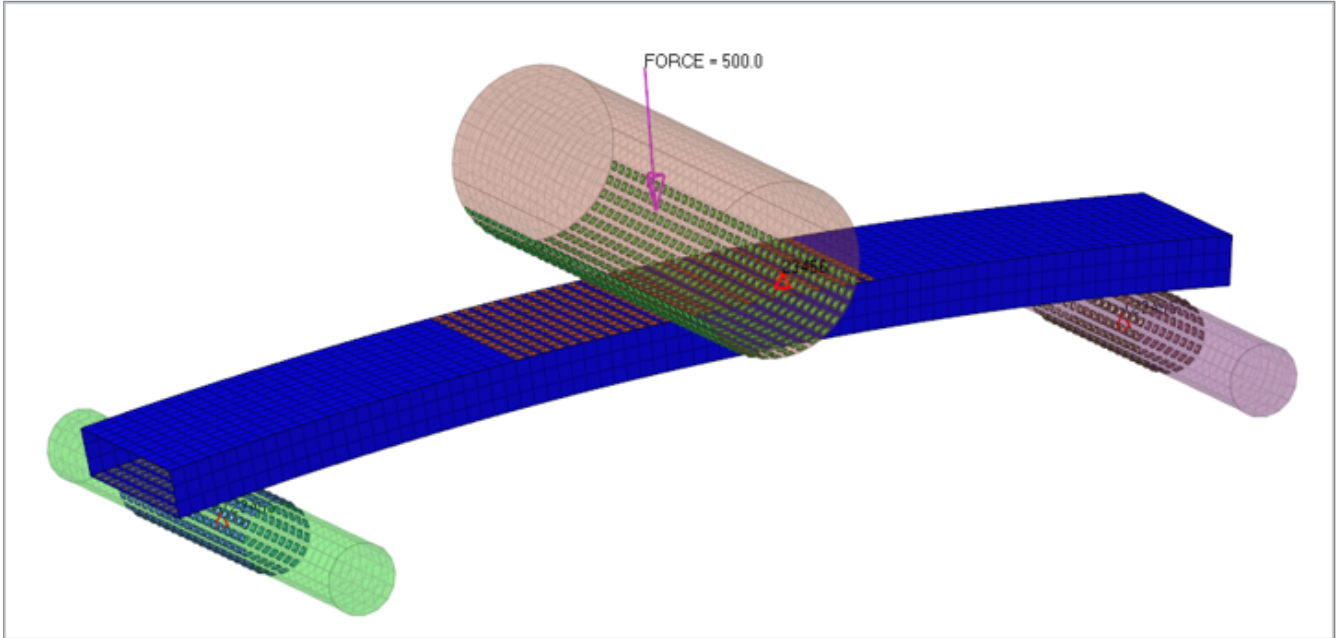


Figure 1. FE-Model with Loadcases and Loadstep

Model Description

This model consists of a steel beam resting on two steel supports and crushed from the middle using another steel cylinder. Sliding contacts are defined between the cylinders and the steel beams. The cylinders are defined as RBODY and the centroid nodes are defined as the reference node, on which the load and boundary conditions can be applied. A load of 500N is applied on the centroid node (reference node) of the big cylinder, the big cylinder can move only in the x direction and the two small cylinders are constrained in all the DOFs. Here a nonlinear implicit analysis is run.

The shell element properties are:

FE Model

Steel Beam and Cylinder First order shell elements

The MAT1 material properties are:

Steel Beam and Cylinder

Young's Modulus 210 GPa

Poisson's Ratio 0.3

Initial Density 7.9×10^{-6} kg/mm³

Results

Figure 2 shows the deformed shape of the steel beam after it is pushed down by the cylinder.

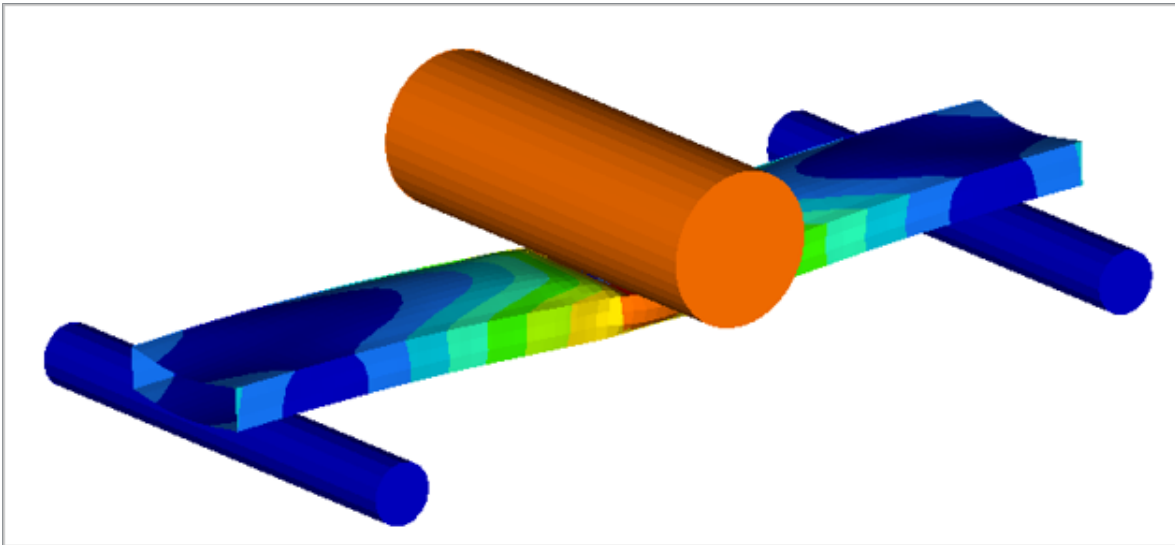


Figure 2. Deformed Shape of Steel Beam

Figure 3 shows the stresses in the rigid bodies after the load is applied.

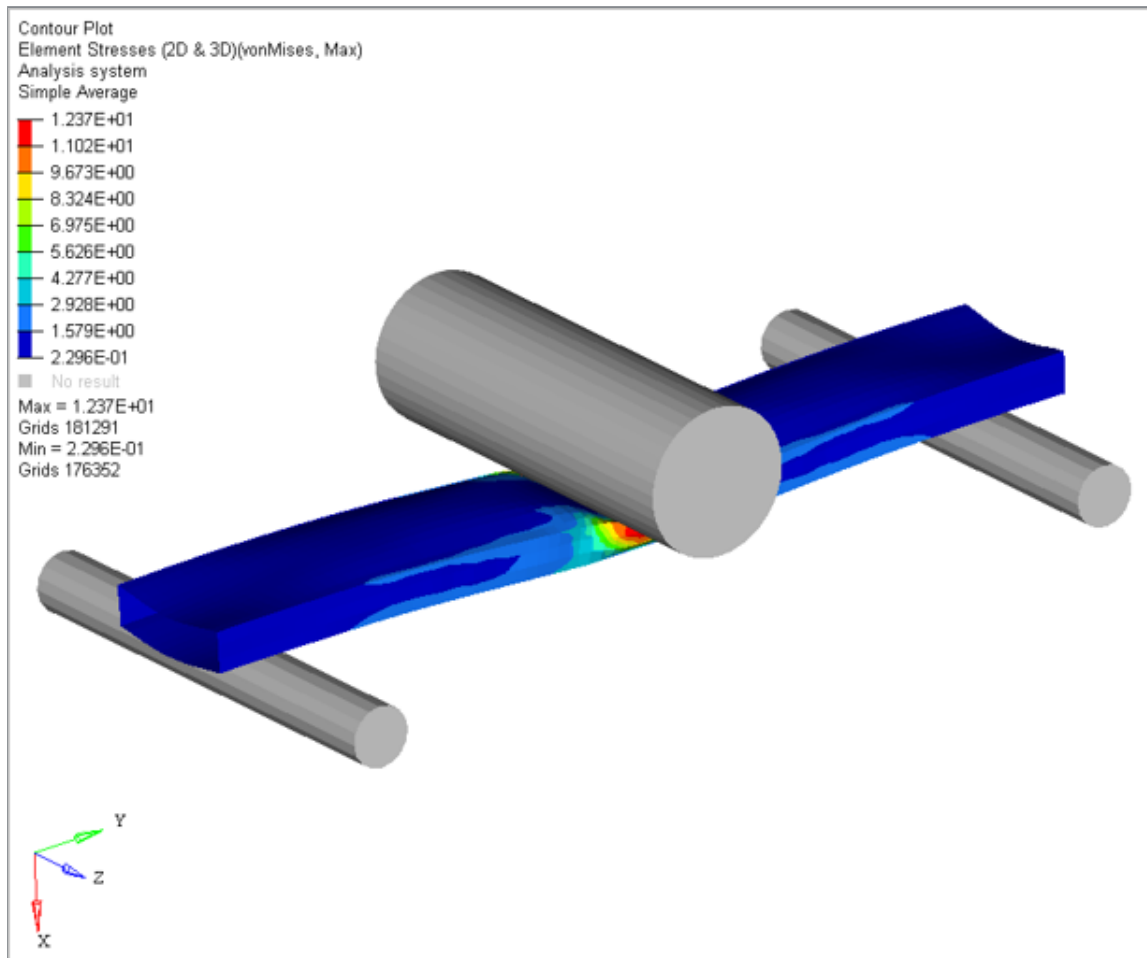


Figure 3. Stress on the Rigid Body as Zero

Model Files

The model files used in this example include:

<install_directory>/demos/hwsolvers/optistruct/examples/3Point_Bending_RBODY.fem