Ans:5

Given $W = 30\ kN$

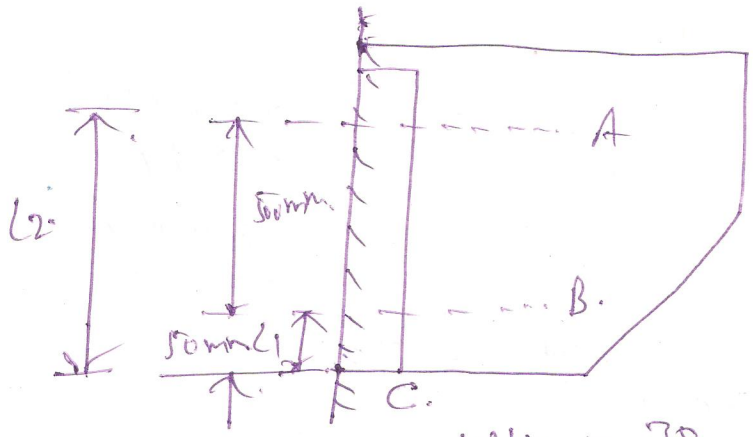
$= 30 \times 10^3\ N = 30{,}000\ N$

$L = 500\ mm.$

$L_1 = 500\ mm,\ L_2 = 550\ mm.$

$\sigma_t = 35\ N/mm^2,\ n = 4.$

We know that direct shear load on each bolt.



$W_s = W/n = \frac{30}{4} = 7.5\ kN.$

We know that max^m. Tensile load carried by bolt 1 & 4.

$W_t = \frac{3.L_2}{2[(L_1)^2+(L_2)^2]} = \frac{30 \times 500 \times 550}{2[(50)^2+(550)^2]} = 13.52\ kN.$

Since the bolt are subjected to shear load as well as Tensile load.

$W_{t_b} = 1/2\left[W_t + \sqrt{(W_t)^2+4(W_s)^2}\right] = \frac{1}{2}\left[13.52 + \sqrt{(13.52)^2+4(7.5)^2}\right]$

$= 16.9756\ kN.$

Size of bolt = Let d_c = core dia of bolt.

$16.976 = \frac{\pi}{4}(d_c)^2 6t = \pi/4\,(d_c)^2 35$

$= 27.47\,(d_c)^2$

$(d_c)^2 = 16.976 / 27.47$ or 3.

$d_c = 24.71\ mm.$

from table in Pcg. DDO page 5.4r

core dia. is 25.706 mm.

We know that the bending tensile stress (σ_t).

$35\ N/mm^2 = \frac{15 \times 10^6 \times 6}{t b^2} \Rightarrow t b^2 = 2571 \times 10^3$ or

$t = 2571 \times 10^3 / b^2.$ ~~or t=0~~.

Assume depth of bracket $b = 250\ mm.$

$t = 2571 \times 10^3 / (28)^2 = 41\ mm.$ Ans