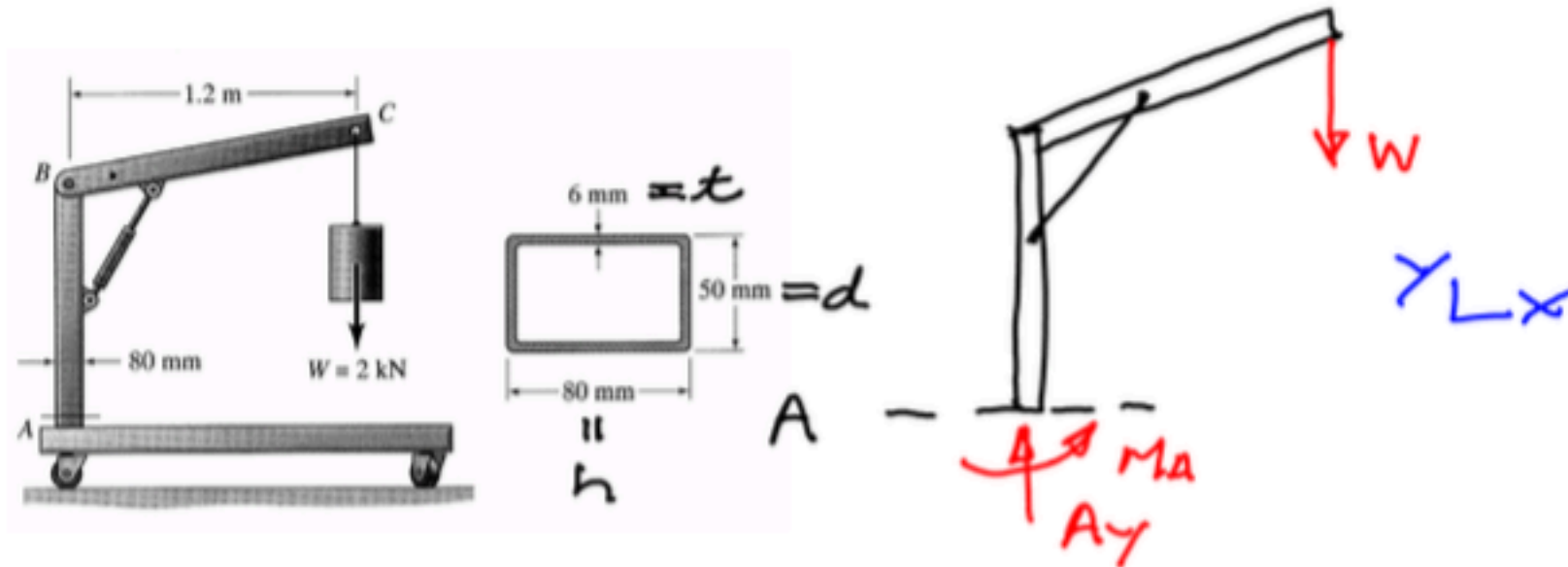A floor crane is used to pick up loads and allow them to be moved easily to other locations. The vertical column AB is made of steel rectangular tubing whose dimensions are shown below. Determine the maximum tensile stress and maximum compressive stress on the base cross section at A when the boom BC is in the position shown.

Equilibrium

$$\sum M_A = M_A - 1.2W = 0 \Rightarrow M_A = 1.2\,W$$

$$\sum F_y = A_y - W = 0 \Rightarrow A_y = W$$

Stress distribution

$$\sigma_a = \frac{A_y}{A} - \frac{M_A h/2}{I}$$

$$\sigma_b = \frac{A_y}{A} + \frac{M_A h/2}{I}$$

w/ $A = hd - (h-t)(d-t)$

$$I = \frac{1}{12}dh^3 - \frac{1}{12}(d-t)(h-t)^3$$