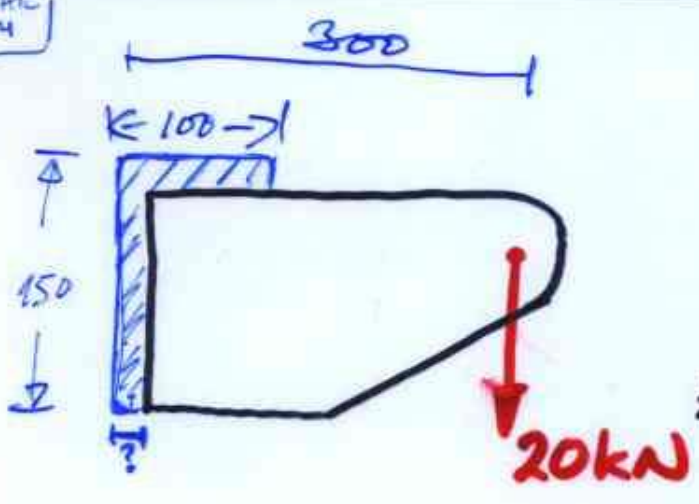


26-MAR-2024

PREVIOUS DAY

1



$$S_y = 345 \text{ MPa}$$

$$F.S. = 2.5$$

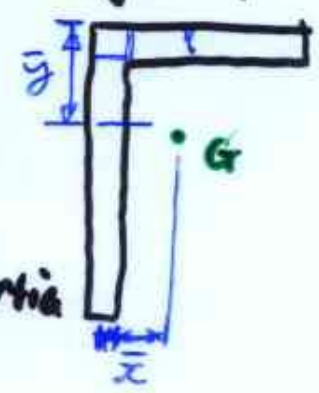
\* specify weld \*

### SOLUTION SEQUENCE:

① find centroid of weld group

$$\bar{x} = \frac{\sum A_i x_i}{\sum A_i}$$

$$\bar{y} = \frac{\sum A_i y_i}{\sum A_i}$$



② find POLAR MOMENT of INERTIA about G: J

$$J = I_x + I_y \quad (I_x = \int y^2 dA)$$

③ EXPRESS LOAD AS A FORCE + TORQUE at G. i.e. 20 kN &  $(20)(300 - \bar{x})$  Nm

④ CALCULATE STRESSES @ EXTREME PLS.

$$\tau = \frac{T r}{J} \quad \text{but: } \tau_x = \frac{T r_y}{J} \quad \tau_y = \frac{T r_x}{J} \quad \left. \begin{array}{l} \text{TORQUE} \\ \text{DIRECT} \end{array} \right\}$$

$$\tau = \frac{V}{A} \quad \dots \quad \text{HERE } \tau = \frac{20 \text{ kN}}{(250 \text{ mm})(t)}$$

⑤ FIND LARGEST RESULTANT SHEAR:  $\frac{692}{t}$

FAIL CRITERION (SHEAR ... DIST. EN.)

$$\frac{692}{t} = \frac{(0.58)(S_y)}{(F.S.)} \quad \text{etc.,}$$