Name 1 _____

Name 2 _____

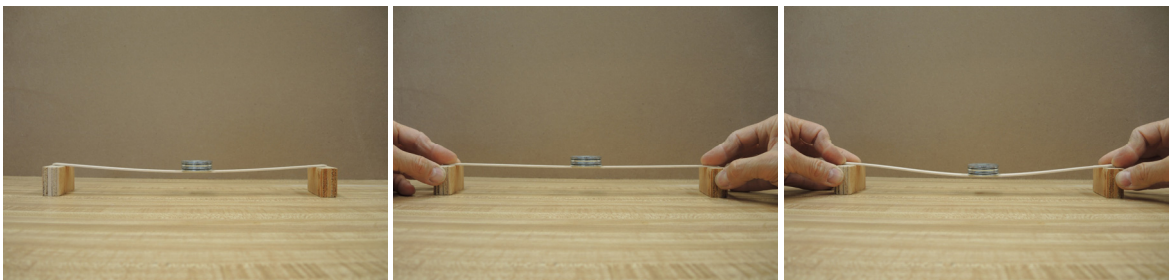Name 3 _____

Combined Stress

Description
This project uses observation of a physical trial to see the effects of flexure combined with tension or compression.

Goals
To observe the behavior of tension + flexure
To observe the behavior of compression + flexure
To estimate the addition of combined stress profiles
To observe results of P + delta loading

Procedure
1. Load the 12 inch wood stick with 4 washers at midspan as shown below. The stick is 1/16"x1/2" A=0.03125 in^2 Sy=0.0003255 in^3 4 washers = 0.15 lbs.
2. Note the deflection caused by the load. Calculate the flexure stress.
3. Next apply an additional axial tension force to the stick of approximately 10 lb (pull on it) and note the change in deflection. Calculate the additional axial stress.
4. Make a sketch showing the addition of the stress profiles of flexure + tension.
5. Now apply (or try) an axial compression load of approximately 10 lb to the stick and again note the change in deflection. Again calculate the axial stress.
6. Make a sketch showing the addition of the stress profiles of flexure + compression.
7. What additional load and stress is being neglected in the case of compression + flexure?

$$M = \frac{PL}{4} \qquad f_b = \frac{M}{S_y} \qquad f_t = \frac{P}{A} \qquad f_c = \frac{P}{A} \qquad f_{comb} = \pm\frac{M}{S_y} \pm \frac{P}{A}$$

Due
during recitation

Structures II   Name 1 _____   Name 2 _____

Arch 324   Name 3 _____