

3.12 It is known that a force with a moment of $960 \text{ N} \cdot \text{m}$ about D is required to straighten the fence post CD . If $d = 2.80 \text{ m}$, determine the tension that must be developed in the cable of winch puller AB to create the required moment about point D .

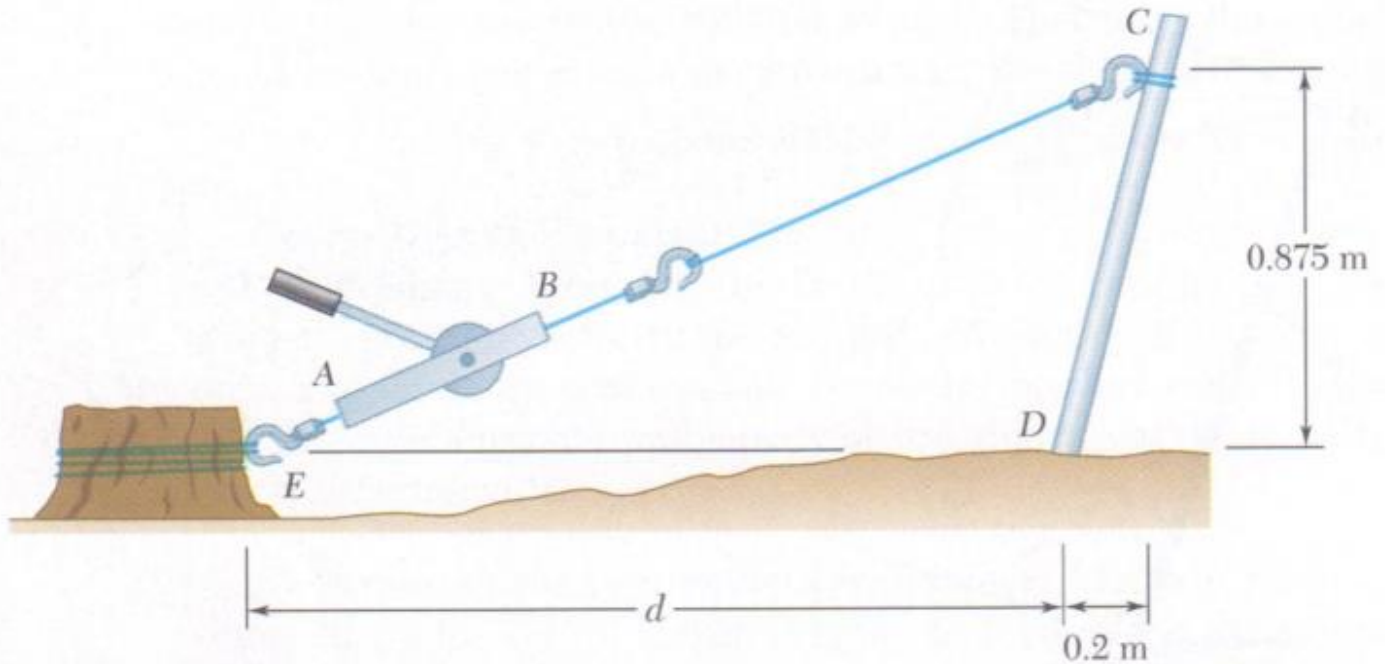
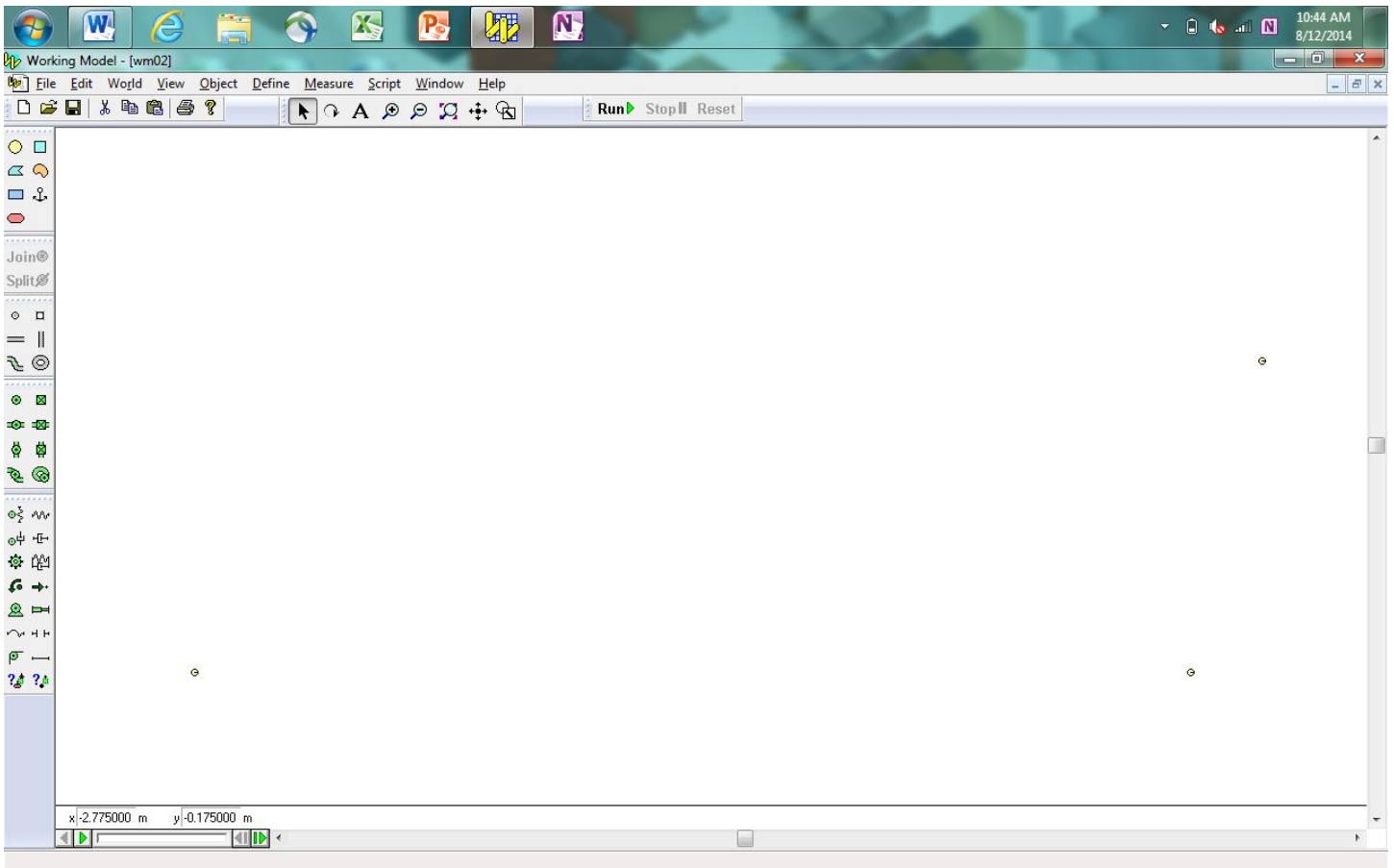
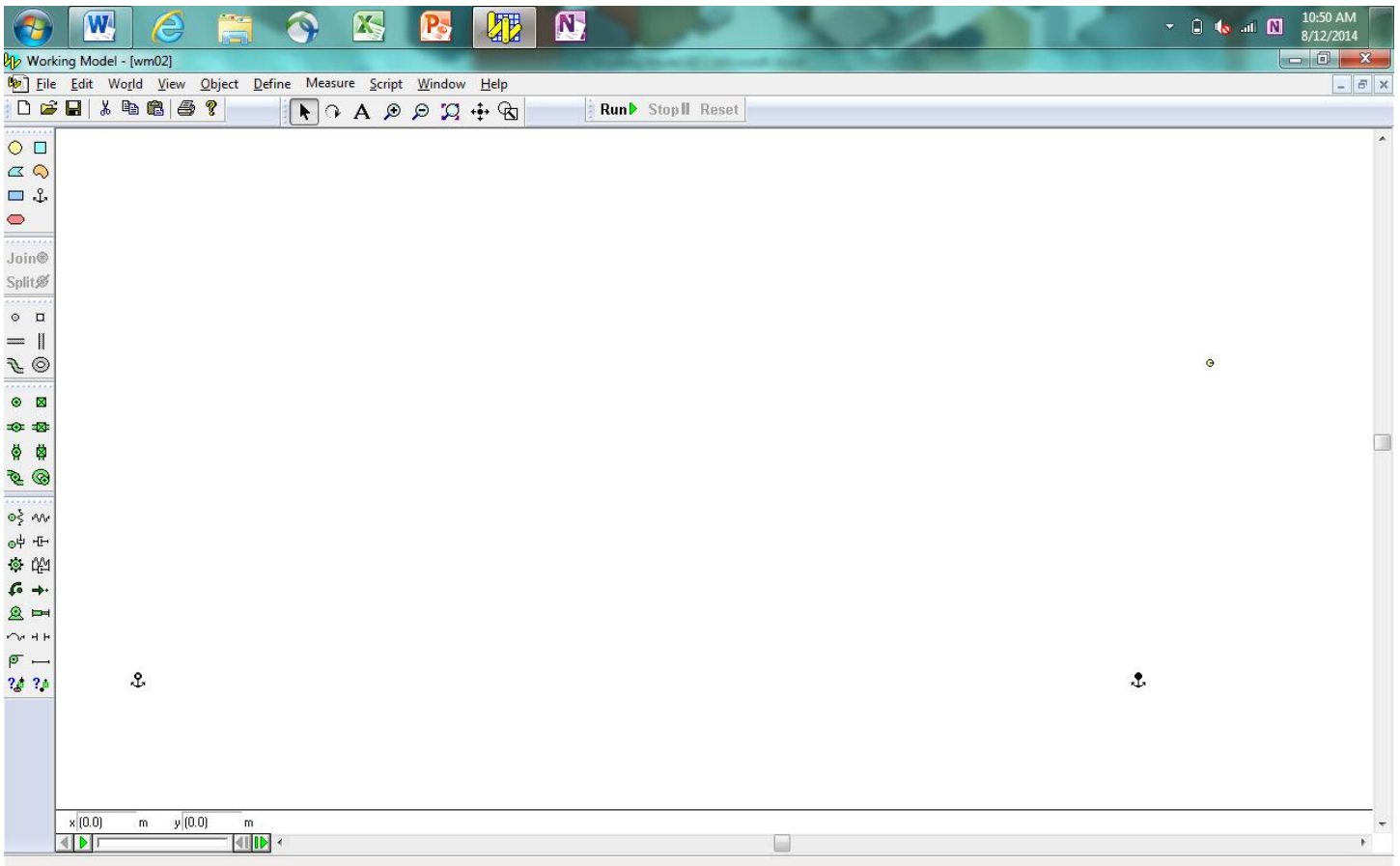


Fig. P3.11, P3.12 and P3.13

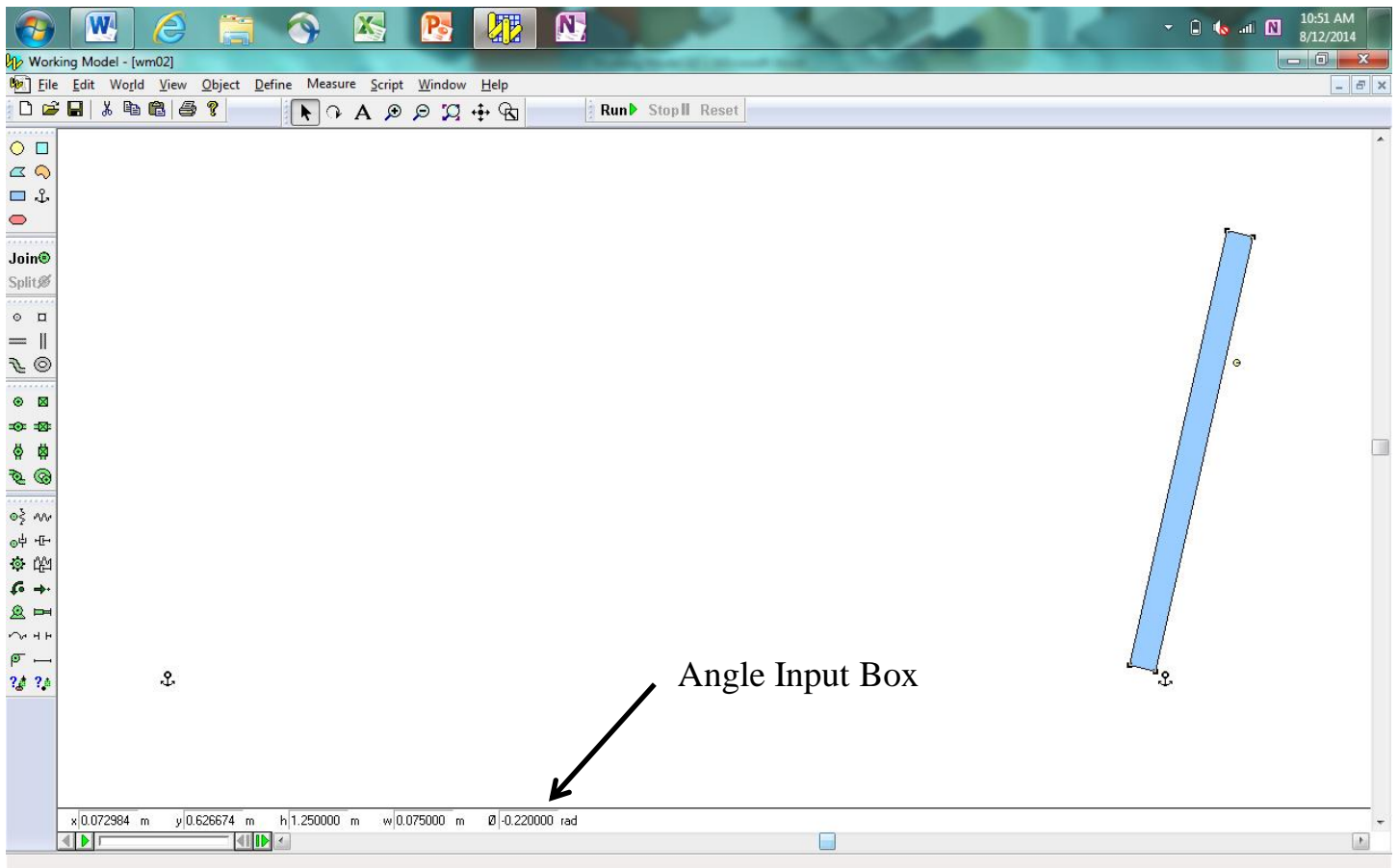
Place small circles at point $D (0,0)$, point $E (-2.8,0)$ and point $C (0.2,0.875)$.



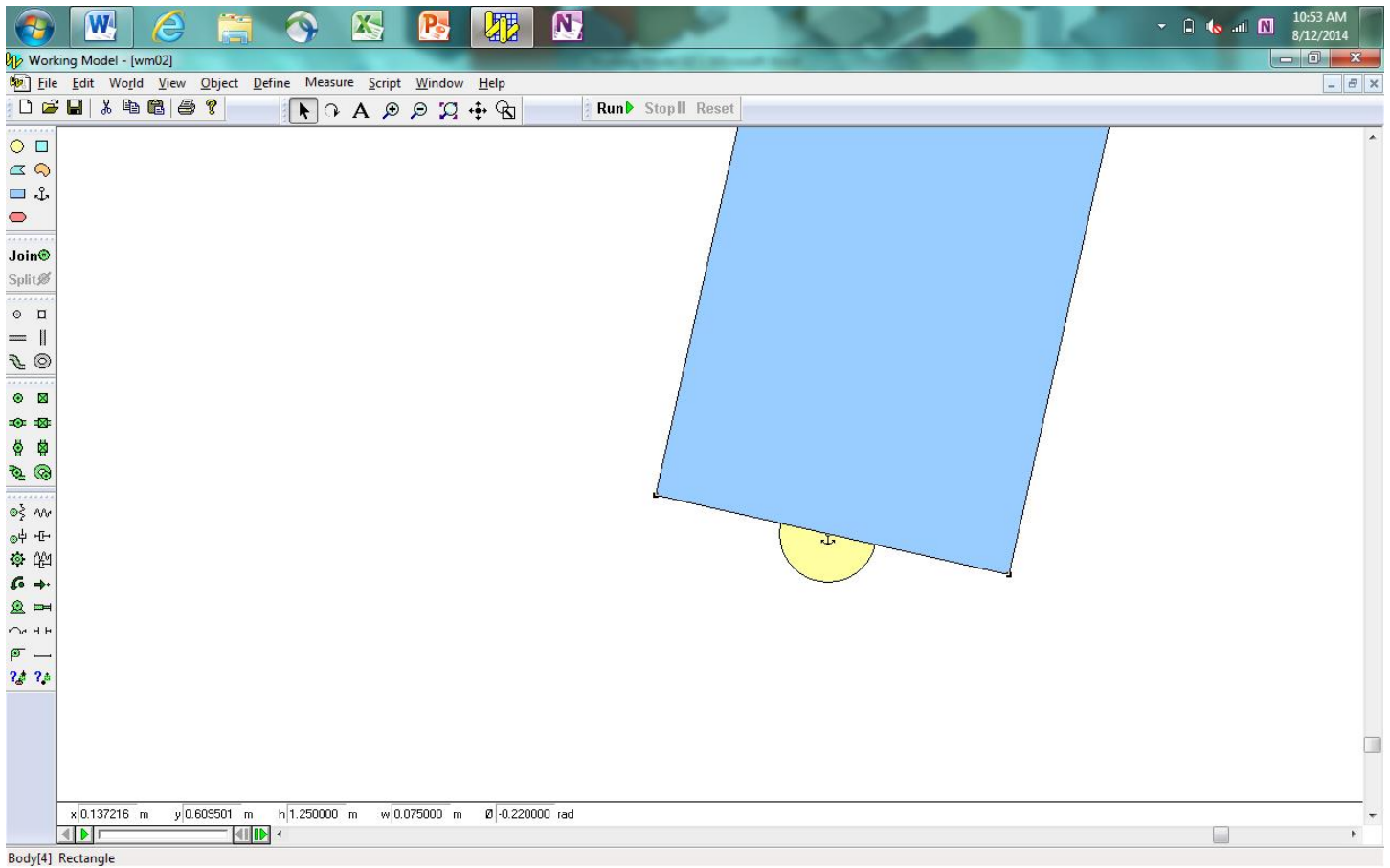
Anchor the two lower circles in place.



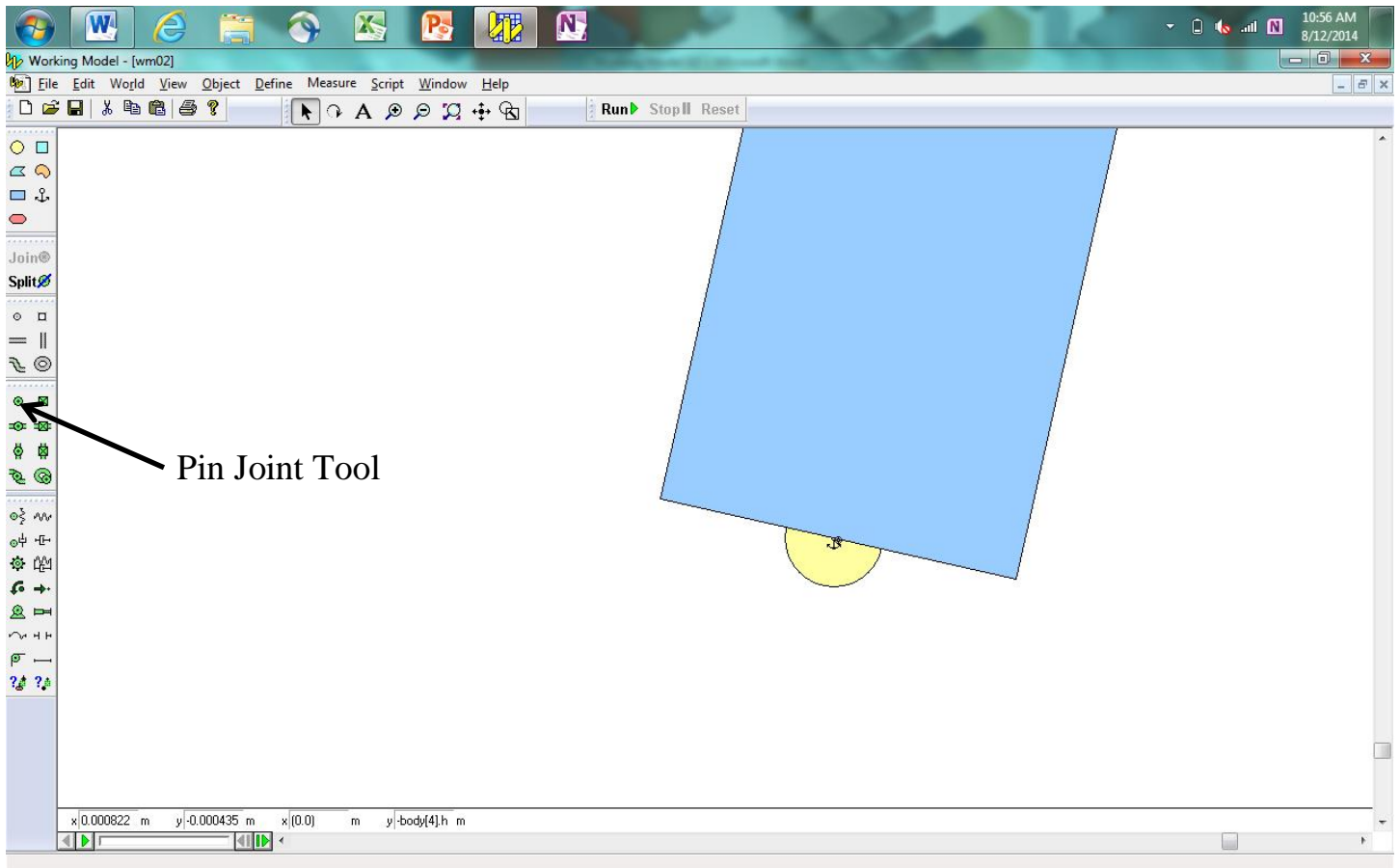
Place a rectangle onto the window and align it with the two circles on the right using the Angle Input box.



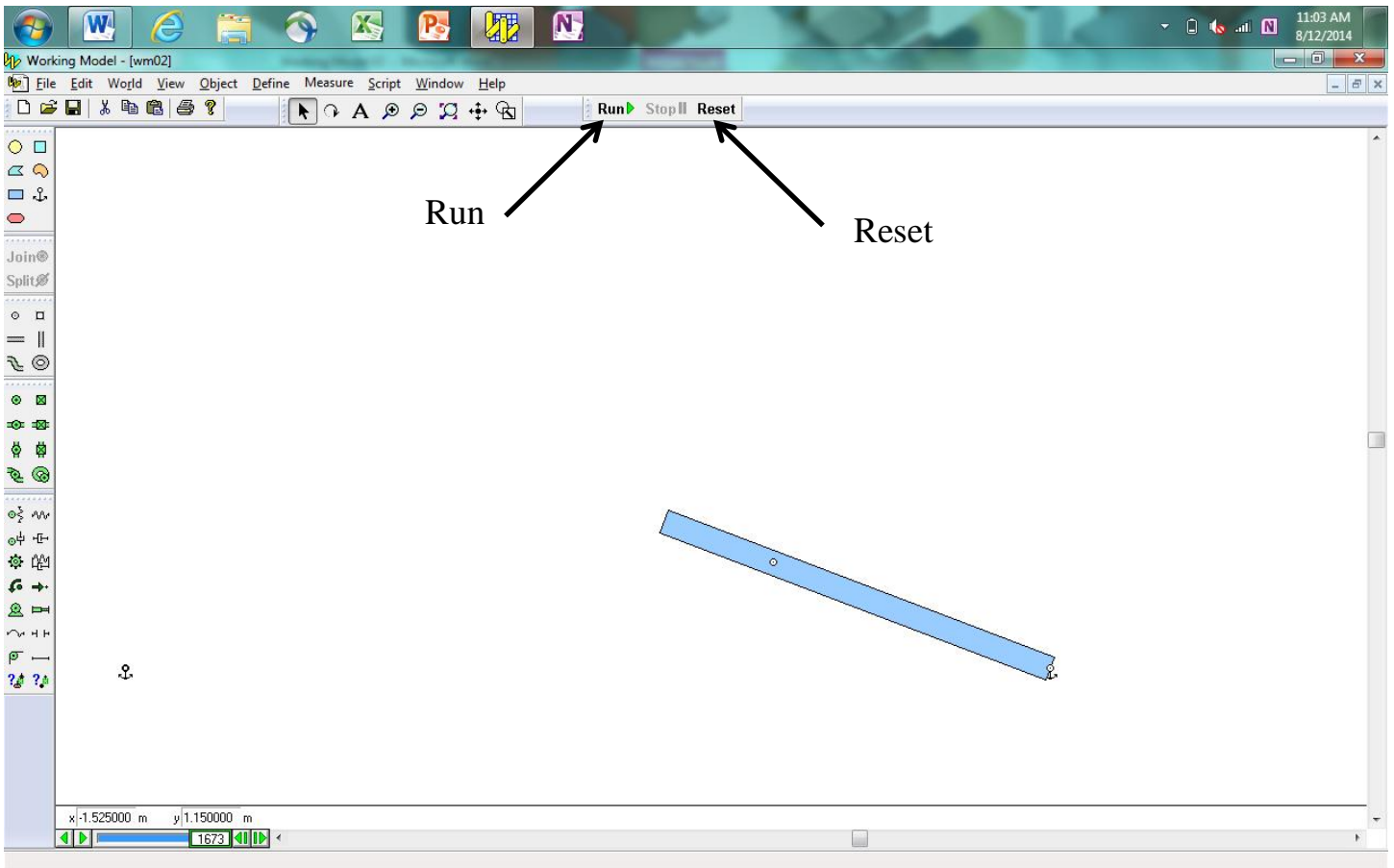
Zoom in on the circle at (0,0) and align the lower end of the rectangle with the center of the circle.



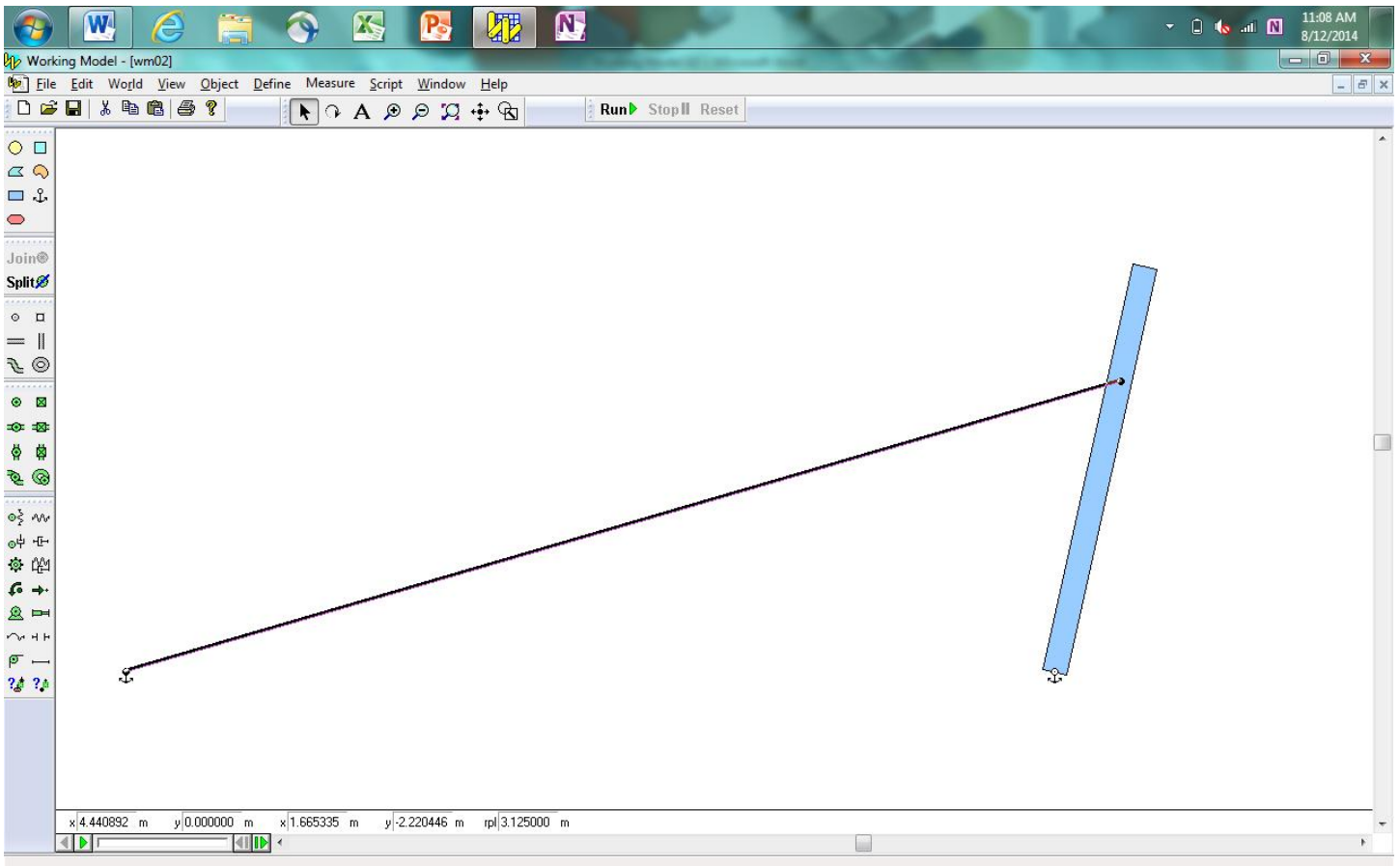
Using the Pin Joint Tool, place pin joints on the two circles on the rectangle. This will lock the circles onto the rectangle.



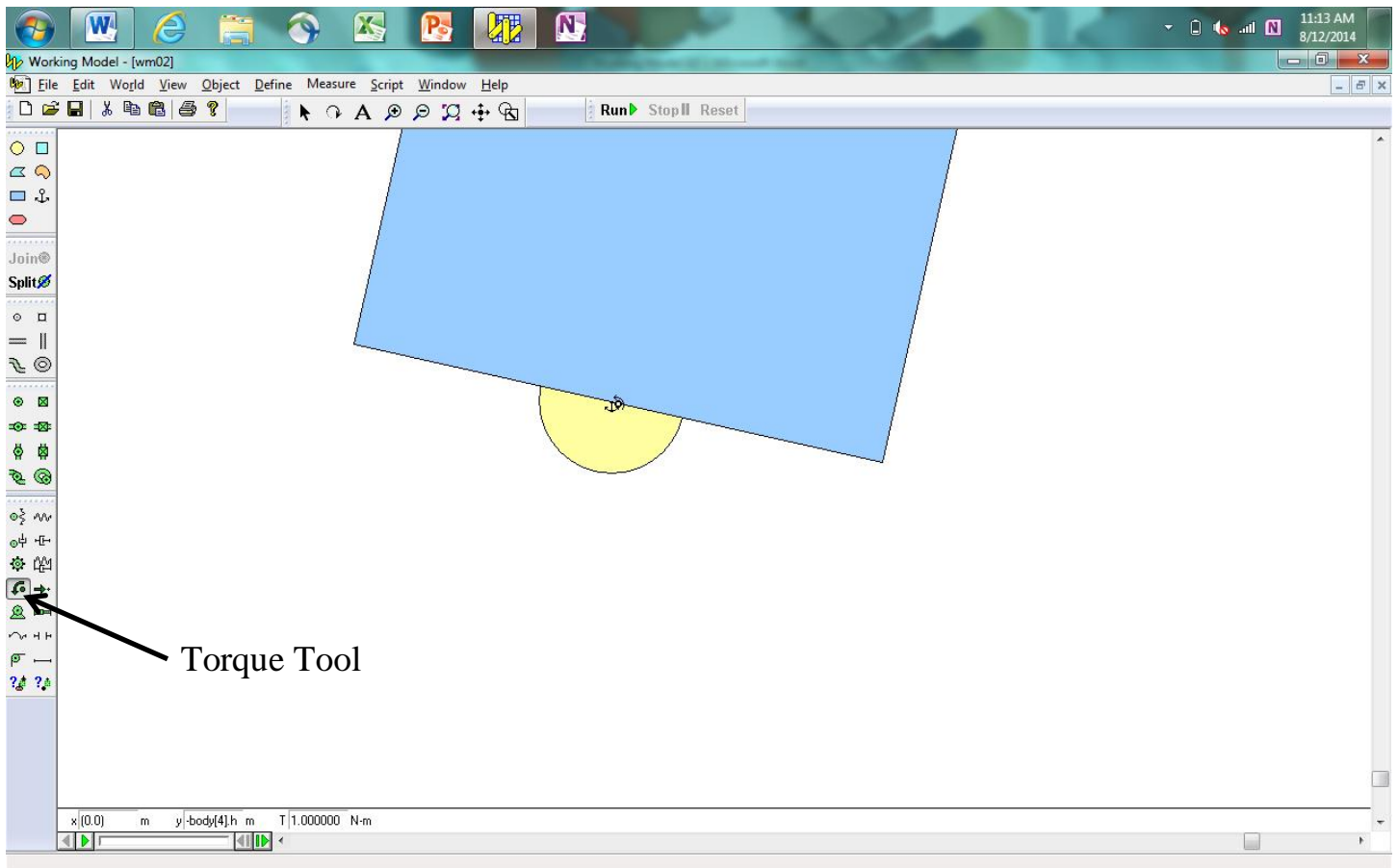
Run the simulation. The rectangle should swing around the lower circle at (0,0). Reset the simulation using the Reset button.



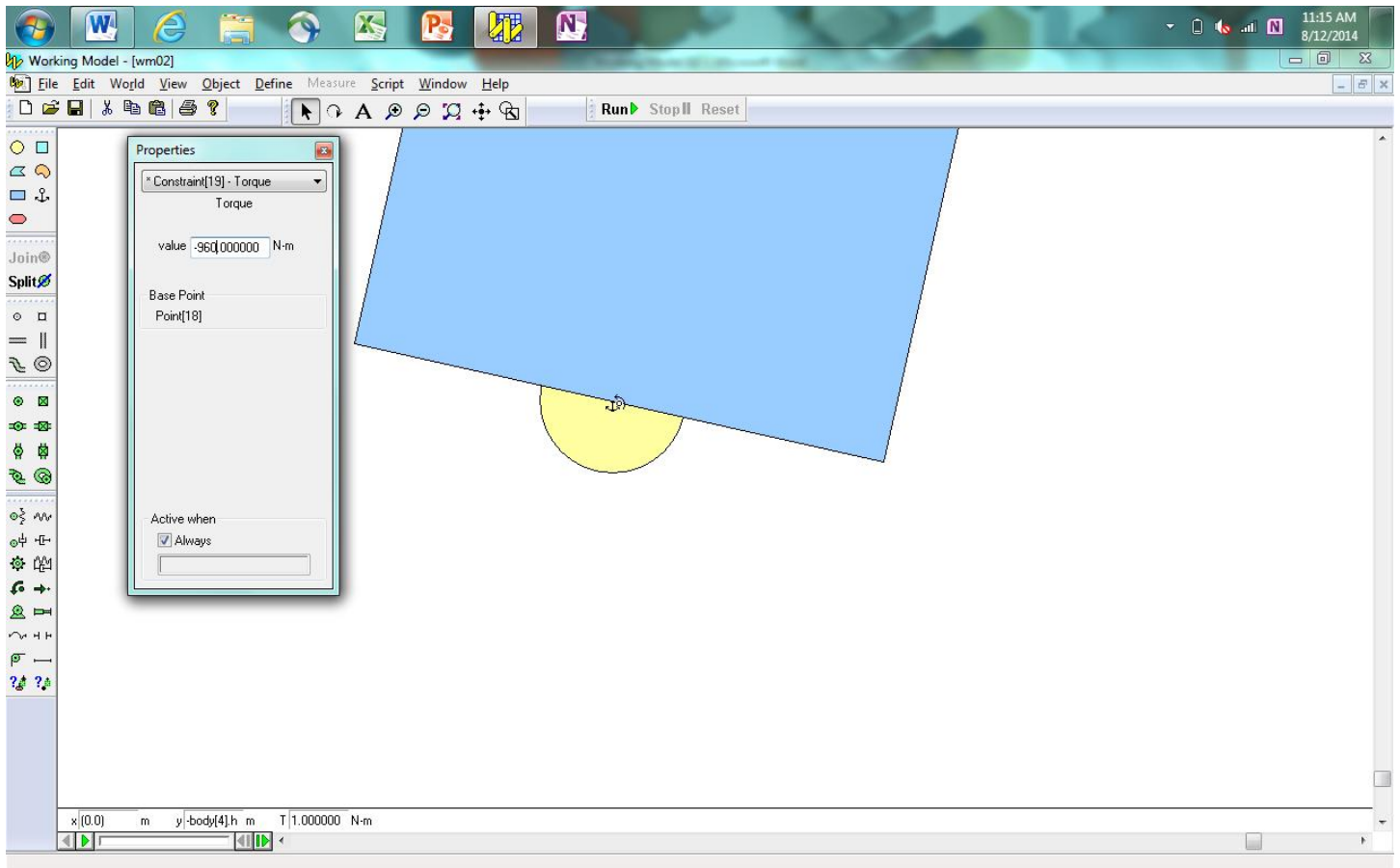
Using the Rope Tool, connect the circle at $(-2.8,0)$ to the upper circle on the rectangle.



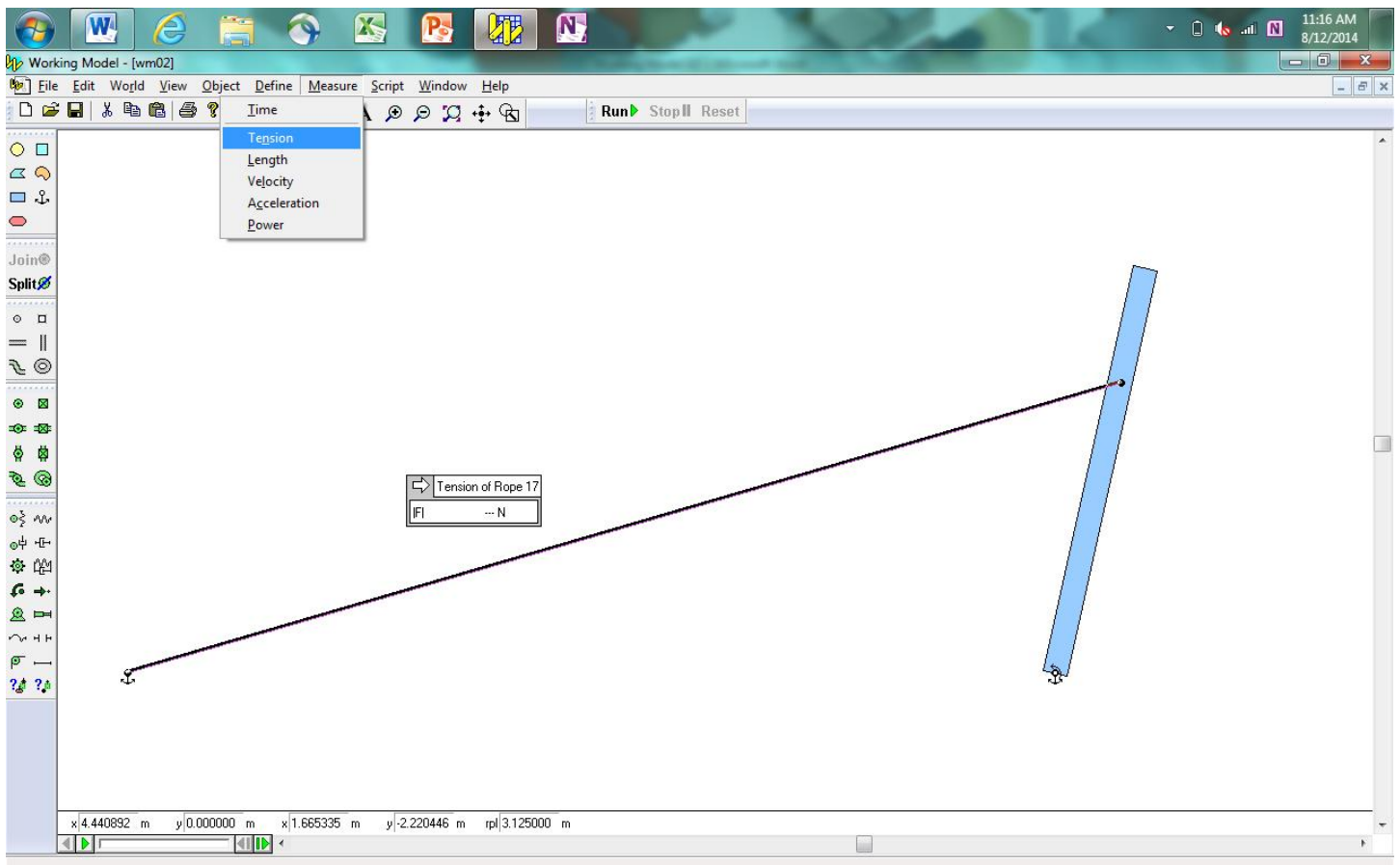
Using the Torque Tool, apply a torque to the lower end of the rectangle.



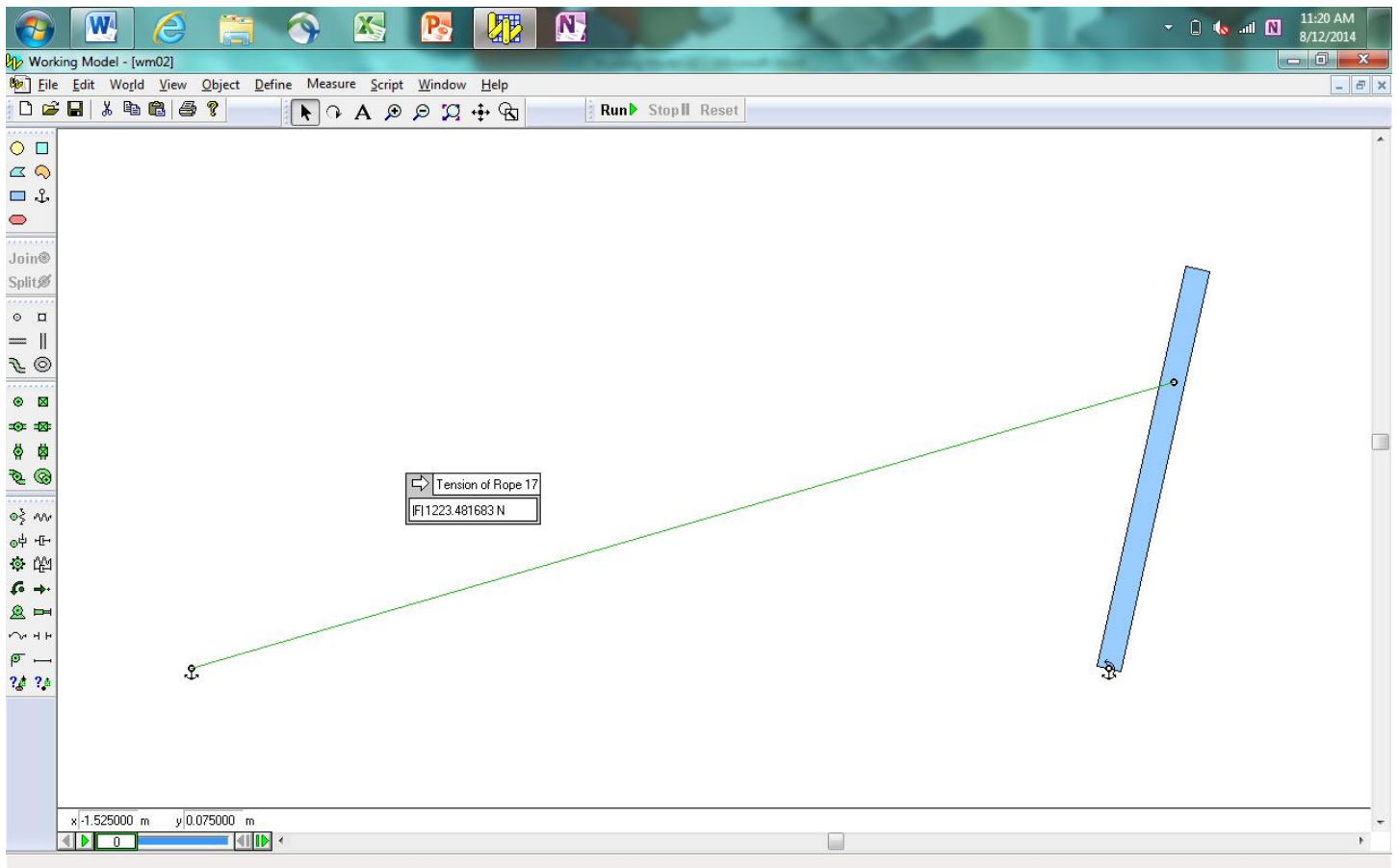
The value of the torque can be set by double-clicking the applied torque.



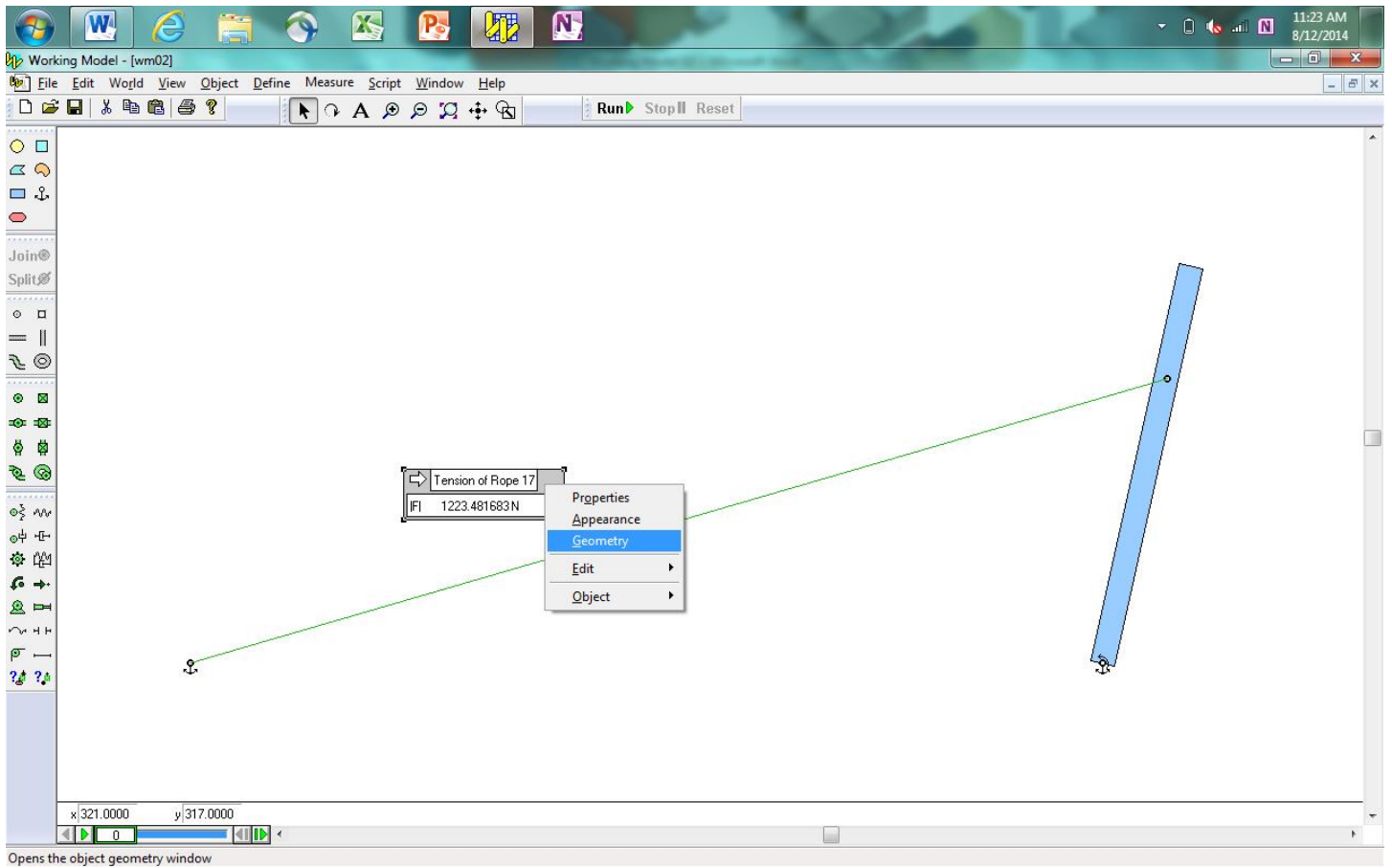
Select the rope, and place a Tension Measurement output box on the window for the rope.



Run the simulation.



The output box can be manipulated to better see the result. Right-click on the box and select Geometry.



Change the width to 150.

The screenshot shows a software interface with a top toolbar and a main workspace. A dialog box titled "Geometry" is open, displaying the following information:

- Dropdown menu: * Output[20] - Tension of Rope
- Section: Tension of Rope 17
- Left: 321
- Top: 317
- Width: 150
- Height: 48
- Section: Offset from body frame
- X:
- Y:
- R:

The workspace contains a blue vertical bar on the right and a green line extending from the left towards the top of the bar. The status bar at the bottom shows coordinates x:321.0000 and y:317.0000.

Output[20] This output measures properties of Constraint[17].

The screenshot shows the same software interface as above, but with a data table displayed in the workspace. The table has the following content:

Tension of Rope 17	
F1	1223.481683N

The workspace contains the same blue vertical bar and green line as in the previous screenshot. The status bar at the bottom shows coordinates x:321.0000 and y:317.0000.

When the results of your model match those shown above, take a screenshot of the model (with numerical values showing), copy and paste it into Microsoft Word, save it as a pdf file, and submit it to the Dropbox in Pilot.