

SolidWorks Part 5

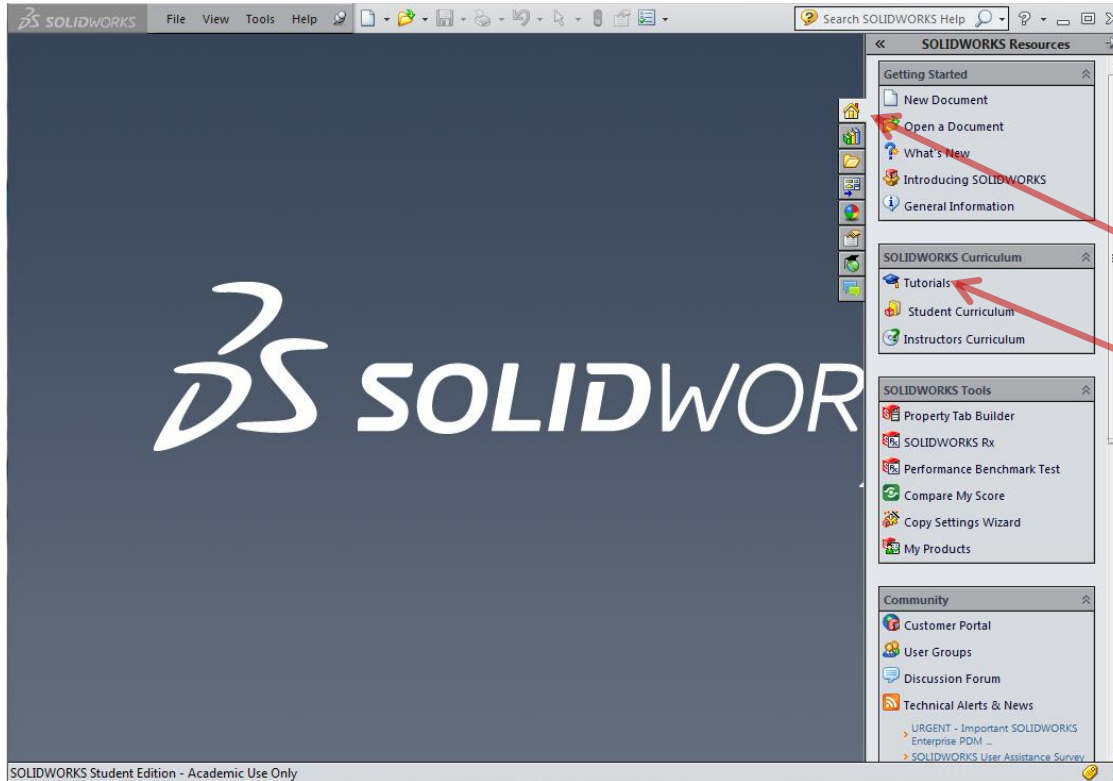
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Introductory Medical Device Prototyping

Department of Biomedical Engineering, University of Minnesota

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Starting The Tutorials



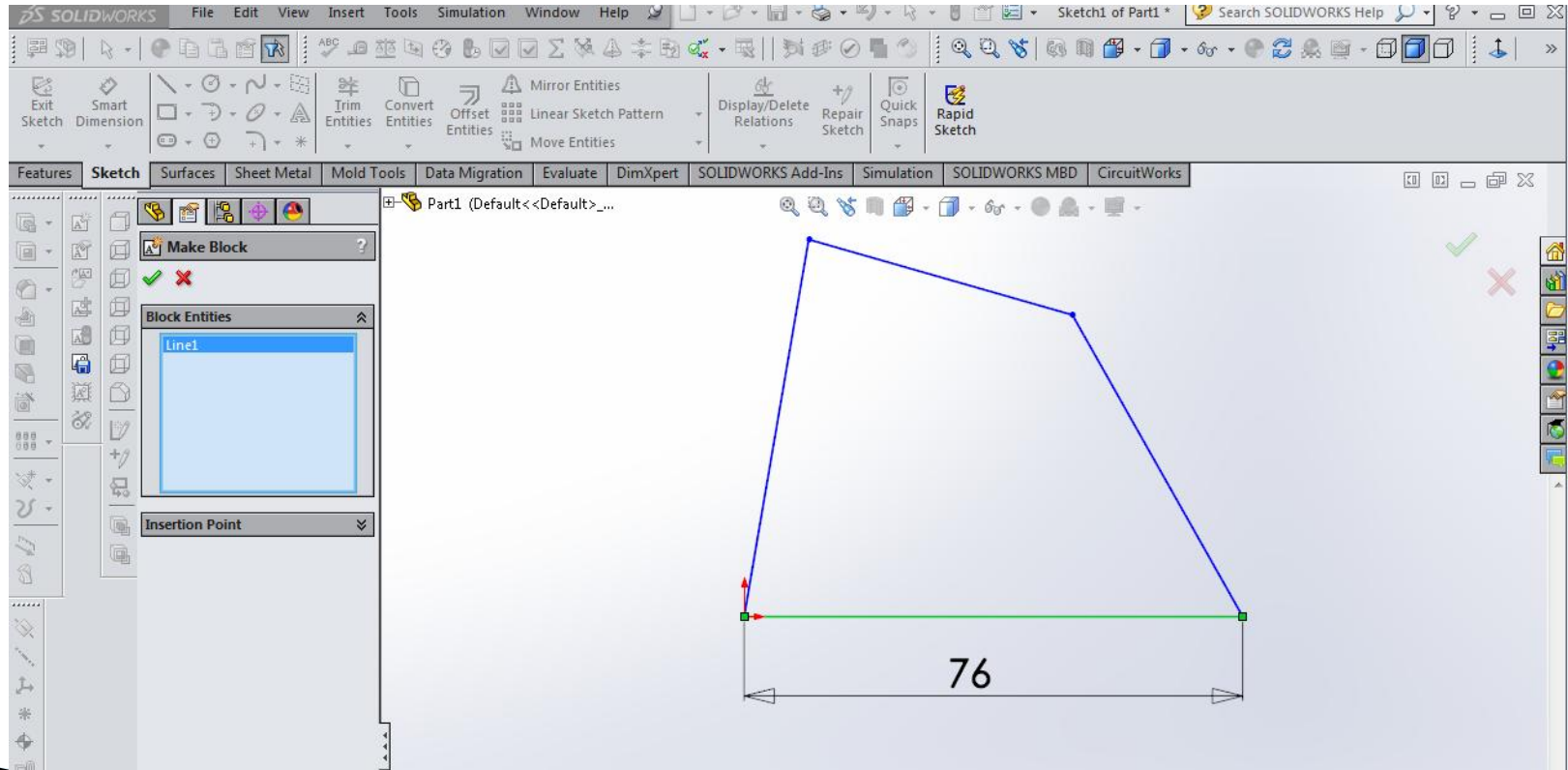
- Launch SolidWorks
- Select Resources to open the Task Pane.
- Select Tutorials

Select Advanced Techniques

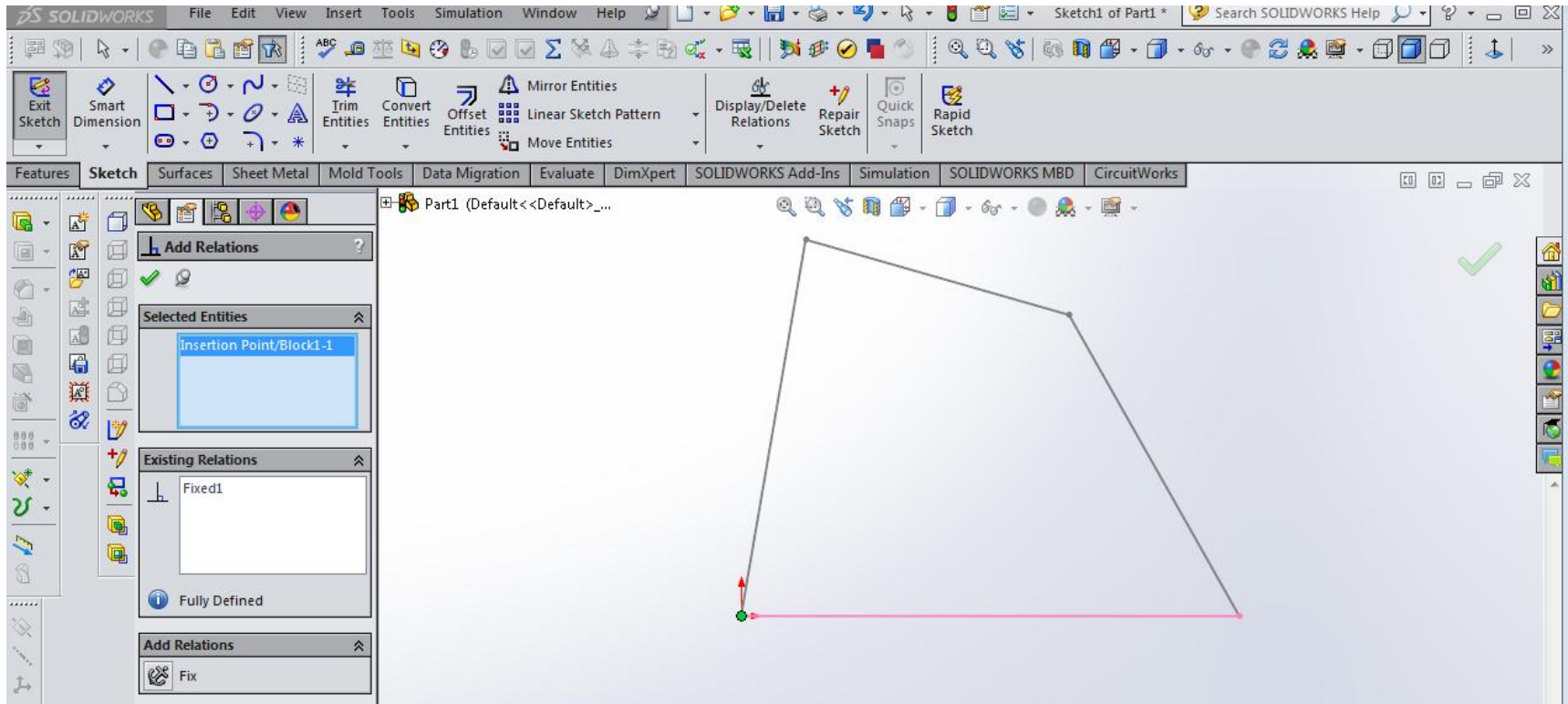


Sketch Blocks

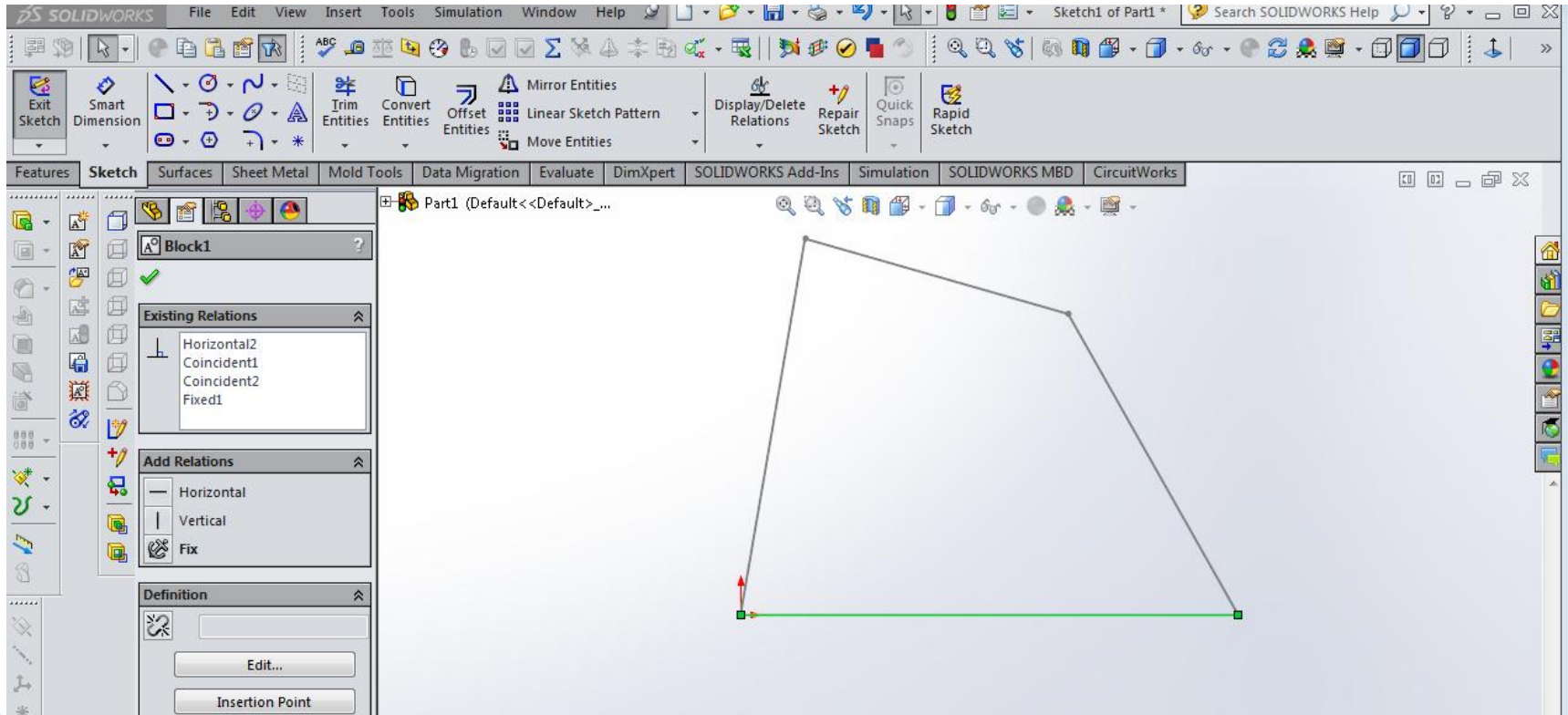
Sketch & Make Each Segment a Block



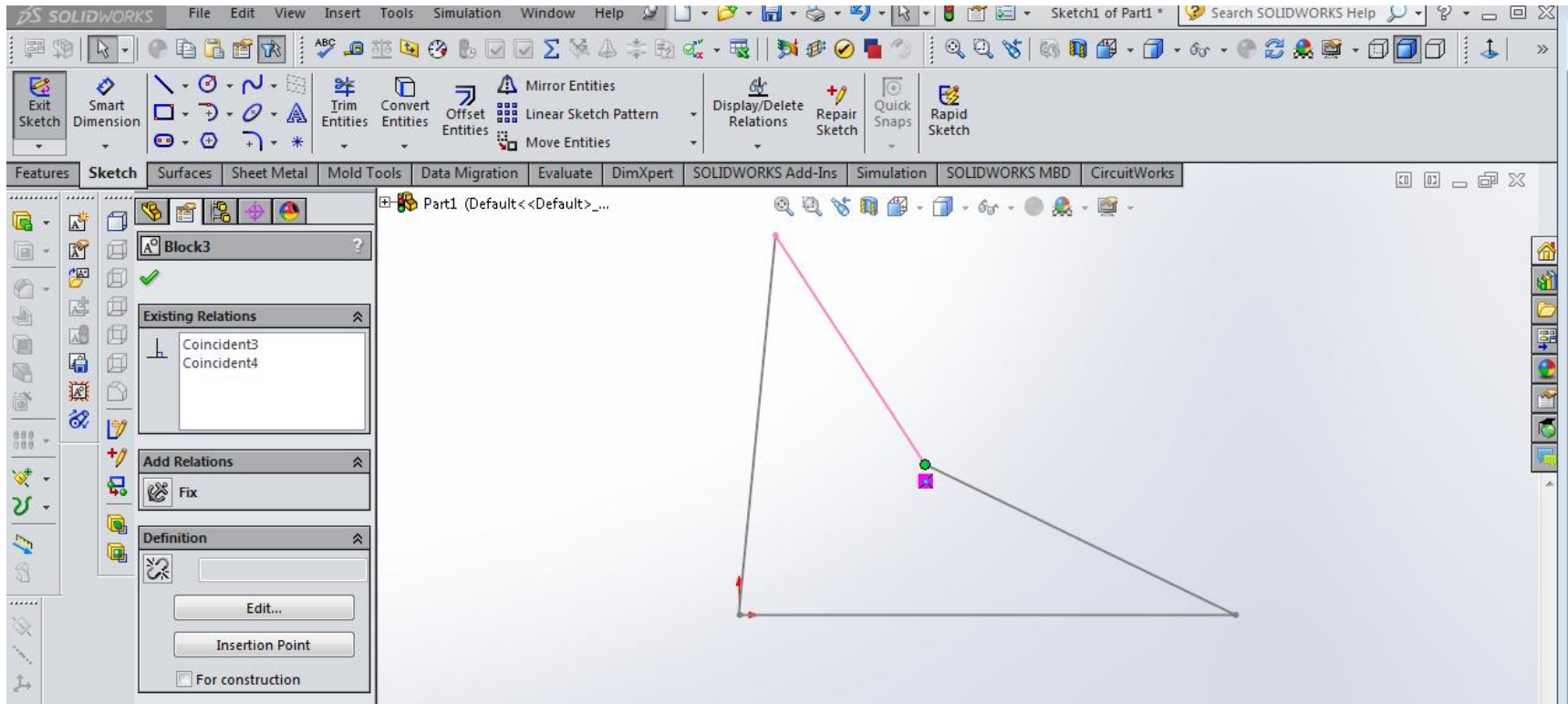
Add Relation – Fix Point



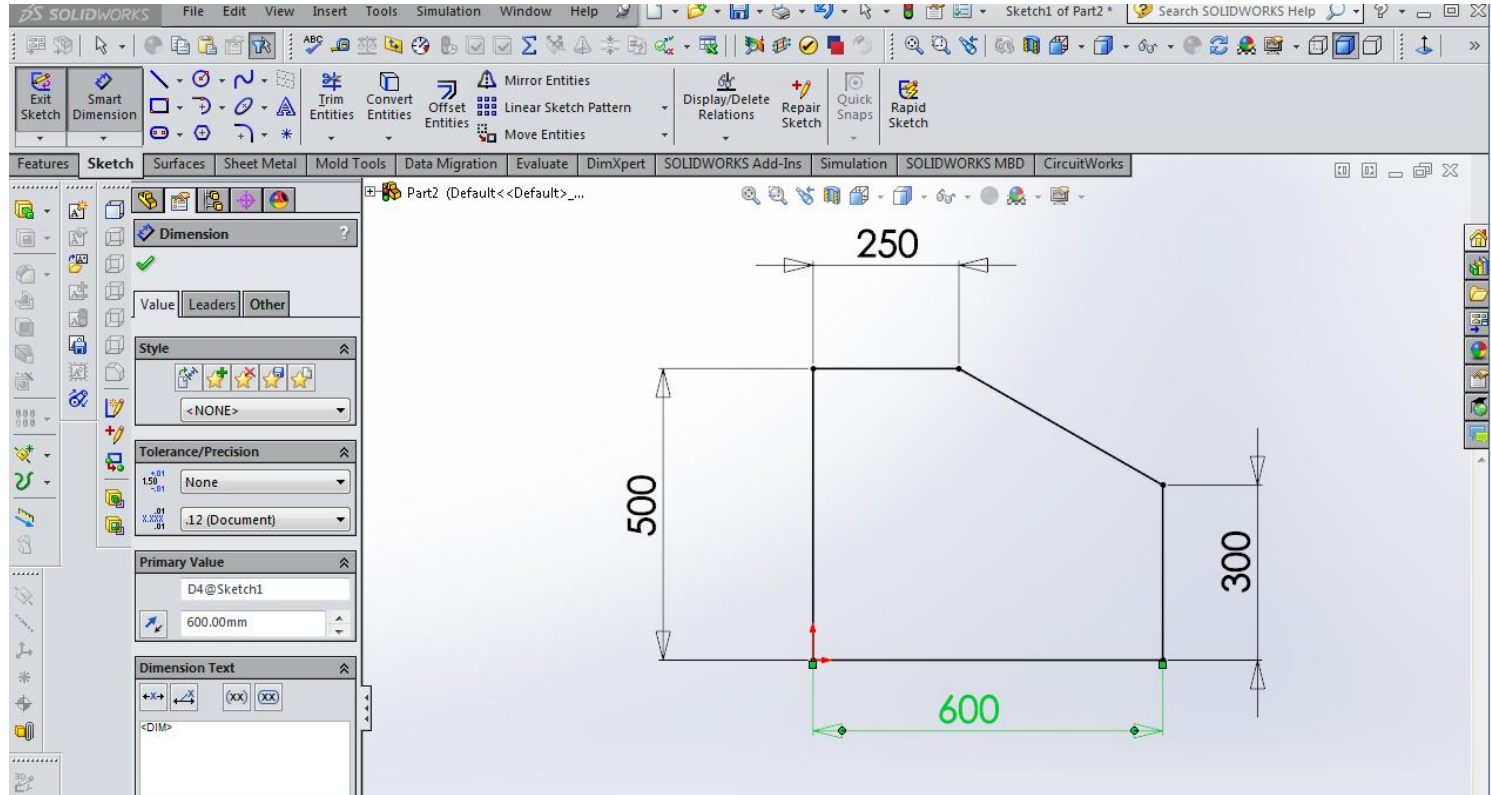
Add Horizontal Relation to Block 1



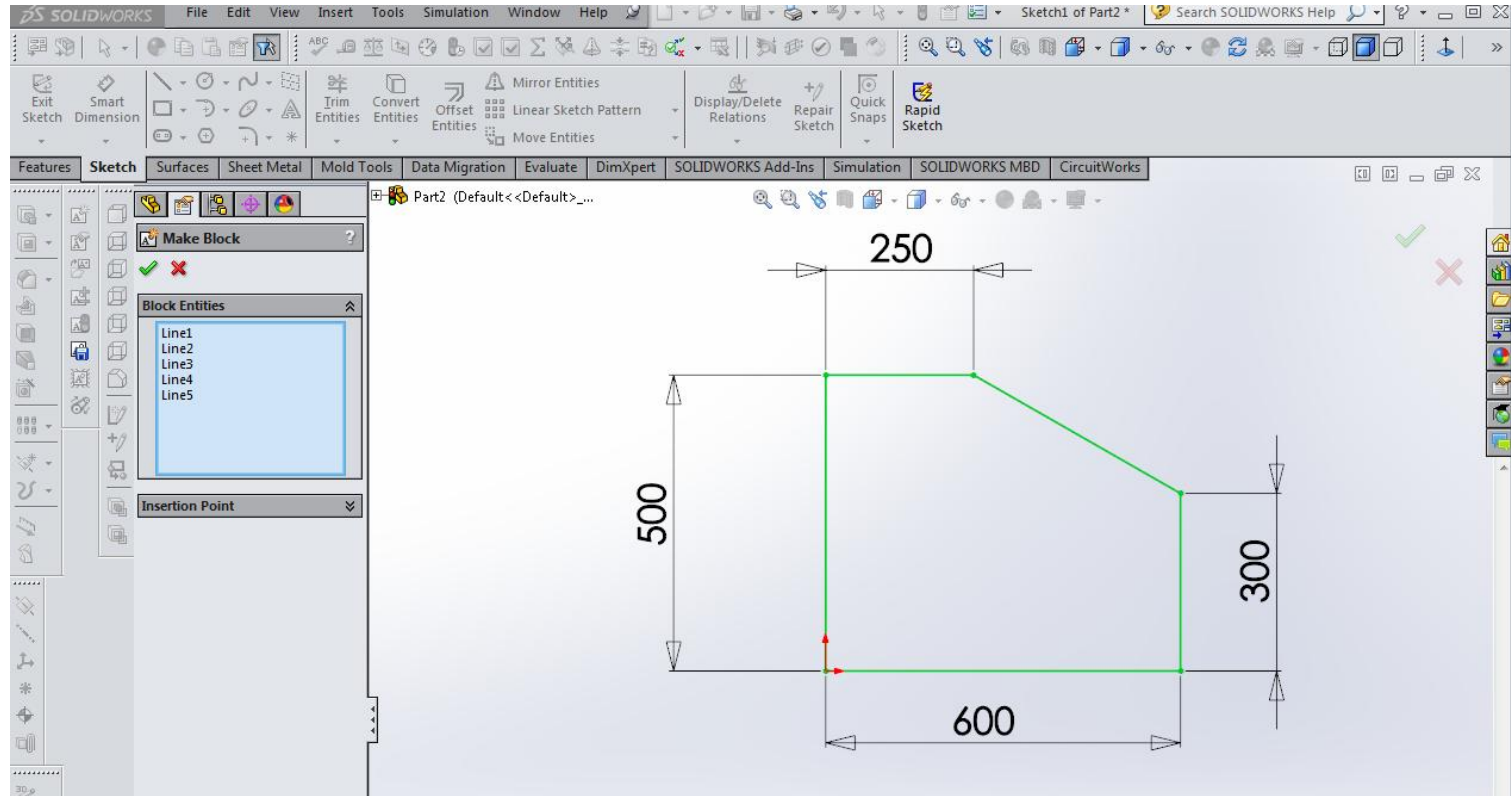
Select Point & Confirm Movement



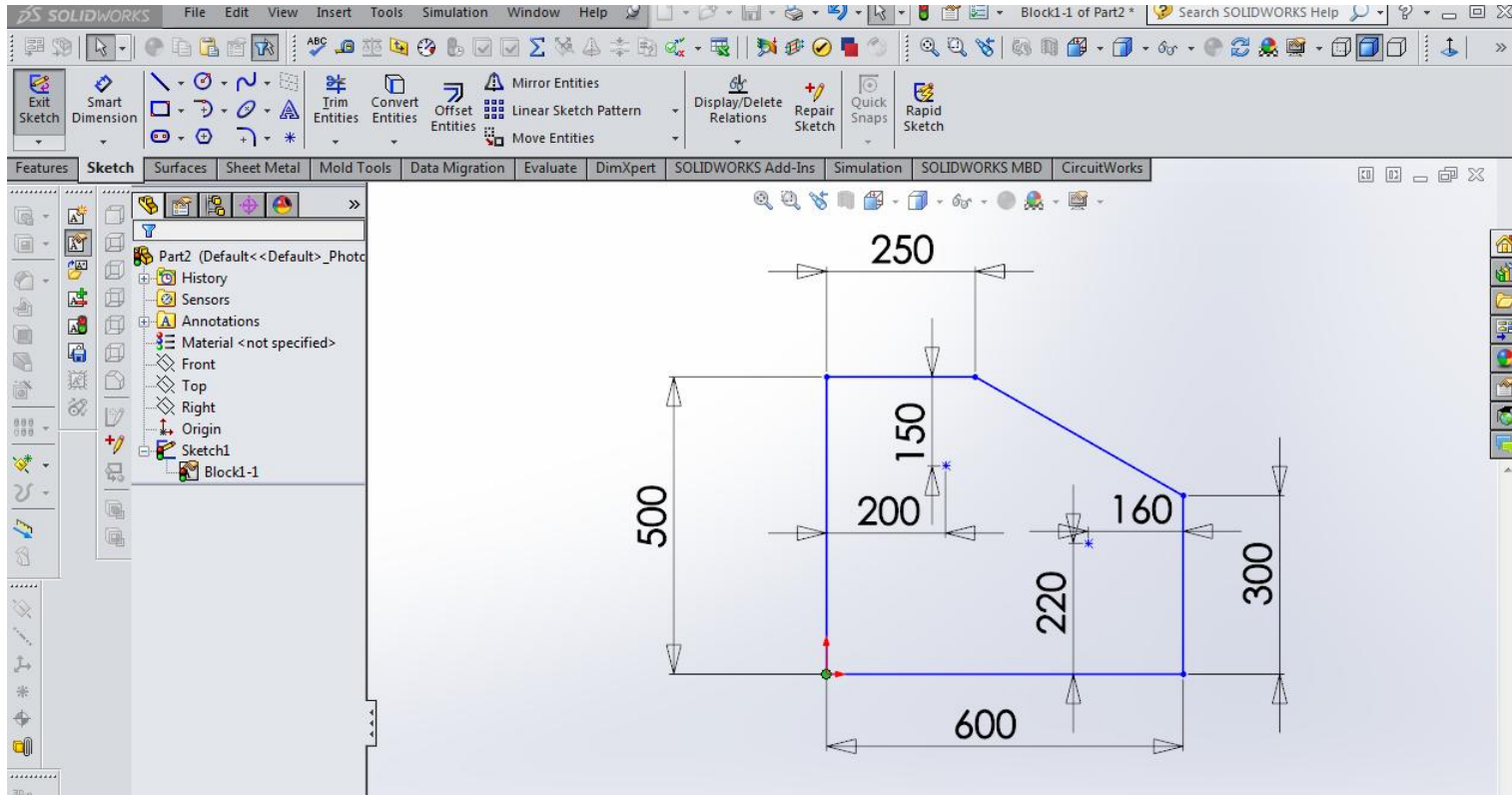
Sketch Base as New Part



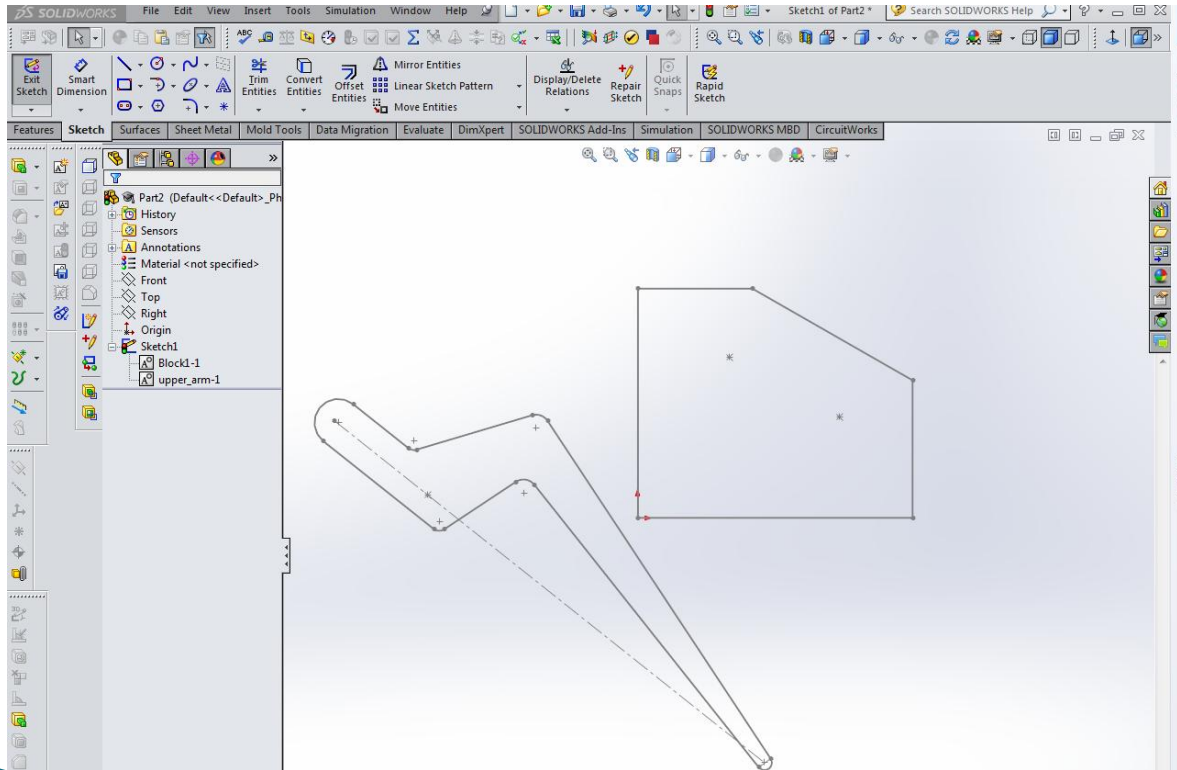
Select All & Make Block



Add 2 Points & Dimension



Insert Block – Browse to Samples Directory



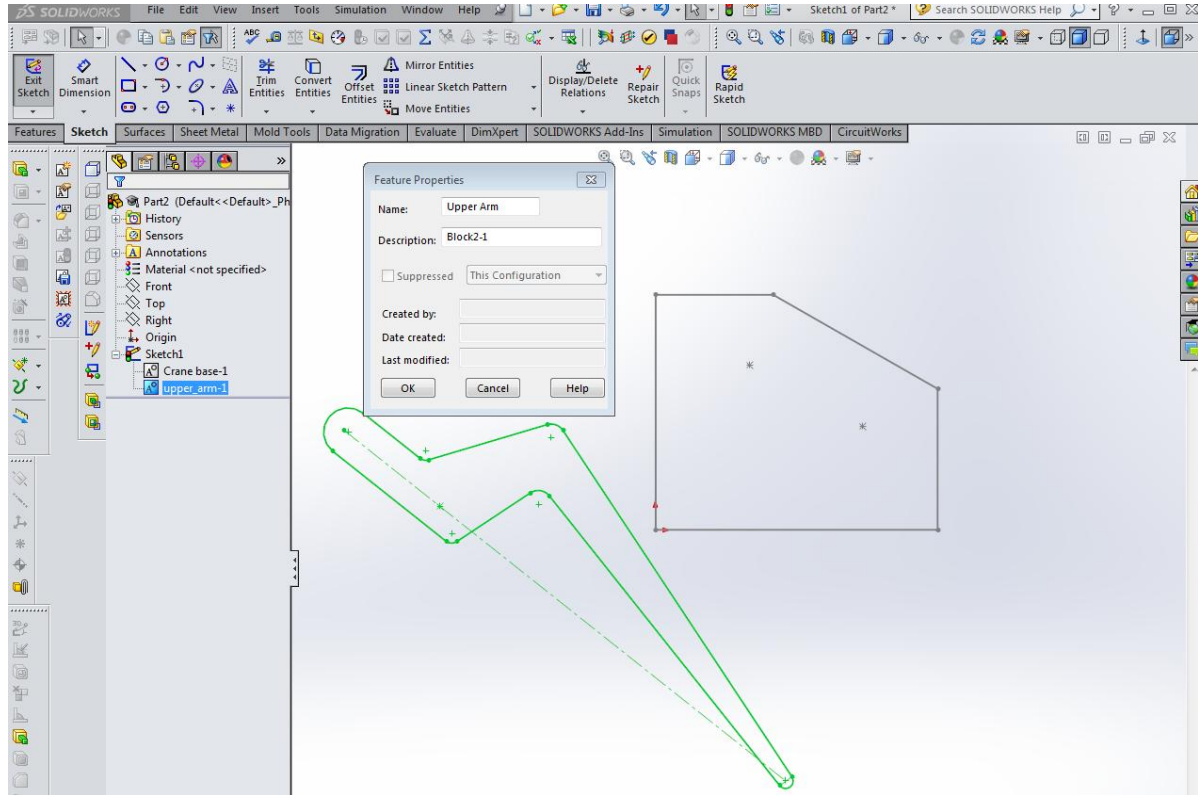
Inserting the Upper Arm

Insert the upper arm block.

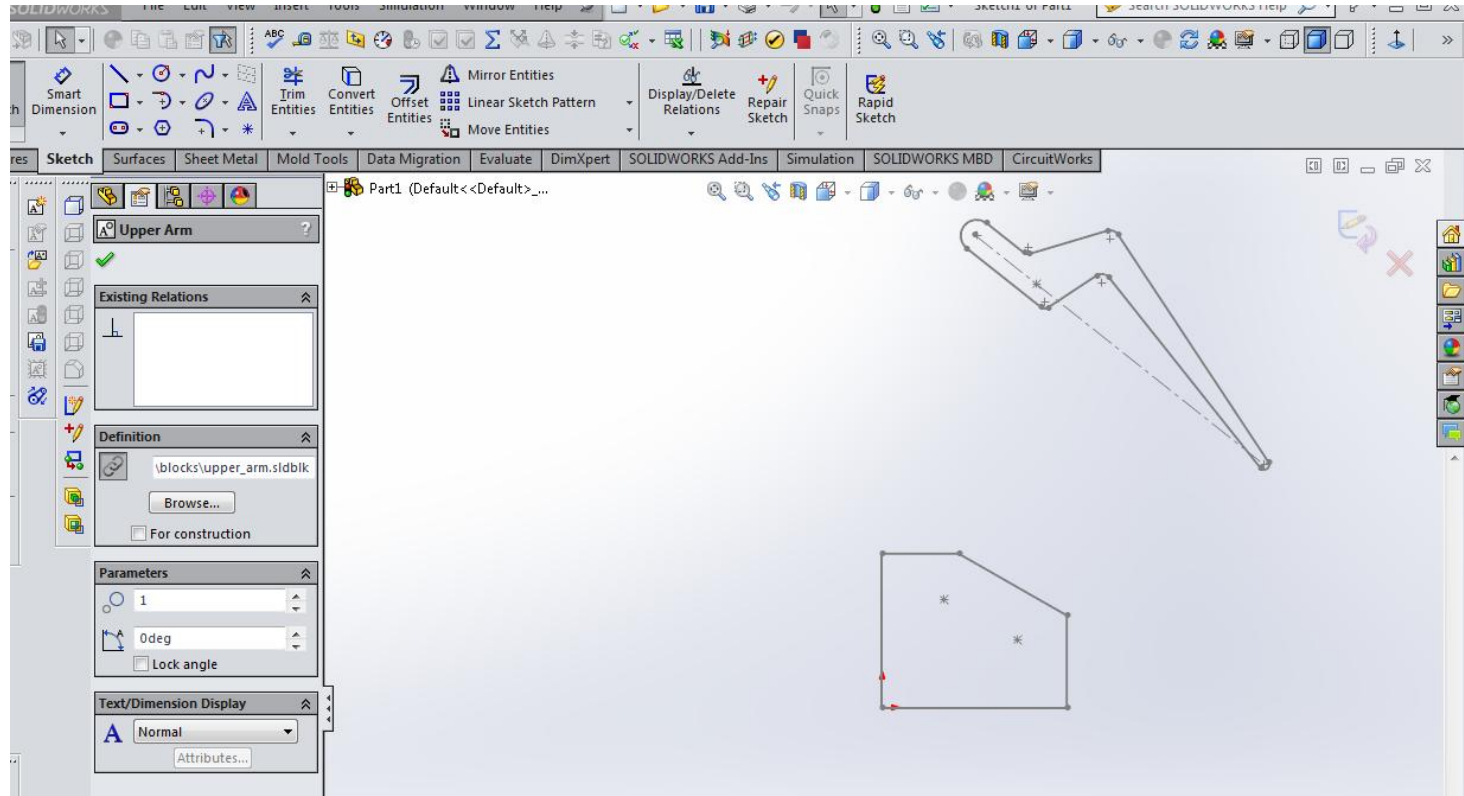
1. In the FeatureManager design tree, right-click **Sketch1**, and select **Edit Sketch**.
2. Click **Insert Block** (Blocks toolbar).
3. In the PropertyManager, under **Blocks to Insert**:
 - a. Click **Browse**, and go to `install_dir\samples\tutorial\blocks`.
 - b. Select `upper_arm.sldbik`, and click **Open**.
4. Click to place the block in the graphics area, and then click **✓**.
You can leave the upper arm anywhere in the graphics area, and position it later.

To insert a single instance of a block, you only need to click once in the graphics area, and then click **✓**.
Although you may see a second image of the block as you move the cursor, only one instance of the block is inserted.

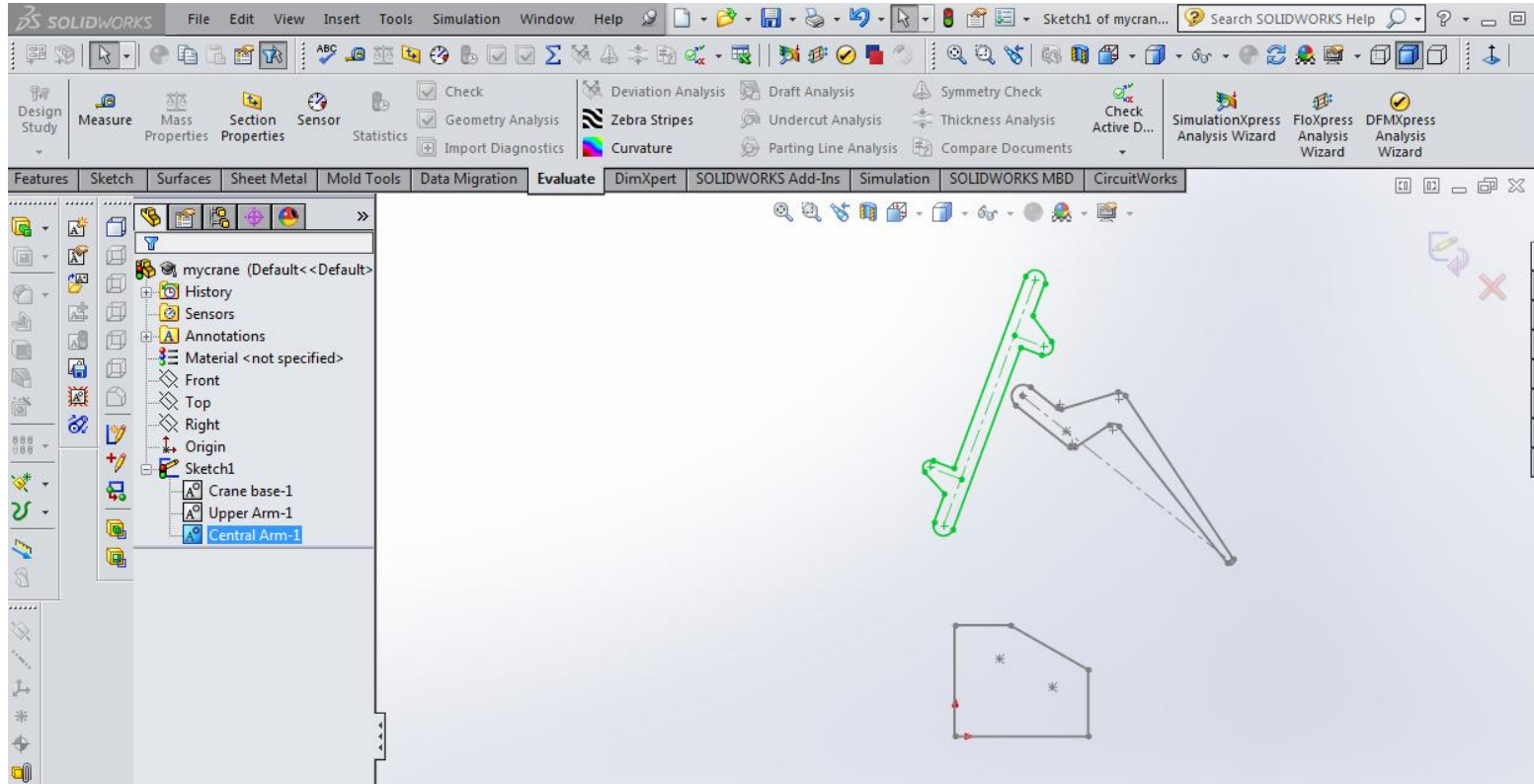
Rename Blocks



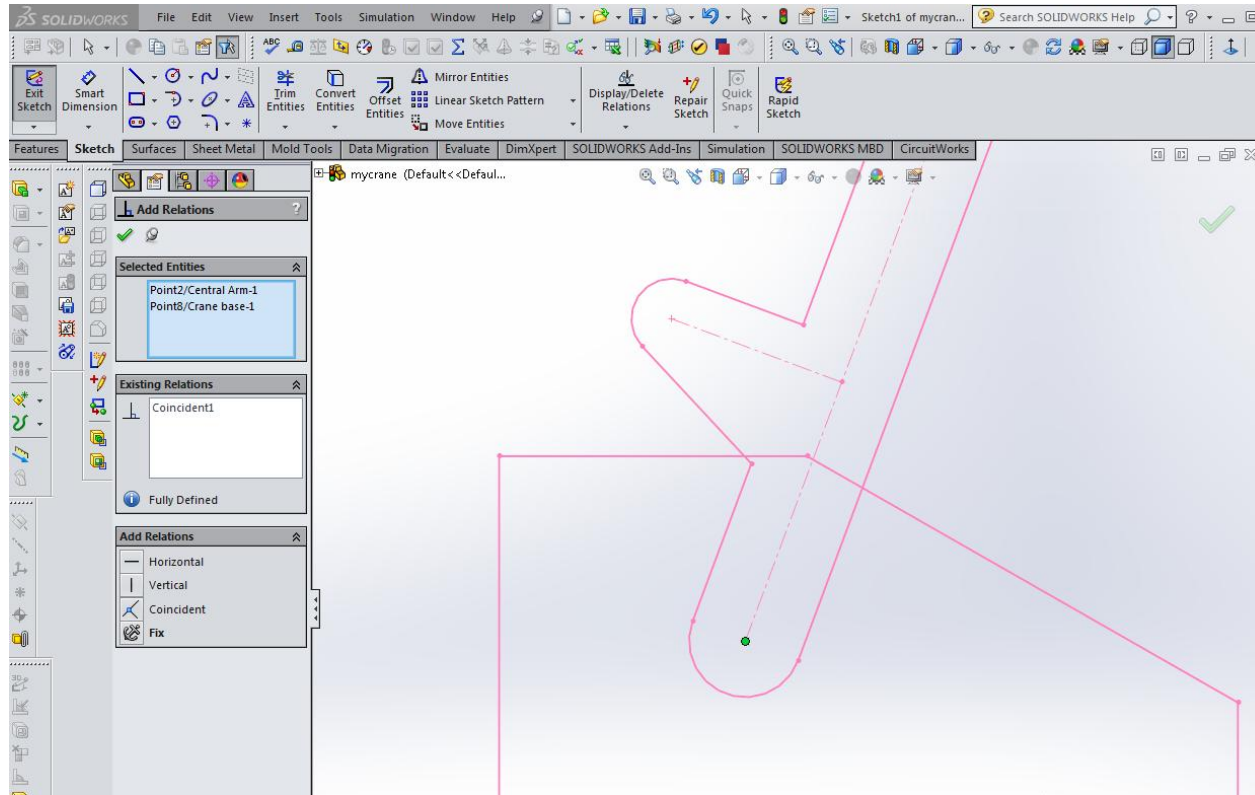
Link to File – Click Chain Icon



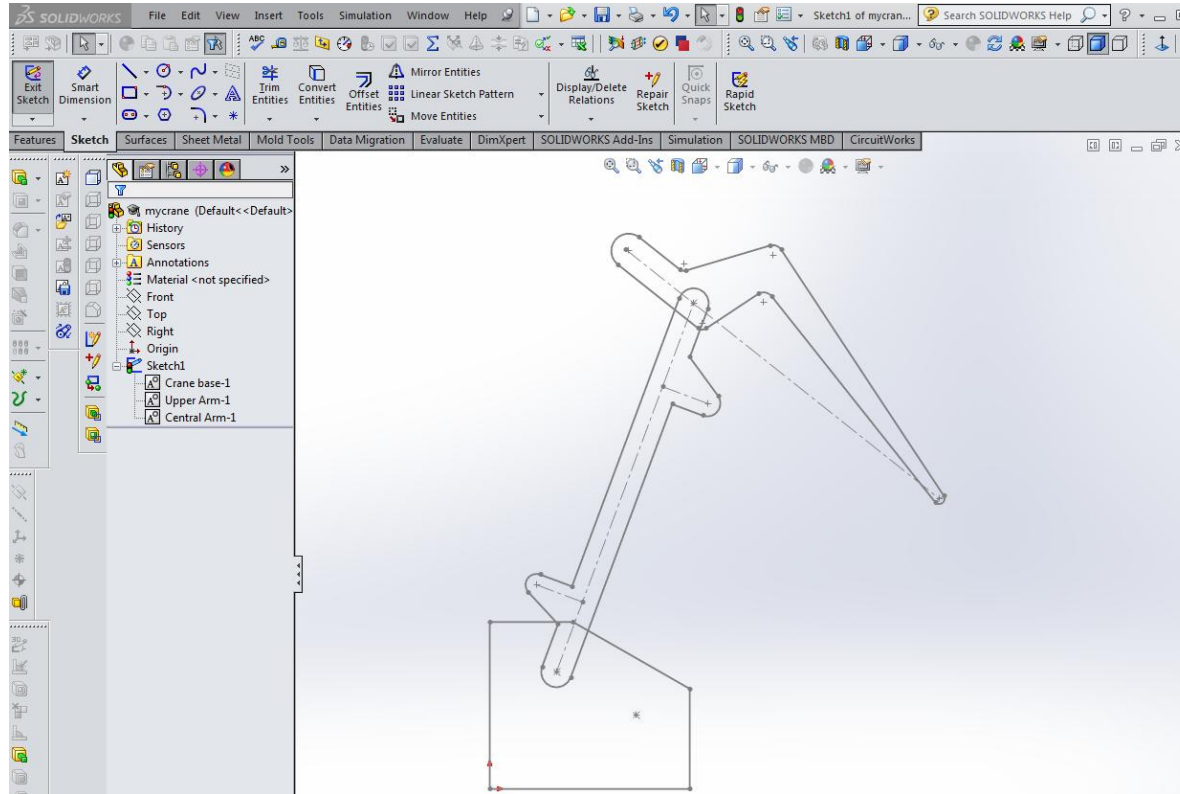
Adding the Central Arm – Scale It



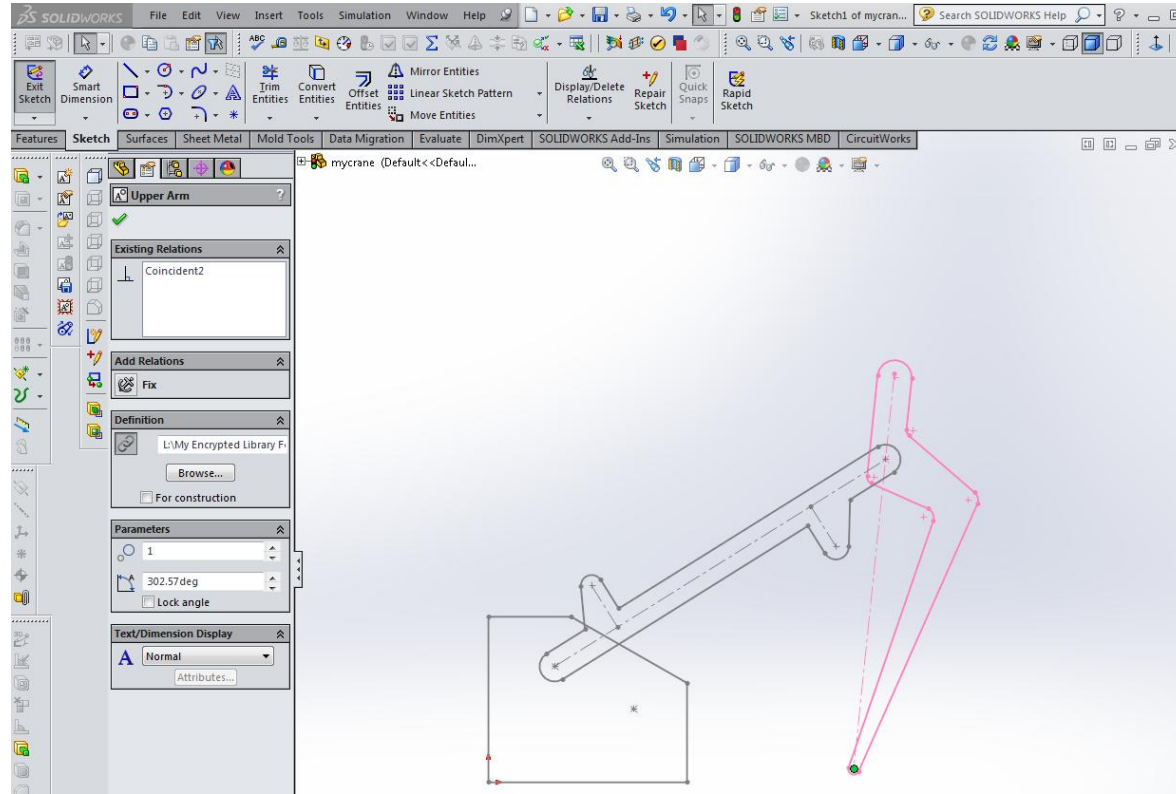
Make Center Arm and Point Coincident



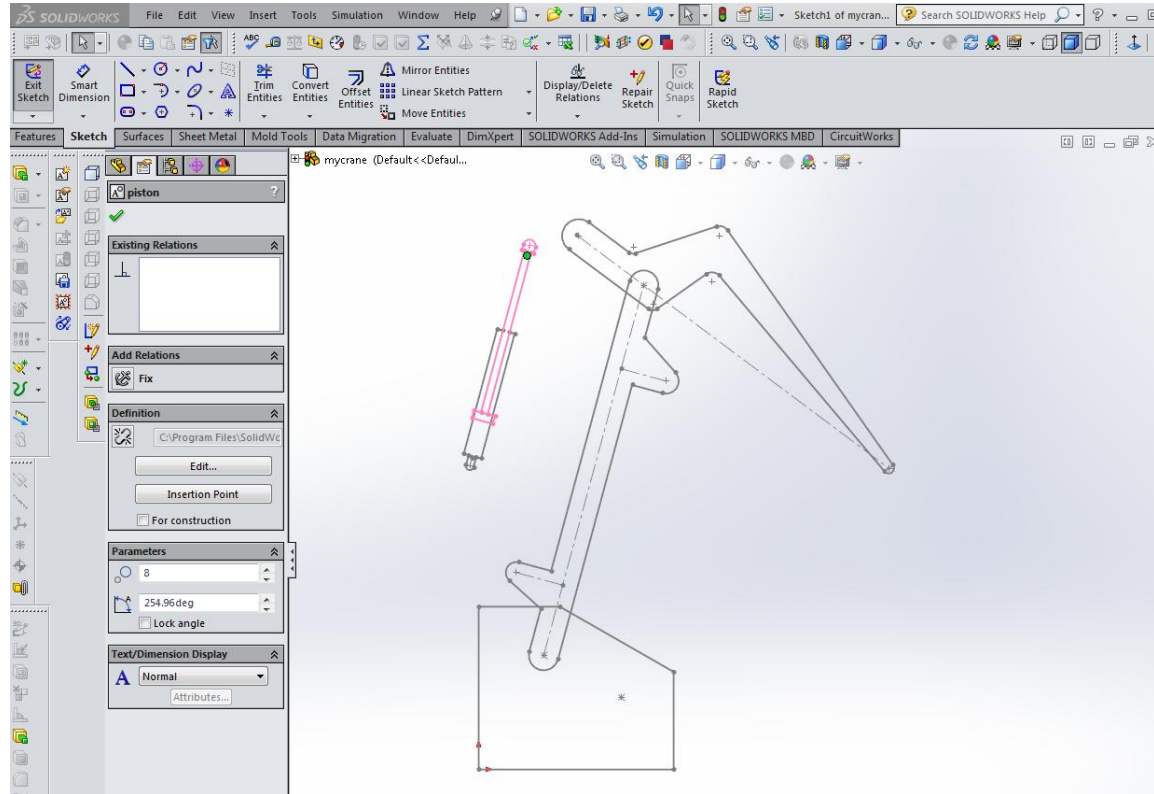
Connecting the Arm



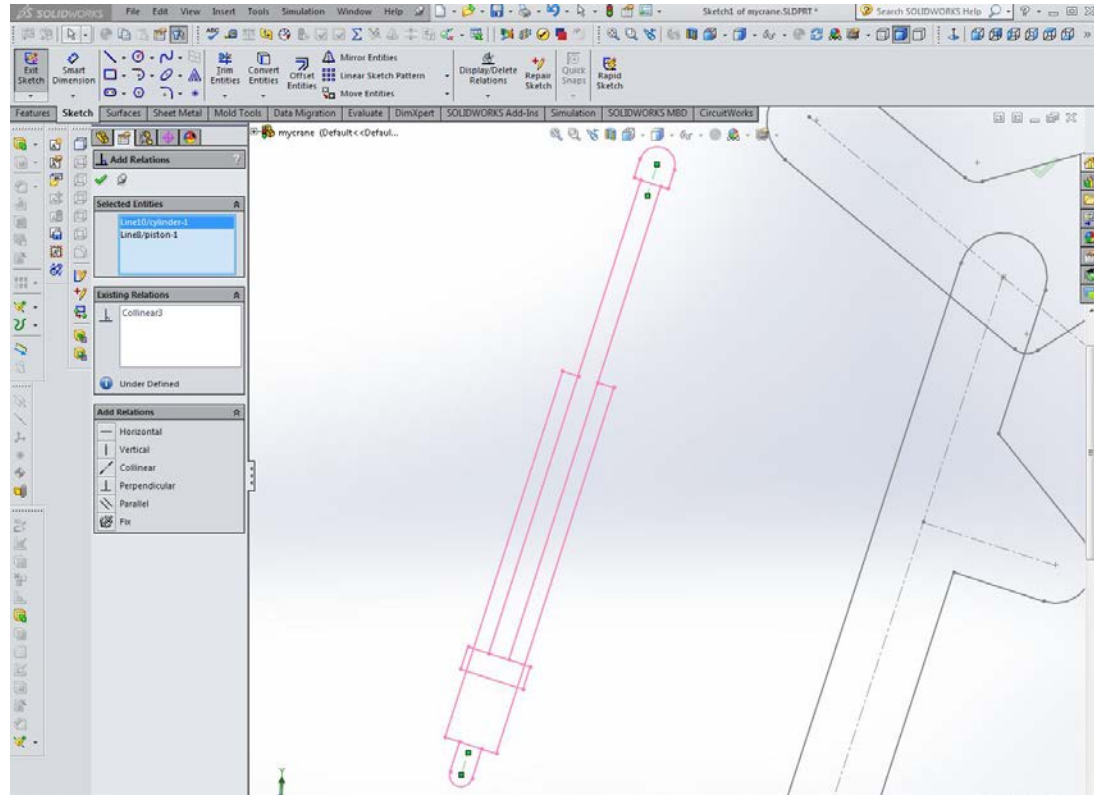
Test Motion of Arm



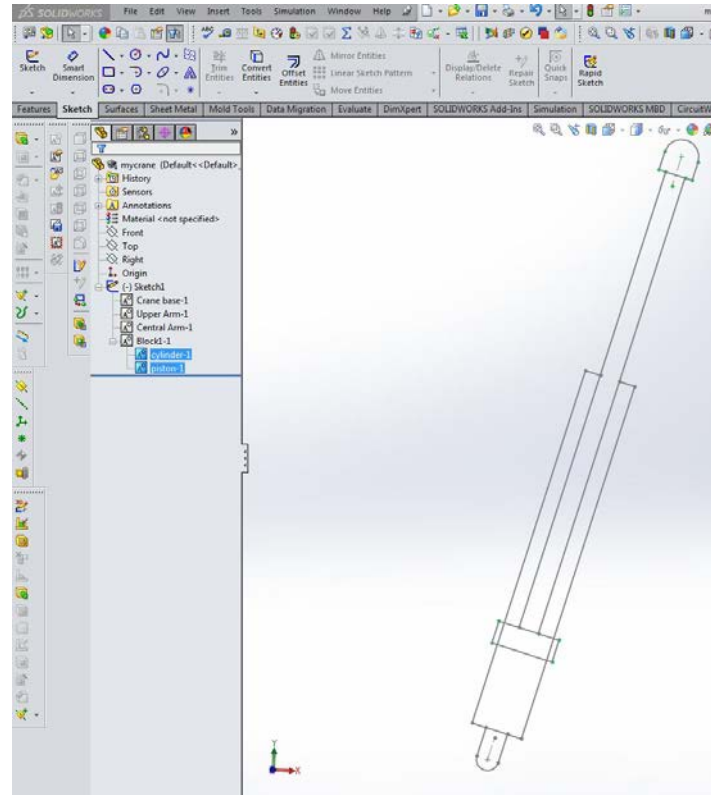
Add Cylinder and Piston Blocks



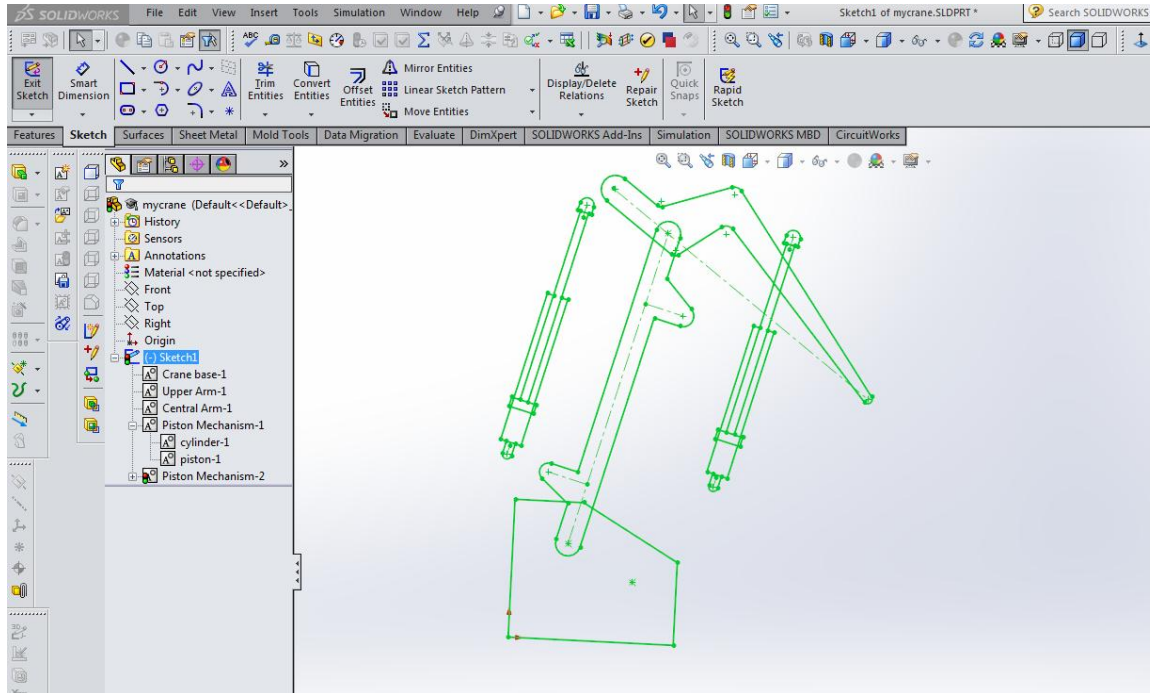
Adding Colinear Relationship – Must Zoom-In!



Make a Single Block of Cylinder-1 & Piston-1




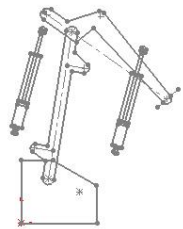
Add a Second Instance of Piston Mechanism



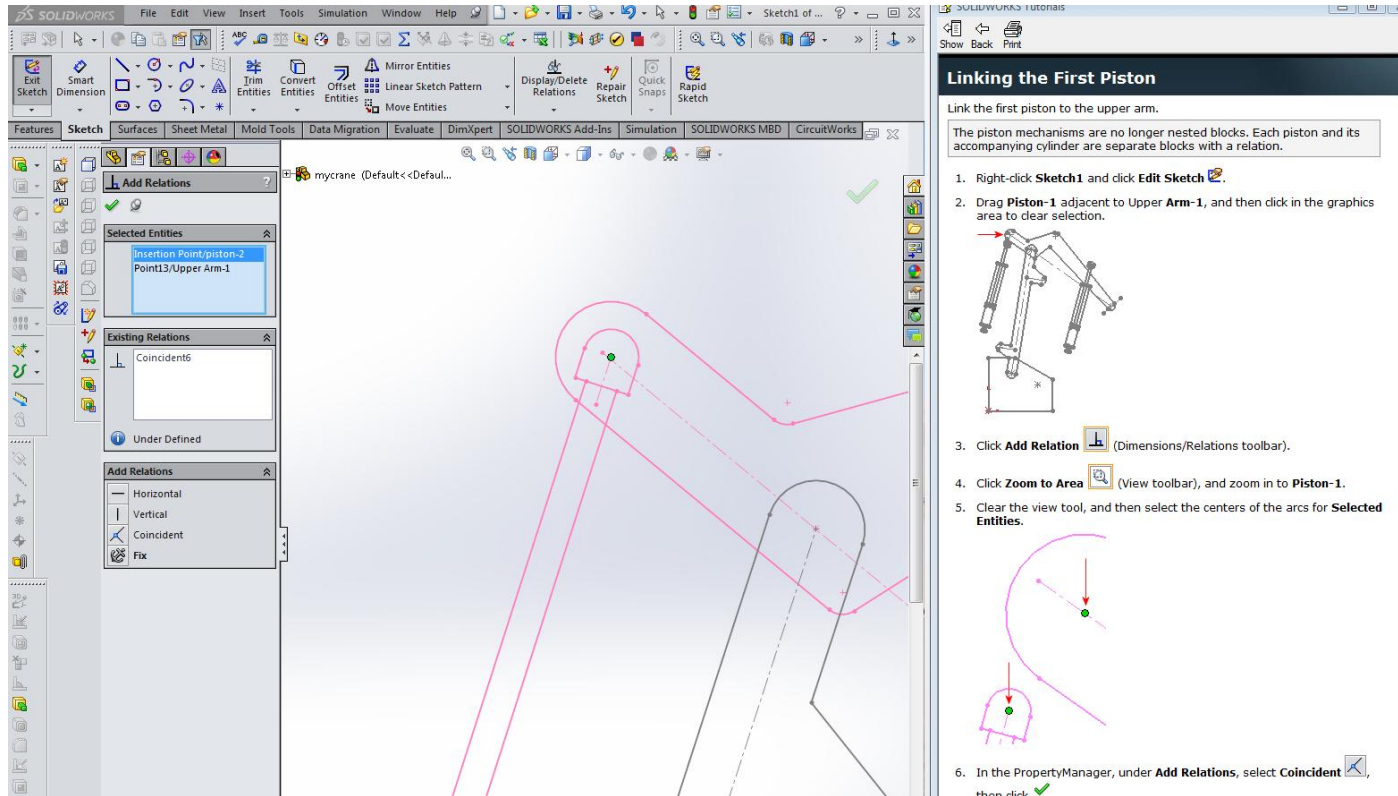
Inserting a Second Piston Mechanism

Insert another instance of the nested block.

1. Select **Sketch1** and click **Insert Block** (Blocks toolbar).
2. In the PropertyManager, under **Open Blocks**, select **Piston Mechanism**.
3. In the graphics area, click to place the block to the right of central arm, then click .
A second instance of the nested block, **Piston Mechanism-1**, is added to the FeatureManager design tree.
4. Save the model.



Linking the First Piston



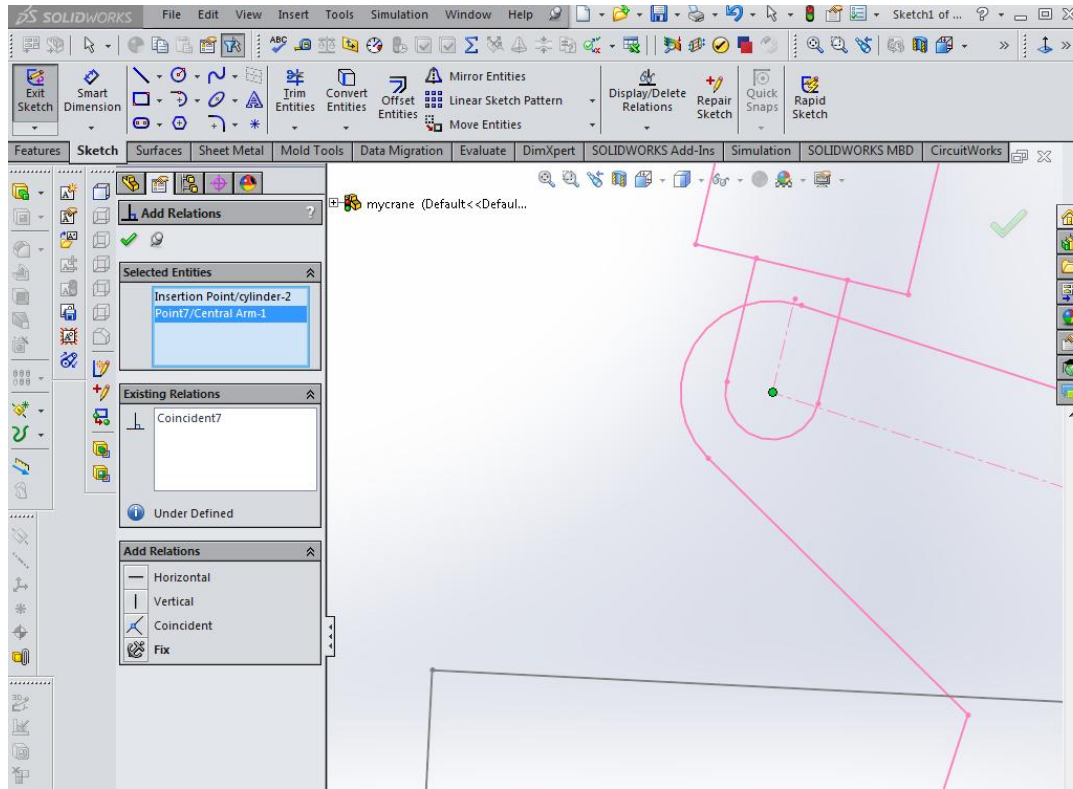
Linking the First Piston

Link the first piston to the upper arm.

The piston mechanisms are no longer nested blocks. Each piston and its accompanying cylinder are separate blocks with a relation.

1. Right-click **Sketch1** and click **Edit Sketch**.
2. Drag **Piston-1** adjacent to **Upper Arm-1**, and then click in the graphics area to clear selection.
3. Click **Add Relation** (Dimensions/Relations toolbar).
4. Click **Zoom to Area** (View toolbar), and zoom in to **Piston-1**.
5. Clear the view tool, and then select the centers of the arcs for **Selected Entities**.
6. In the PropertyManager, under **Add Relations**, select **Coincident**, then click **✓**.

Linking the First Cylinder

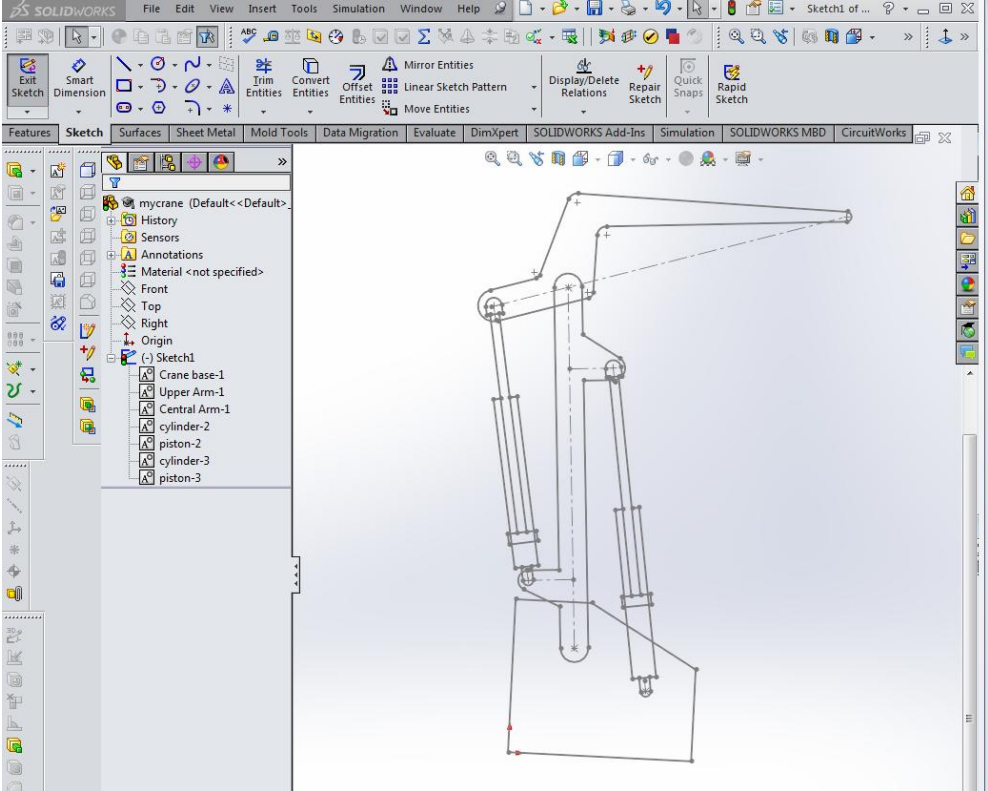


Linking the First Cylinder

Link the first cylinder to the crane base.

1. Click **Zoom to Fit** (View toolbar), clear the view tool, and drag **Cylinder-1**. Place the cylinder adjacent to **Central_Arm-1**, and then click in the graphics area to clear the selection.
2. Click **Zoom to Area** (View toolbar), and zoom in to the lower section of **Cylinder-1** and the left side of **Central_Arm-1**.
3. Click **Add Relation** (Dimensions/Relations toolbar).
4. Click **Zoom to Area** (View toolbar), and zoom in to **Piston-1**.
5. Clear the view tool, and then select the centers of the arcs for **Selected Entities**.
6. In the PropertyManager, under **Add Relations**, select **Coincident**, then click **OK**.

Linking the Second Piston

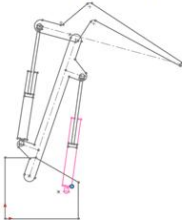


The screenshot shows the SolidWorks interface with a crane assembly. The left-hand side features the Feature Tree, which lists the following items: mycrane (Default<<Default>>), History, Sensors, Annotations, Material <not specified>, Front, Top, Right, Origin, and Sketch1. Under Sketch1, the following items are listed: Crane base-1, Upper Arm-1, Central Arm-1, cylinder-2, piston-2, cylinder-3, and piston-3. The main workspace displays a 3D model of the crane with a sketch of a second piston being added. The piston is shown as a cylinder with a central axis and a top surface. The crane base is visible at the bottom of the model.

Linking the Second Cylinder

Link the second cylinder to the crane base.

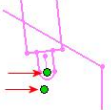
1. Click **Zoom to Fit** (View toolbar) and drag the bottom of **Cylinder-2** adjacent to the second point in the crane base.



2. Zoom in to the bottom of the cylinder, clear the Zoom tool, and click **Add Relation** (Dimensions/Relations toolbar).

3. Select the center of the arc on the cylinder and the point on the base for selected entities.

4. Add a **Coincident** relation, and then click **OK**.

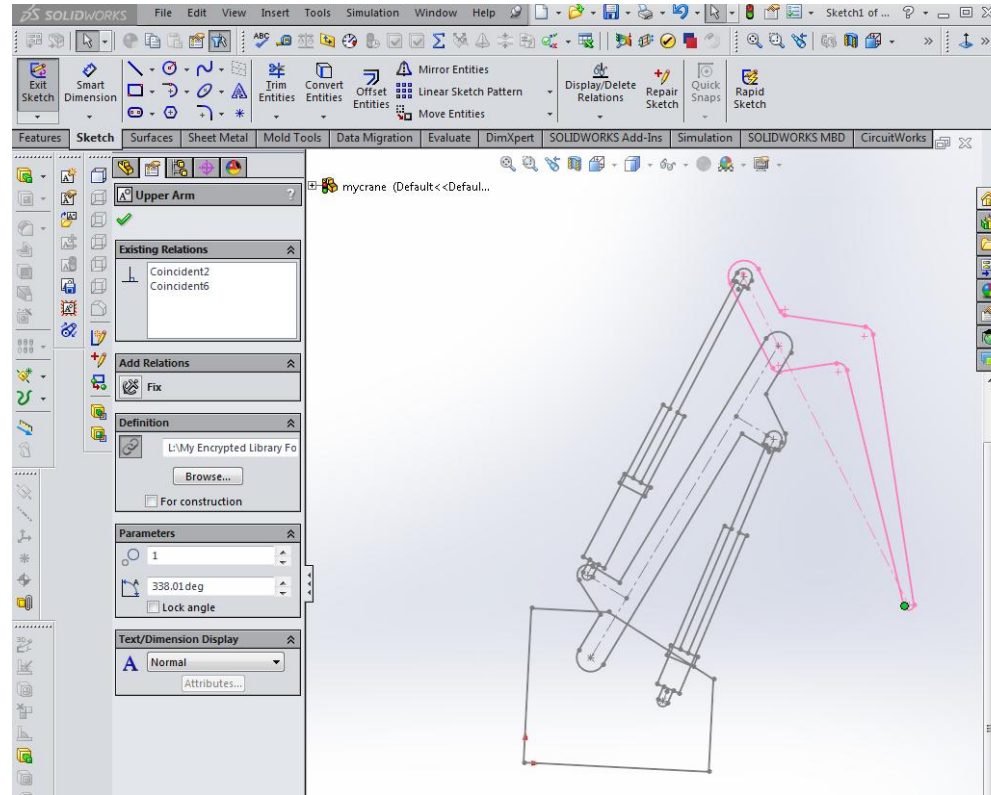


5. Click **Zoom to Fit** (View toolbar), select any sketch entity on the upper arm, and move the arm up and down and back and forth.
[Video: Rotating and Sliding Motion](#)

6. Close the sketch and save the part.

Congratulations! You have completed this tutorial.

Confirming Motion



Summary

- ▶ Concepts reviewed:
 - Making blocks.
 - Making relationships between blocks.
 - Demonstrating movement.
 - Saving, inserting, editing and renaming blocks.
 - Testing motion about coincident and colinear relationships.
 - Combining blocks as a new block.
 - Linking blocks with relationships.