ANSYS 12 - Crank - Problem Specification

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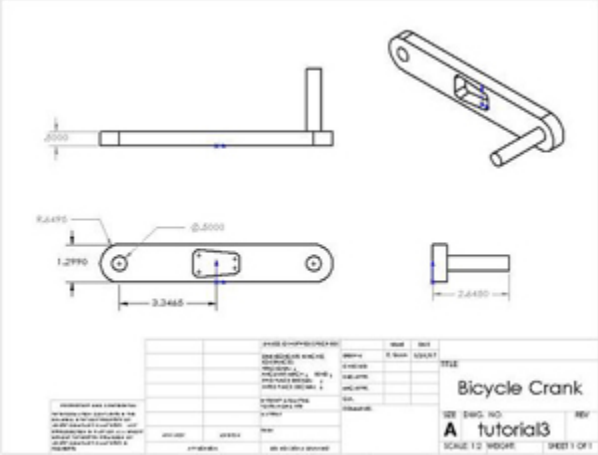
⚠ This tutorial is no longer updated. Use the new bike crank tutorial instead.

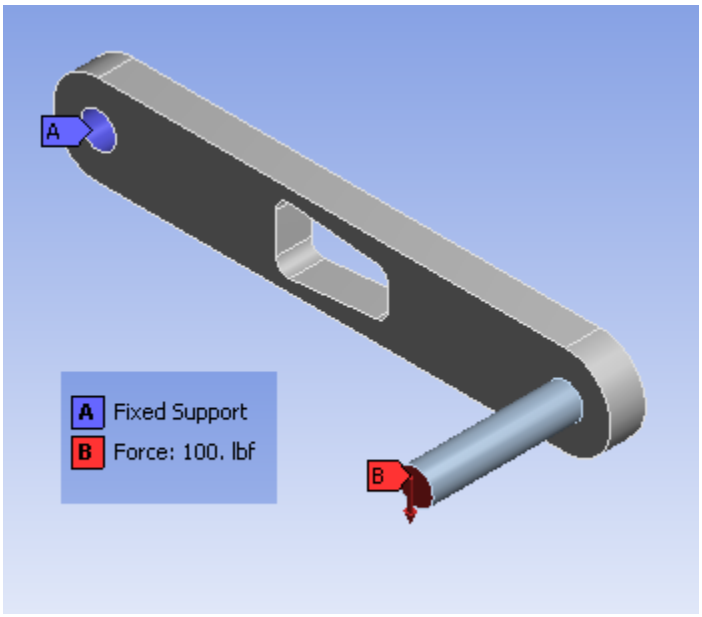
Problem Specification

A preeminent bicycle company is disappointed with the negative feedback they have received on their latest model, and they have pinpointed the problem to an outdated bicycle crank design that they assumed would still withstand typical loads. To protect their reputation, they have outsourced the task of analyzing the crank to you, providing you with the geometry of the bicycle crank and attached pedal shaft shown below. The dimensions are given in inches. The material they selected has an Young's modulus $E = 2.8 \times 10^7$ psi and Poisson ratio =0.3.



Higher Resolution Image

Using ANSYS, determine the mechanical response due to a load of 100 lbf applied vertically downward at the end of the pedal shaft as shown in the figure below. Assume that the crank is attached rigidly to a fixed shaft fitted into the hole near the left end of the crank. This means you can constrain the surface of the left hole in *X*, *Y* and *Z* directions as indicated below.



Calculate the deflection, strain and stress distributions in the crank/pedal shaft combination for this loading condition. Use the ANSYS results to evaluate the degree of stress concentration in the vicinity of the cut-out in the crank geometry.

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