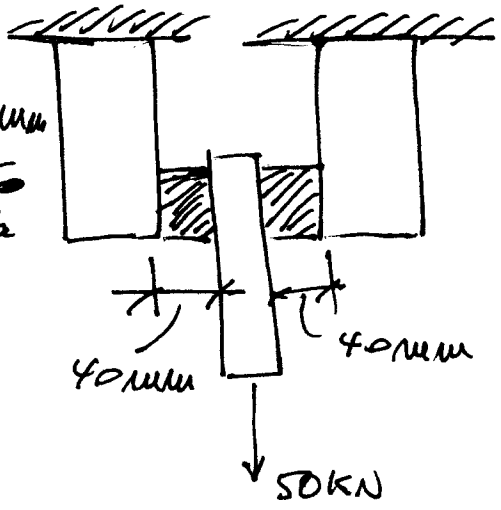
3-29



Given

Size of PAD $30 \times 20 \times 40$ mm

G = Modulus of Rigidity = 0.2 GPa

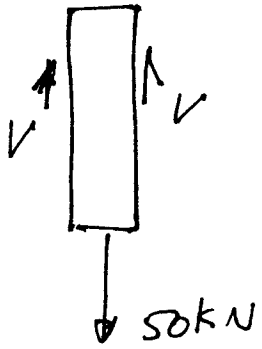
Determine:

The vertical movement of the 50 kN Load

$\Sigma F_y = 0$

$2V - 50 = 0$

$V = 25$ kN



$$\tau = \frac{25 \times 10^3 \text{ N}}{20 \times 30 \times 10^{-6}}$$

$$= 0.04167 \times 10^9 \text{ N/m}^2 \text{ OR } 0.04167 \text{ GPa}$$

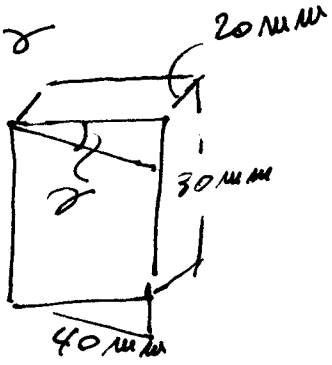
but (γ ← shear strain)

$\tau = G\gamma$

(G ← modulus of Rigidity)

$\therefore 0.04167 \text{ GPa} = 0.2 \text{ GPa} \cdot \gamma$

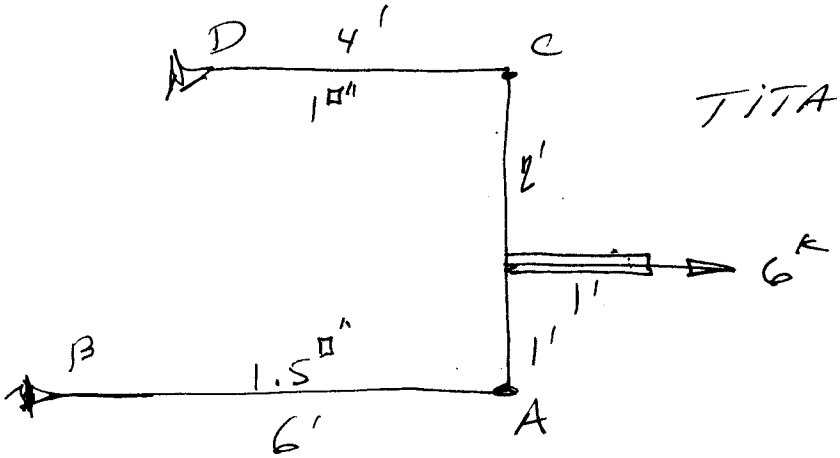
$\therefore \gamma = .20833$ Rad.



$\therefore \Delta = 40\text{mm} \times .20833$

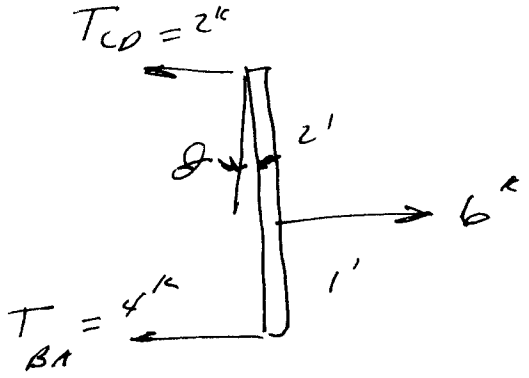
$\Delta = 8.33$ mm

4-12



TITANIUM
Ti-6Al-4V
SEE PROP. in back of Book

determine the angle of TILT of BAR AC



$$(T_{CD})(3) - 6\times 1 = 0$$

$$T_{CD} = 2^k$$

$$T_{BA} = 4^k$$

$$\therefore \quad \delta_{CD} = \frac{T_{CD}\cdot L_{CD}}{A_{CD}E_{CD}} = \frac{(2)(4\times 12)}{(1)(17.4\times 10^3)} = .00552''$$ (units)

$$\delta_{AB} = \frac{T_{AB}\cdot L_{AB}}{A_{AB}E_{AB}} = \frac{4\times 6\times 12}{1.5\times 17.4\times 10^3} = 0.01103'$$

$$\tan\theta = \frac{\delta_{AB}-\delta_{CD}}{(3\times 12)} = \frac{.01103 - 0.00552}{36} = 0.00291$$

$$\theta = 0.0088^\circ$$