

Bike Crank AIM - Physics Setup

Author(s): Andrew Dawd, Cornell University

[Problem Specification](#)

[1. Pre-Analysis & Start-Up](#)

[2. Geometry](#)

[3. Mesh](#)

[4. Physics Setup](#)

[5. Numerical Solution](#)

[6. Numerical Results](#)

[7. Verification & Validation](#)

[Comments](#)

Physics Setup

In the following video, we will begin the physics setup in our simulation. In AIM, we must first assign the region of which the physics simulation is to be based on. We will also create and assign the material to our bike crank. Be sure to go back to the Start Up part of this tutorial on more information about the material properties.

Summary of steps in the above video:

1. In the Physics main window, go to "Physics Region" (under the Objects tab), and select "Structural"
2. Use the body select tool and add the body of the crank. Click Apply.
3. Under the objects tab, select "Add material" under Material Assignments and add the body.
4. Create new material: Al - 2061 (You can change the name of the material)
5. Select "Add Material Data" and add "Isotropic Elasticity"
6. Enter Young's Modulus - $1e7$ psi Note: Use square brackets when entering units
7. Enter Poisson's ratio - 0.33

Next, we apply the boundary conditions i.e. displacement constraints at the 3 left holes and traction on part of the right hole.

Summary of steps in the above video:

1. In the main Physics window, under the objects tab, Click ADD next to "Boundary Conditions"
2. Select Support, and, while holding the CTRL key, select and add the three support holes
3. Make sure all Translation is Fixed
4. Add another boundary condition - "Force"
5. Define the location at the right inner face on the opposite end
6. Define by "Directional Components" : $+100$ lbf in the Y-Direction (Units in square brackets)
7. Go back to main Physics window and Update

[Go to Step 5: Numerical Solution](#)

[Go to all \(ANSYS or FLUENT\) Learning Modules](#)