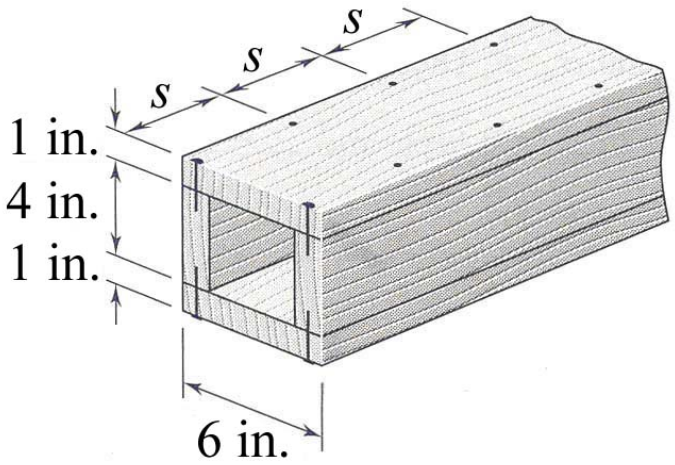
MEEG 3013 Quiz #6

A box beam is made of two 1 × 6-in. and two 1 × 4-in. planks nailed together as shown. The beam is subjected to a vertical shear V = 500 lb. Knowing that the allowable shearing force in each nail is 180 lb, determine (*a*) the largest permissible spacing s of the nails, (*b*) the corresponding maximum shearing stress τ_m in the beam.



$$2(180) = \frac{500[1(6)(2.5)]s}{\frac{1}{12}(6^4 - 4^4)}$$

$$s = 4.16 \text{ in.} \quad ⑤$$

$$\tau_m = \frac{500[3(6)(1.5) - 2(4)(1)]}{\frac{1}{12}(6^4 - 4^4)(1+1)} = 54.8077$$

$$\tau_m = 54.8 \text{ psi} \quad ⑤$$