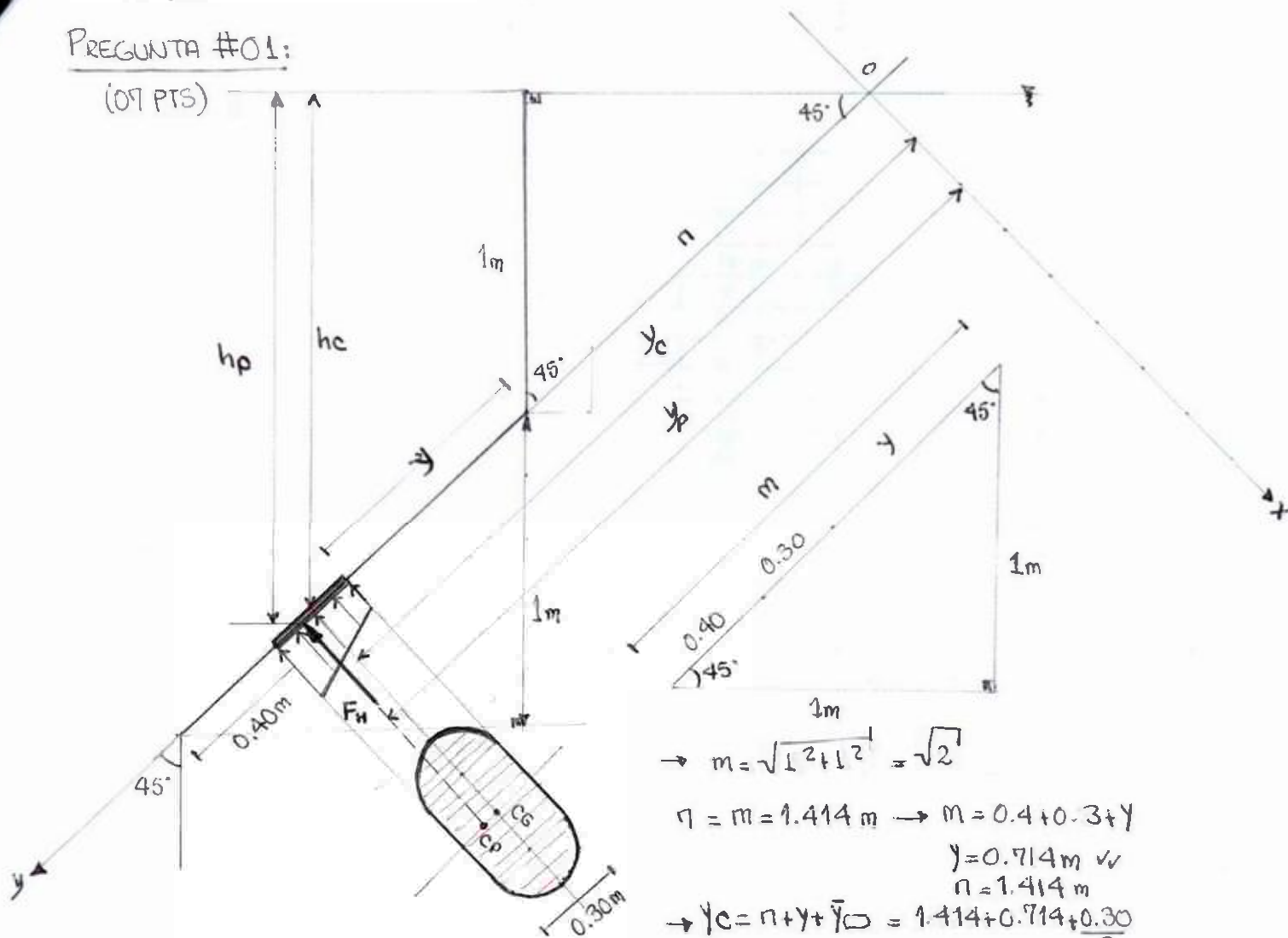


SOLUCIONARIO: GRUPO (C)

PREGUNTA #01:

(07 PTS)



$$\rightarrow m = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$$\eta = m = 1.414 \text{ m} \rightarrow m = 0.4 + 0.3 + \gamma$$

$$\gamma = 0.714 \text{ m} \checkmark$$

$$\eta = 1.414 \text{ m}$$

$$\rightarrow \gamma_c = \eta + \gamma + \frac{0.30}{2}$$

$$\gamma_c = 2.278 \text{ m} \checkmark$$

$$\sin 45^\circ = \frac{\gamma_c}{hc} \rightarrow hc = \frac{\gamma_c}{\sin 45^\circ} = \frac{2.278}{\frac{\sqrt{2}}{2}} = \frac{2 \times 2.278}{\sqrt{2}}$$

$$hc = 3.22$$

$$hc = \gamma_c \times \sin 45^\circ = 2.278 \times \frac{\sqrt{2}}{2} \rightarrow hc = 1.611 \text{ m} \checkmark$$

$$h_{pc} = 1.613 \text{ m} \checkmark$$

$$A_m = \square + \bigcirc = (0.30 \times 0.30) + (\pi \times r^2) \rightarrow A_m = 0.161 \text{ m}^2 \checkmark$$

$$\rightarrow F_H = \gamma'_{H_2O} \times h_{pc} \times A_m = 9810 \times 1.613 \times 0.161$$

$$F_H = 2547.59 \text{ N} \checkmark \checkmark$$

$$\rightarrow I_{xx} = 0.000675 + 0.000398$$

$$I_{xx} = 0.001073$$

$$\rightarrow \gamma_p = \gamma_c + \frac{I_{xx}}{\gamma_c \times A_m}$$

$$\rightarrow \gamma_p = 2.278 + \frac{0.001073}{2.278 \times 0.161}$$

$$\gamma_p = 2.281 \text{ m} \checkmark \checkmark$$

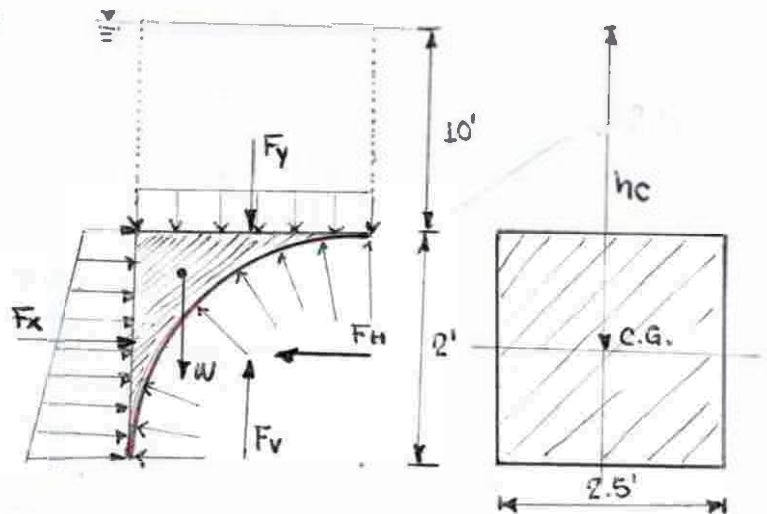
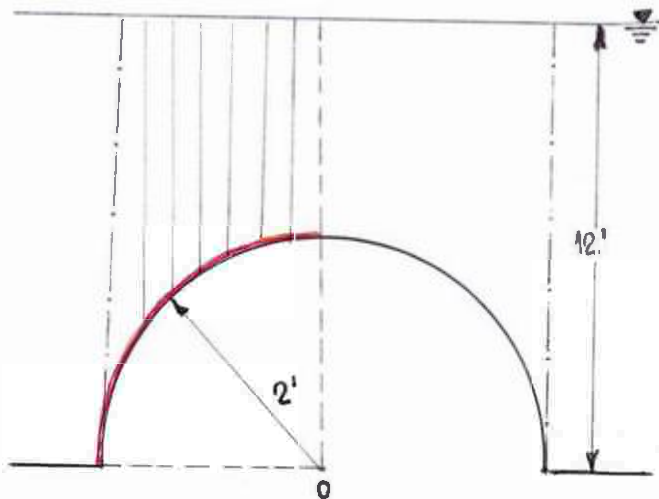
donde: $I_{xx} = [I_{xx\Box} + A_{\Box} d_{\Box}^2] + [I_{xx\bigcirc} + A_{\bigcirc} d_{\bigcirc}^2]$

$$I_{xx\Box} = \frac{b \times h^3}{12} = \frac{0.30 \times (0.30)^3}{12} = 0.000675 \text{ m}^4$$

$$I_{xx\bigcirc} = \frac{\pi r^4}{4} = \frac{\pi \times (0.15)^4}{4} = 0.000398 \text{ m}^4$$

PREGUNTA #02:
(07 PTS)

D.C.L. (TOMAMOS LA MITAD)



$$\rightarrow \Sigma F_x = 0$$

$$F_x - F_H = 0$$

$$F_H = F_x$$

$$F_H = \gamma \times hc \times A_m$$

$$= 62.4 \frac{\text{lb-f}}{\text{pie}^3} \times 11' \times (2.5' \times 2')$$

$$F_H = 3,432 \text{ lb-f} \checkmark$$

$$\downarrow \Sigma F_y = 0$$

$$F_y + W - F_v = 0$$

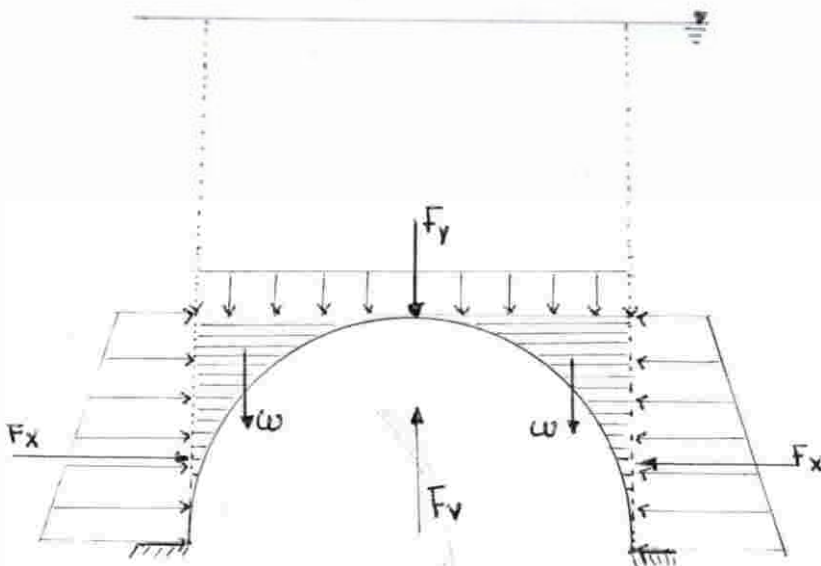
$$F_v = F_y + W$$

$$F_v = [(40' \times 8') \times (2.00' \times 2.50')] + (8' \times 2.00' \times 2.00' \times 25 - \frac{8' \times \pi \times R^2 \times 2.5}{4})$$

$$F_v = [3120 + (624 - 490.088)]$$

$$F_v = 3253.912 \text{ lb-f} \checkmark$$

⇒ SI ANALIZAMOS HACIENDO EL D.C.L. DE TODA LA ESTRUCTURA CURVA SE CONCLUYE QUE LA FUERZA TOTAL QUE SOPORTA LA ESTRUCTURA CURVA ES LA FUERZA VERTICAL.



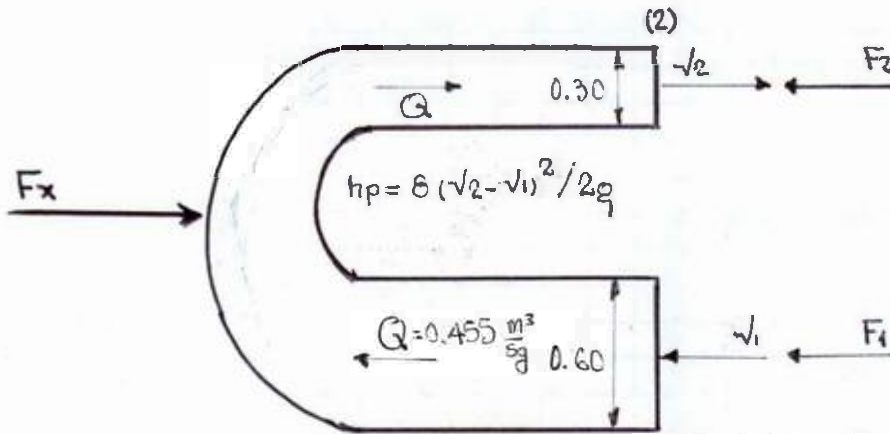
• LAS FUERZAS EN X SE EQUILIBRAN ENTONCES LA RESULTANTE SE HACE CERO ACTUAN LAS FUERZAS EN X, PERO PARA LA RESULTANTE SE HACEN CERO.

• LAS FUERZAS EN Y SE DUPLICARIA POR LO TANTO QUEDARIA

$$\Rightarrow F_v = 2 \times 3253.912 \text{ lb-f}$$

$$F_v = 6507.824 \text{ lb-f} \checkmark$$

PREGUNTA #03:
(06 PTS)



(1) $P_1 = 1.52 \text{ kg/cm}^2 \times \frac{100 \times 100 \text{ cm}^2}{1 \text{ m}^2}$

$P_1 = 15.200 \frac{\text{kg}}{\text{m}^2} \times 9.81 \frac{\text{m}}{\text{s}^2}$

$P_1 = 149.112 \frac{\text{N}}{\text{m}^2} \checkmark$

- POR CONTINUIDAD HALLAMOS v_1 Y v_2

$Q = A_1 \times v_1 = A_2 \times v_2$

$\rightarrow v_1 = \frac{0.455}{\left(\frac{\pi \times 0.6^2}{4}\right)} \rightarrow v_1 = 1.609 \frac{\text{m}}{\text{s}} \checkmark$

$\rightarrow v_2 = \frac{0.455}{\left(\frac{\pi \times 0.3^2}{4}\right)} \rightarrow v_2 = 6.437 \frac{\text{m}}{\text{s}} \checkmark$

- HALLAMOS LAS F_1 Y F_2

$\rightarrow F_1 = P_1 \times A_1 = 149.112 \times \left(\frac{\pi \times 0.6^2}{4}\right)$

$F_1 = 42.160.425 \text{ N} \checkmark$

$\rightarrow F_2 = P_2 \times A_2 = 110372.31 \times \left(\frac{\pi \times 0.3^2}{4}\right)$

$F_2 = 7810.759 \text{ N} \checkmark$

- ECUACION DE LA ENERGIA PARA HALLAR LA PRESION EN 2

$\cancel{z_1} + \frac{P_1}{\gamma} + \frac{v_1^2}{2g} - h_p = \cancel{z_2} + \frac{P_2}{\gamma} + \frac{v_2^2}{2g}$

$\frac{P_1}{\gamma} + \frac{v_1^2}{2g} - h_p = \frac{P_2}{\gamma} + \frac{v_2^2}{2g}$

$\frac{P_2}{\gamma} = \frac{P_1}{\gamma} + \frac{v_1^2}{2g} - \frac{v_2^2}{2g} - \left[\frac{8(v_2 - v_1)^2}{2g} \right]$

REEMPLAZANDO VALORES

$\frac{P_2}{\gamma} = \frac{149112}{9810} + \frac{(1.609)^2}{2 \times 9.81} - \frac{(6.437)^2}{2 \times 9.81} - \frac{8 \times (6.437 - 1.609)^2}{2 \times 9.81}$

$\frac{P_2}{\gamma} = 15.2 + 0.132 - 2.112 - 1.969$

$P_2 = 110372.31 \frac{\text{N}}{\text{m}^2} \checkmark$

- ECUACION CANTIDAD DE MOVIMIENTO

$\Sigma F_x = C_{M \text{ SALIDA}} - C_{M \text{ INGRESO}}$

$-F_1 - F_2 + F_x = \rho Q v_2 + \rho Q v_1$

$F_x = \rho Q (v_2 + v_1) + F_1 + F_2$

REEMPLAZANDO VALORES

$F_x = 1000 \times 0.455 \times (6.437 + 1.609) + 42160.425 + 7810.759$

$F_x = 53632.114 \text{ N} \checkmark$

$F_x = 5467.086 \text{ kg} \checkmark$