ANSYS AIM - Bike Crank Tutorial

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3D Finite Element Analysis of a Bike Crank Using ANSYS AIM

Created using ANSYS 16.2. There may be some differences in newer version (AIM 17.0)

Learning Goals

In this tutorial, you will learn to:

- Determine the displacements and stresses in a bike crank using 3D FEA capabilities in ANSYS AIM
- Verify the finite-element results from ANSYS by refining the mesh and also comparing with hand calculations
- Gain a better understanding of the new ANSYS AIM software and its comparison to Workbench.
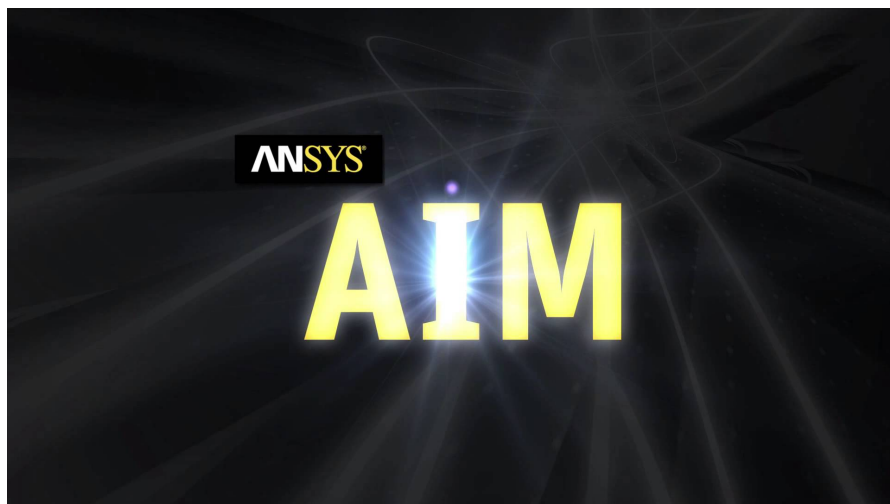
Problem Specification

Consider the following bike crank model:
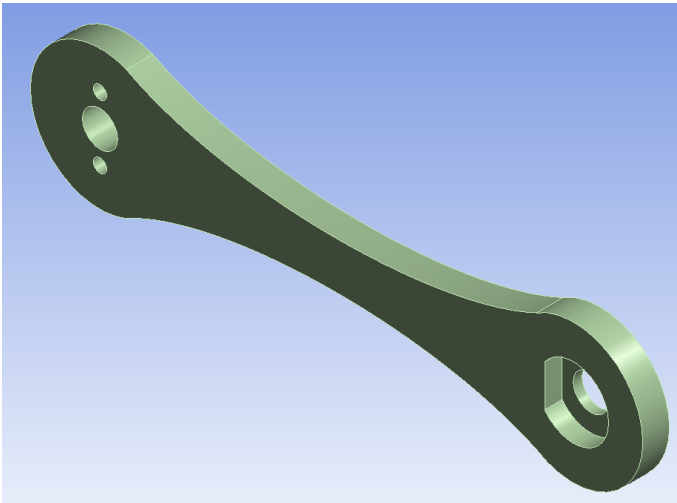
To orient ourselves, the following figure shows the location of a similar bike crank mounted on a bicycle.

Material properties: The bicycle crank's material is aluminum 6061-t6. The Young's modulus is 10,000 ksi, and the Poisson's Ratio is 0.33 .

Boundary conditions: Apply a load of 100 lbf in the y-direction on the right hole surface and fix the 3 left hole surfaces as shown below. Note that this is an approximation of the actual loads and constraints on the bike crank.

These three hole surfaces are fixed

Load of 100 lbf is applied to this surface
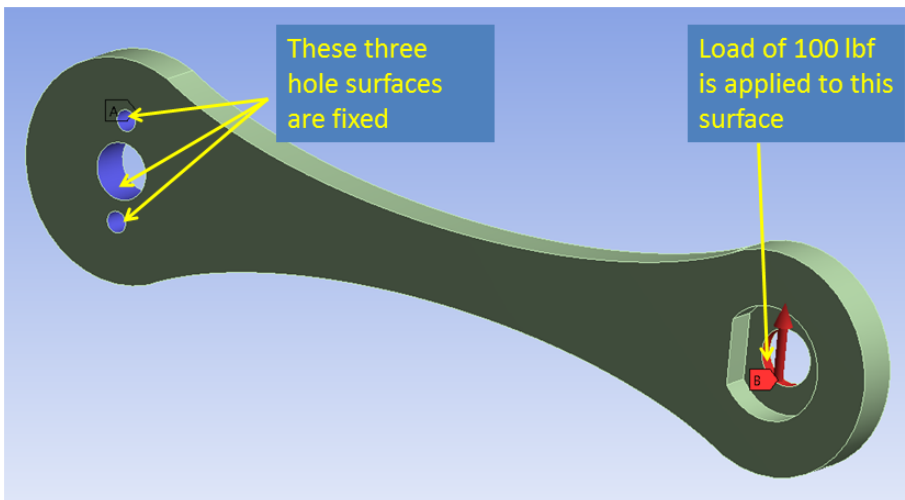
Using ANSYS AIM, determine the following:

- Deformed shape and displacement field

- Stress distribution