

Strength of Materials Project Spring 2007

Your goals in this project are to:

1. Learn SolidWorks enough to produce a 3-dimensional prismatic shaft with a rectangular cross-section.
2. Use Cosmos within Solidworks to place your shaft in pure shear by applying torques at the beams ends.
3. Determine the angle of twist for your shaft.
4. Determine the distribution of shear stresses over the cross-sectional area of your shaft.

Project Constraints

1. A formal engineering report will be written and submitted to the instructor by Wednesday April 25, 2007 concerning your investigation into torsion in a rectangular shaft (see Figure). If you are unsure about format check out the following: http://evan.lemley.org/courses/engr_report_format_spring_2005.pdf.

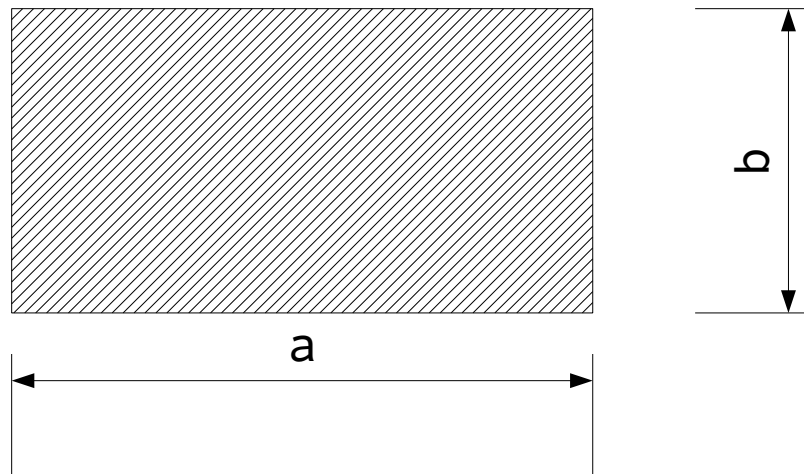


Figure 1: Rectangular beam cross section for project.

2. You will need to reference your findings to a circular shaft of the same volume (or cross-sectional area). So that everyone is on the same page – let's all reference the following beam

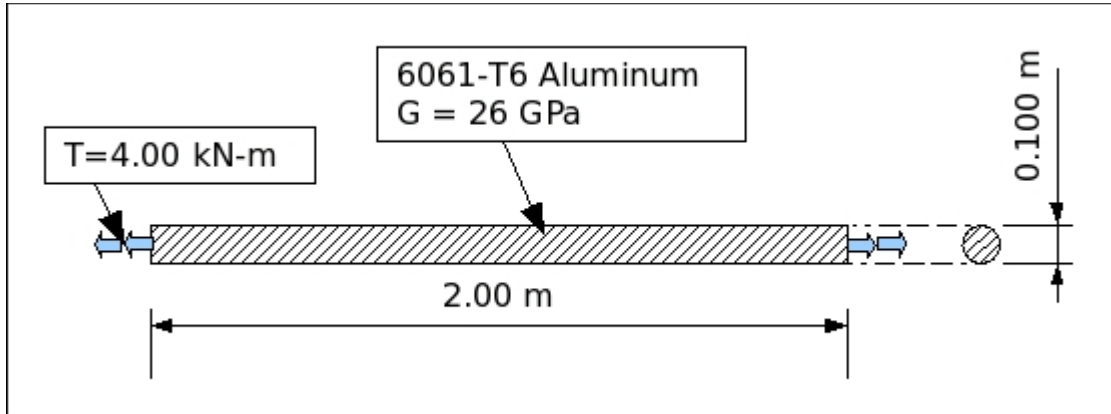


Figure 2: Reference volume equivalent circular cross beam.

At a minimum you should have plots of shear stress vs. radial position for the rectangular and the volume equivalent circular shaft. You should also compare your results to those calculated for max shear stress and angle of twist using equations 3.43 and 3.44 in your text.

3. You may work together to figure things out (particularly in Solidworks), but you should have distinctly different cross-section shapes.

Note I will help you as much as time permits. When you have problems accessing Solidworks or cannot figure things out ask me or ask other students. Successful completion of this project will depend on asking questions and consistently working on the project.