# Expected Results

One of the final goals of this project is to verify our ability to predict residual stress formation. In order to do this, analytical and numerical models were created to compare to the eventually measured stresses. The analytical method involved calculating the residual stresses as shown on the Analytical Calculation pdf. To obtain a numerical model, the commercially available program Abaqus was used. Also as a comparison, the residual stresses were calculated numerically in MathCad using equations developed in the paper "Uniaxial Stress-Strain Curves from a Bending Test", by Mayville and Finnie.

The results of these various models are shown in the following graphs. In figure 1, the test setup had the inner contact points 4" apart, while the outer contact points were 9" apart, and the bar was loaded to 2000 lbf.

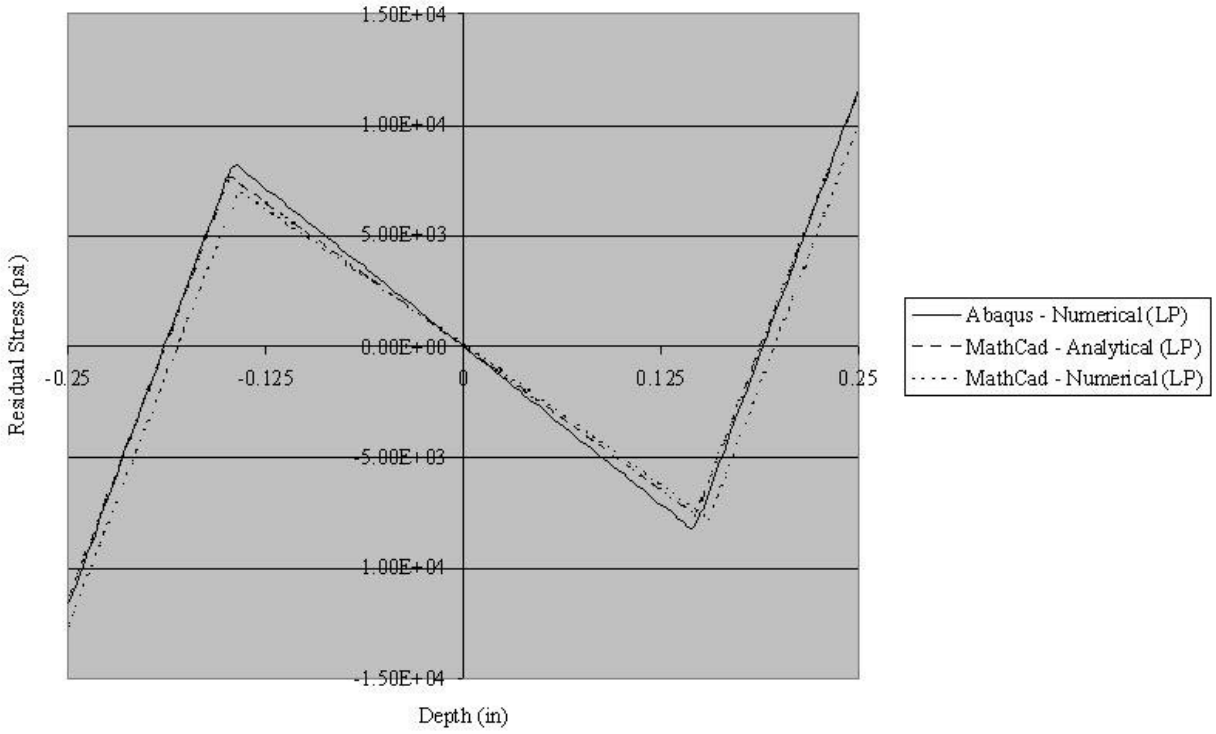


Figure 1: Predicted Residual Stress Profile of Aluminum Sample #1

Figure 2 is the profile from the resulting setup of having the inner contact points at 7" apart, the outer contact points at 10.5" apart, and loading to 3000 lbf.

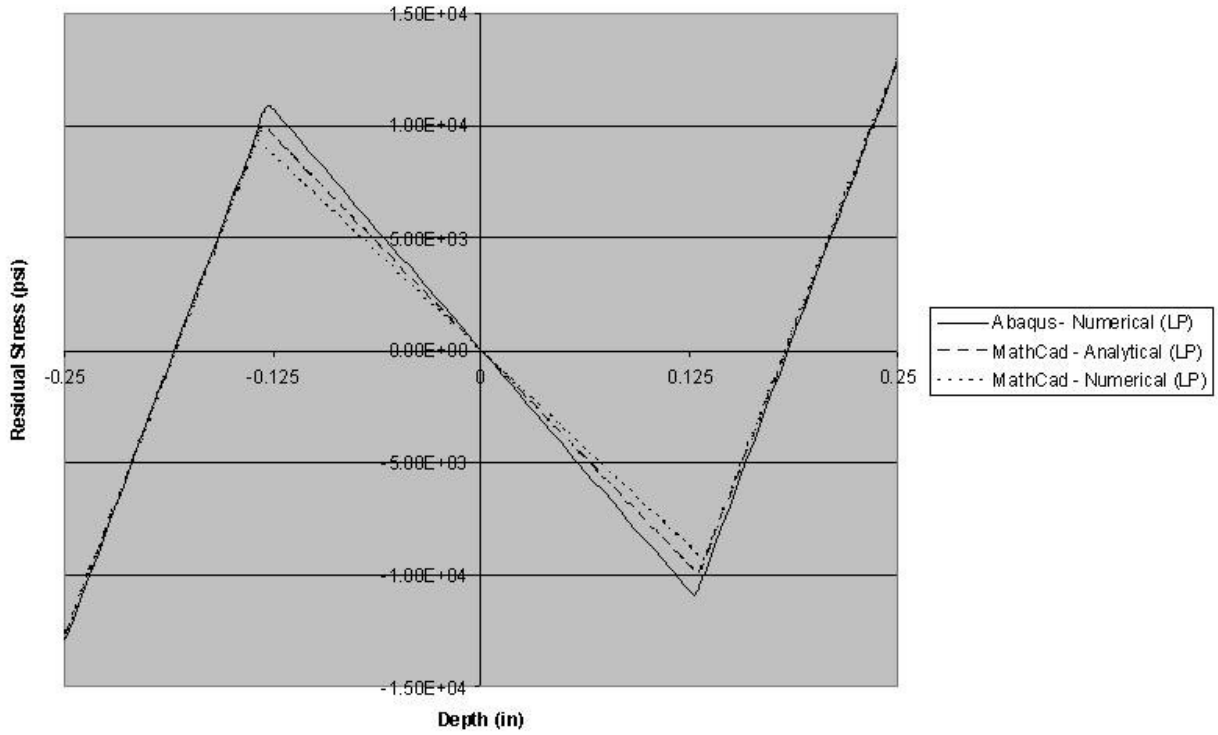


Figure 2: Predicted Residual Stress Profile of Aluminum Sample #2