

## EME 150A Fall 2015 Homework #08

**Date:** Monday, November 23, 2015

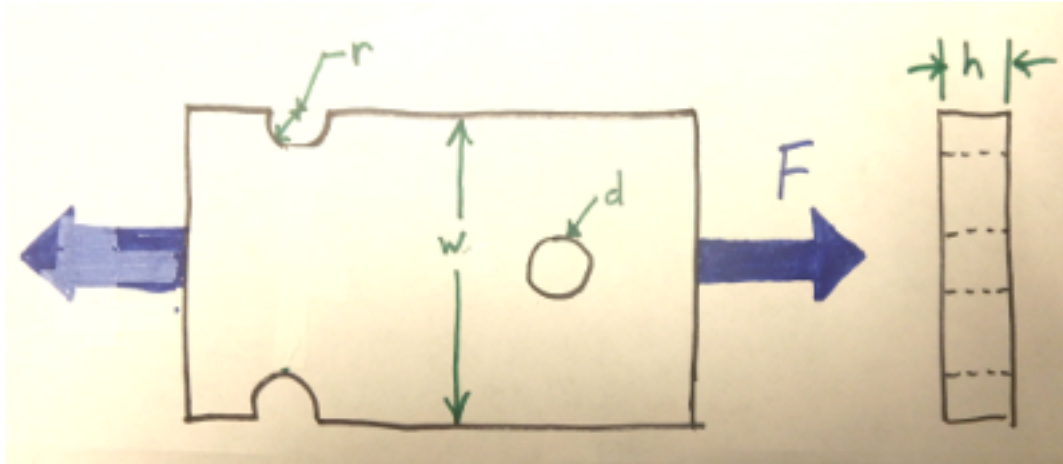
**DUE:** Monday, November 30, 2015 before class in Box D in the MAE department.

### Problem 1

A round tensile link with no stress concentrations is subjected to a fluctuating load (1000 to 5000 lbs). Use  $S_{ut} = 150\text{kpsi}$ ,  $S_y = 120\text{kpsi}$ . Assume a highly polished specimen and design factor of 2. Find the diameter for infinite life and for  $10^3$  cycles.

### Problem 2

The element shown below is subjected to a fluctuating load that ranges between 4 kip in tension and 14 kip in compression. The dimensions are  $r = 0.313\text{in}$ ,  $d = 0.5\text{in}$ ,  $h = 0.375\text{in}$ ,  $w = 4\text{in}$ . Determine the factor of safety if the material is cold drawn AISI 1018 steel.



### Problem 3

The AISI hot rolled 1020 steel element shown is welded to the fixed plate with a fillet weld. This fillet introduces stress concentration factors of  $K_t = 1.8$  and  $K_{ts} = 1.6$ . The dimensions are  $d = 0.875\text{in}$ ,  $l_1 = 2\text{ft}$ ,  $l_2 = 1\text{in}$ . The load  $F$  cycles from 300 lbs to 750 lbs. Using the Goodman criteria for fluctuating stress, find the factor of safety at point A with respect to infinite life or the number of cycles to failure for finite life.

