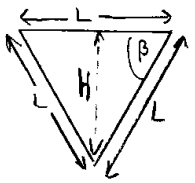
Pauta Auxiliar #3
C131A - Mecánica de Fluidos

P1] Peso cuerpo:

$$\vec{W} = \gamma_c \cdot (2\,b\,e\,L + 2\cdot \frac{H\cdot L}{2}\cdot e)$$

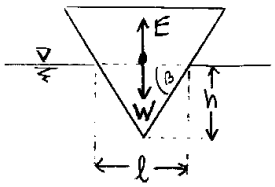
$$\vec{W} = \gamma_c\,(2\,b\,e\,L + L^2 \operatorname{sen}\beta \cdot e)$$

$$\vec{W} = 63{,}89\ [\vec{N}]$$



$$\operatorname{sen}\beta = \frac{H}{L} \Rightarrow H = L\operatorname{sen}\beta$$
$$H = 17{,}3\ [cm]$$

a) Estado de equilibrio inicial



Peso = Empuje $(\sum F = 0)$

$E = \gamma \cdot \forall_d$ $\quad \forall_d$: volumen de líquido desplazado

$$\forall_d = \frac{\ell\cdot h}{2}\cdot(b+2e) \qquad \operatorname{sen}\beta = \frac{h}{\ell} \Rightarrow \ell = \frac{h}{\operatorname{sen}\beta}$$

$$\forall_d = \frac{h^2\cdot(b+2e)}{2\operatorname{sen}\beta}$$

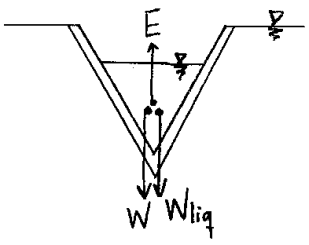
$$E = W \Rightarrow W = \frac{\gamma h^2 (b+2e)}{2\operatorname{sen}\beta} \Rightarrow h = \sqrt{\frac{2W\operatorname{sen}\beta}{\gamma(b+2e)}}$$

$$\Rightarrow h = 10{,}5\ [cm]$$

b) Momento en que el cuerpo se hunde:

Volumen desplazado $= \dfrac{H^2(b+2e)}{2\operatorname{sen}\beta}$

Empuje $= \gamma\cdot\forall_d = \dfrac{\gamma H^2(b+2e)}{2\operatorname{sen}\beta}$



$\sum F = 0 \Rightarrow E = W + W_{liq}$

$W_{liq} = E - W = 109{,}24\ [\vec{N}]$

pero $W_{liq} = \gamma\cdot\forall_{liq}$

$\Rightarrow \forall_{liq} = 0{,}01115\ [m^3] = 11{,}15\ [lt]$

$Q = \dfrac{\forall_{liq}}{t^*} \Rightarrow t^* = \dfrac{\forall_{liq}}{Q} = 5{,}57\ [min]$

t^*: tiempo que demora en salir un volumen $\forall_{liq}$ por la llave.

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