

Rev. 0

SYEN2233. Solid Modeling and Design Project
Assigned: 3/28/13, Due: 4/8/13
Step One: Assembly drawing of Controller and Battery Pack

Download the Control and Sensor System (CASSY) Fabrication Guide, Rev. 1 from robotics.ualr.edu → Robots and Facilities → Control and Sensor System (CASSY) → CASSY Fabrication Guides → CASSY Fabrication Guides, Rev. 1 (current).

Go to Step Twelve: Controller and Battery Pack.

Download models for Vex Robotics parts from vexrobotics.com\vex.

Navigate to “vex wiki home” (directly at www.vexforum.com/wiki/Main_Page).

Navigate to “Vex CAD” (directly at www.vexforum.com/wiki/VEXCAD).

Download the appropriate part models (for instance the VEX PIC Microcontroller, <http://content.vexrobotics.com/cad/STEP/VEX-PIC-MICROCONTROLLER.zip>).

NOTE: this step may involve a little hunting to get all the right parts for this step. However, you'll need a chunk of these parts for later steps in the process.

Unzip the various parts and import them into SolidWorks.

The spacer and battery models can be downloaded from McMaster-Carr (mcmaster.com).

Assign mass properties to all of your parts. For the steel parts, pick a steel. For the parts which are not a consistent material, calculate the volume of the part from SolidWorks. Then, use the mass in the Fabrication Guide to calculate the density. Assign a custom material to the part with this density.

Assemble a SolidWorks model of the Robot Controller and Battery Pack using the instructions provided in the fabrication guide.

Calculate the mass of the part and compare to the measured mass in the fabrication guide. If they are close, your model is probably accurate. If they are not close, account for the discrepancy (usually involves fixing your model).

Use SolidWorks to compute the moments of inertia of your assembly and the center of mass.

Create an assembly drawing of your Robot Controller and Battery Pack. Include the inventory.

On your drawing, dimension the center of mass relative to the center of the Robot Controller.

Include the mass properties on your assembly drawing as a note.

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On mating round parts with square parts...

Since the Vex parts use square holes to hold alignment, but fasteners tend to be round, one problem that arises in assembling this model is how to align a round part with a square part.

The easiest way to go is to modify the part model of the parts with square holes to include a datum axis at the center of the square hole.

A center-line can usually be assigned with the constraints of being at the mid-point of each side.