

EME 150A Fall 2016 Homework #01

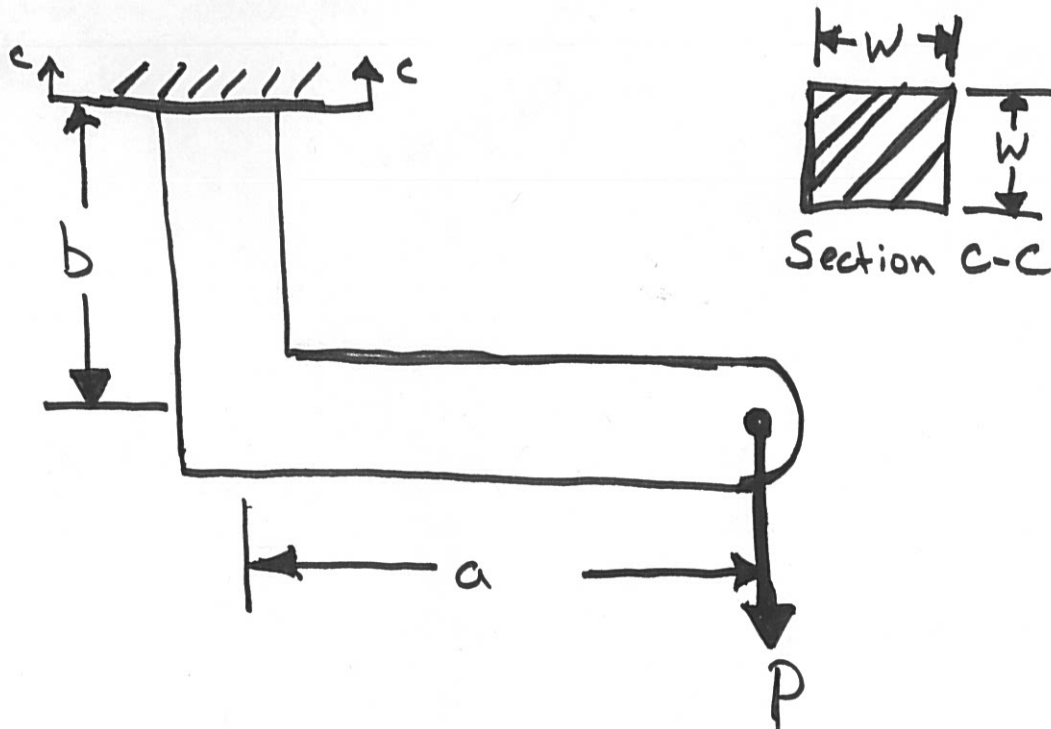
DUE: Monday, October 03, 2016 before class in Box B in the MAE department.

Problem 1

Your manufacturing company has been contracted to manufacture 10,000 custom cotter pins that secure the PTO to external attachments for a new tractor model. The delivered outer diameter of the pins must be 0.625 ± 0.01 ". Your quality control team has run some test batches of the pins and have found that the manufacturing process produces a mean diameter of 0.621" with a standard deviation of 0.004". How many more pins will you have to make to ensure you deliver 10,000 pins that meet the criteria?

Problem 2

Part 1 Determine the internal loads and the maximum normal stress at section C-C (symbolic form).



Part 2 It has been determined that the design factor for this part is to be 3 with respect to yielding. If the material is 1018 steel, will a cross section width of $w = 1\text{cm}$ of the square bar be able to meet this design factor if only the maximum normal stress is considered with $P = 120\text{N}$, $a = 6\text{cm}$, and $b = 5\text{cm}$? Compute the actual factor of safety to show this.

Part 3 Explain in words the difference between "design factor" and "factor of safety".

Problem 3

Draw the shear and moment diagrams for the beam shown in the figure.

