

EFFECT OF TEMPERATURE

$$\epsilon_T = \frac{\Delta L}{L} = \alpha \Delta T$$

This is the strain that results from a change in temperature. α is the temperature coefficient of the material.

AXIAL FORMULA

$$\Delta L = \frac{PL}{AE}$$

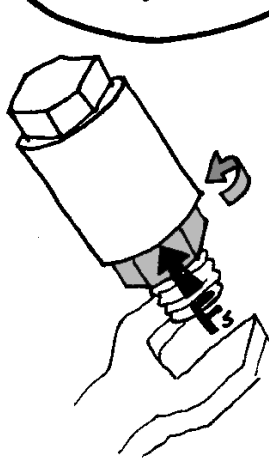
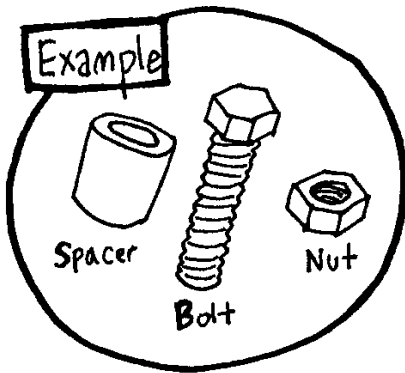
Use this to see how much a material shortens or lengthens from an applied load, P . A is the cross sectional area, E is the Young's modulus, and L is the original length.



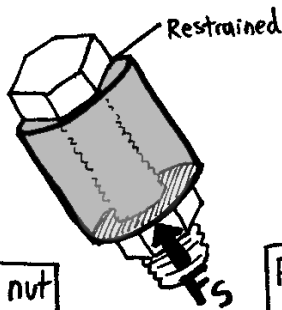
Vector, what's my α ? I wonder how much my head will shrink!



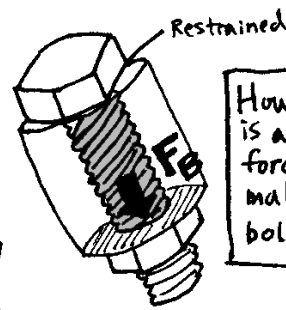
Maybe I should go take you to see one instead!



Turning nut results in force F_s



F_s compresses spacer ΔL_s



However, there is a reactive force, F_b , that makes the bolt lengthen!

$$F_s = F_b$$

$$\Delta L = \frac{PL}{EA}$$

$$\Delta L_{SPACER} = \frac{F_s L_s}{E_s A_s}$$

$$\Delta L_{BOLT} = \frac{F_b L_b}{E_b A_b}$$