

Elasticity

Description

This project uses Hooke's Law to find the elastic modulus of a material.

Goals

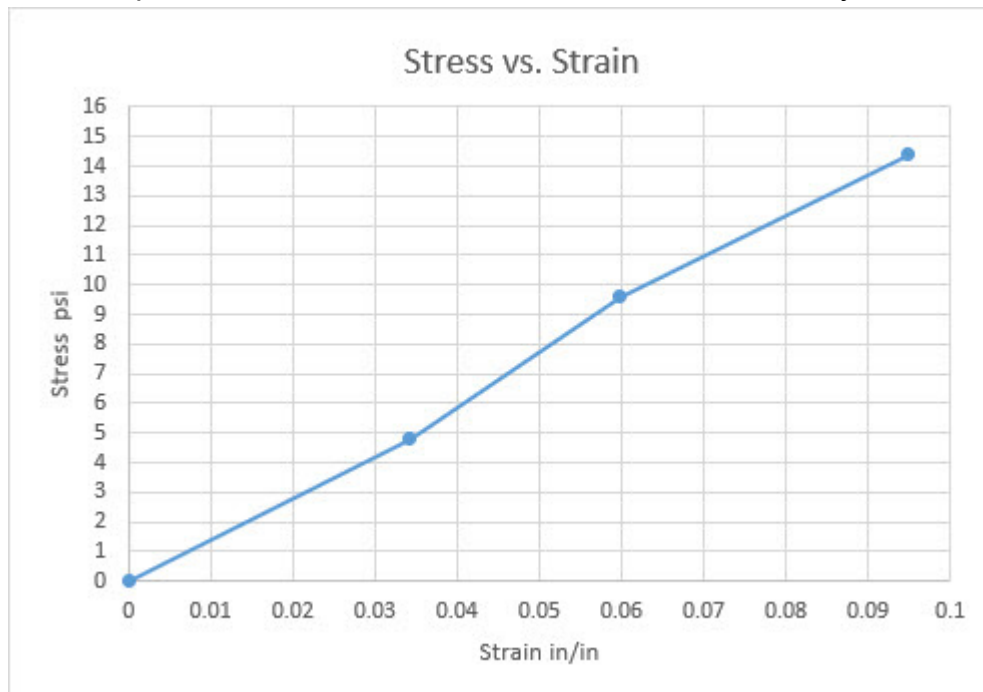
To observe elastic behavior of a material.

To calculate stress and strain from a physical test.

To produce a stress vs. strain graph and calculate the E modulus.

Procedure

1. Pin the large graph paper to the wall.
2. Put a clip on each end of the rubber cord hanging it so that the top clip is at the top of the graph paper. Adjust the bottom clip to the edge of a large, dark square. The larger squares are each $\frac{1}{2}$ inch.
3. Measure the length of the cord between the ends by counting the squares.
4. Hang one weight from the cord.
5. Measure the deformation of the cord (the amount it stretches). Each small square is 0.1 inch.
6. Next hang two weights on the chord and measure the total deformation.
7. Finally hang three weights on the chord and measure the total deformation again.
8. Calculate the stress ($f=P/A$) and strain ($\varepsilon=D/L$). The area of the $\frac{1}{8}$ "x $\frac{1}{16}$ " cord is 0.007813 in^2 and each washer weighs $\frac{1}{2}$ oz. = 0.03125 lbs.
9. Plot the stress vs. strain.
10. Find the slope of the line to determine the modulus of elasticity, $E = f/\varepsilon$.



Due

During recitation