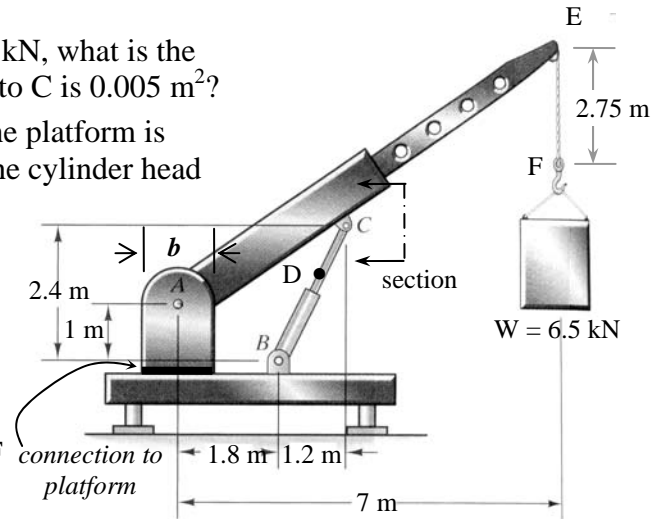


ENDS 231: Practice Quiz 7

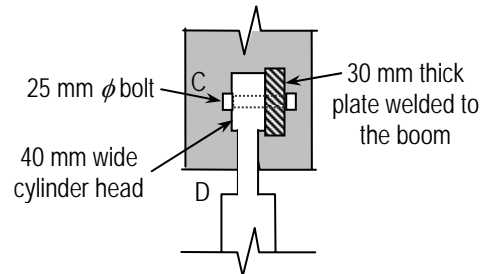
Clearly show your work and answer.

A boom with a self weight of 2000 kN supports a weight of 6.5 kN suspended from a cable at F.

- a) If the cylinder BC has a compressive force of 30.3 kN, what is the normal stress at D if the cross section area from D to C is 0.005 m^2 ?
- b) What is the bearing stress on the platform at B if the platform is 2.5 m wide and 4.5 m long and the base plate for the cylinder head is 0.1 m by 0.145 m and B_y is 27.1 kN?
- c) What is the bearing stress on the 40 mm wide cylinder head at C if the bolt hole is 27 mm ϕ ?
- d) What is the shear stress in the 25 mm diameter pin at C when the cylinder bar is 40 mm wide and the plate thickness is 30 mm (see figure)?
- e) What is the elongation in the 2.75 m-long cable EF if $A = 75 \times 10^{-6} \text{ m}^2$ and $E = 60 \times 10^6 \text{ kN/m}^2$?
- f) What final temperature would cable EF have to see such that the total length change from weight and temperature would be 3.4 mm when the initial temperature is 10° C and $\alpha = 8.2 \times 10^{-6}/^\circ\text{C}$?
- g) [some short question from the text material]



Detail of Connection at C



Answers:

- a) $f_c = 6060 \text{ kPa}$
- b) $f_p = 1870 \text{ kPa}$
- c) $f_p = 28.1 \text{ MPa}$
- d) $f_v = 61.7 \text{ MPa}$
- e) $\delta_p = 0.00397 \text{ m}$
- f) $T_{\text{final}} = -15.3^\circ\text{C}$

Disclaimer: Answers have NOT been painstakingly researched.