Top figure labels: BULONES, P, 0,25.P, MÉNSULA, COLUMNA, A, z, x, BULONES, 1000 mm, COLUMNA, P, CHAPA, 0,25.P, A, z, y, 300 mm, 300 mm, COLUMNA, MÉNSULA, CHAPA

$$R_x = 0 \; ; \qquad M_x = 0$$
$$R_y = -0{,}25 \cdot 20t = 5t \qquad M_y = 20\,tm$$
$$R_z = -20\,t \qquad M_z = -5\,tm$$

Diagram labels: b_1, b_2, z, $20\,tm$, y, $5\,tm$, b_3, b_4

Para M_y =

$b_1 = b_2$
M_y
$b_3 = b_4$

$$b_1 = b_2 = (20\,tm \,/\, 0{,}3m) \times 0{,}5$$
$$b_3 = b_4 = (-20\,tm \,/\, 0{,}3m) \times 0{,}5$$

Para M_z :

$b_1 = b_3$
M_z
$b_2 = b_4$

$$b_1 = b_3 = -(5\,tm \,/\, 0{,}3m) \times 0{,}5$$
$$b_2 = b_4 = (5\,tm \,/\, 0{,}3m) \times 0{,}5$$

$$b_1 = 33{,}33t - 8{,}33t$$
$$b_2 = 33{,}33t + 8{,}33t$$
$$b_3 = -33{,}33t - 8{,}33t$$
$$b_4 = -33{,}33t + 8{,}33t$$

[ACCIONES]
$$b_1 = 25\,t$$
$$b_2 = 41{,}66\,t$$
$$b_3 = -41{,}66\,t$$
$$b_4 = -25\,t$$

[REACCIONES]
$$b_1 = -25\,t$$
$$b_2 = -41{,}66\,t$$
$$b_3 = 41{,}66\,t$$
$$b_4 = 25\,t$$

COLUMNA   MÉNSULA
CHAPA   BULONES

$1900 \ kg/m^3 = 1.9 \ t/m^3$

$K'_A \cdot \gamma \cdot H = 0.35 \cdot 1.9 \ t/m^3 \cdot 4m = 2.66 \ t/m^2$

MURO

TENSOR
(ANCLAJE)

$35°$

$1,5m$

$2,5m$

$1m$

$2m$

$1m$

① ARCILLAS COMPACTAS

$0.25 H$

$0.5 H$

$0.25 H$

$K'_A \gamma H$

$1,5m$

$2,5m$

T.sin(35°)

$1m$

$2m$

$1m$

A
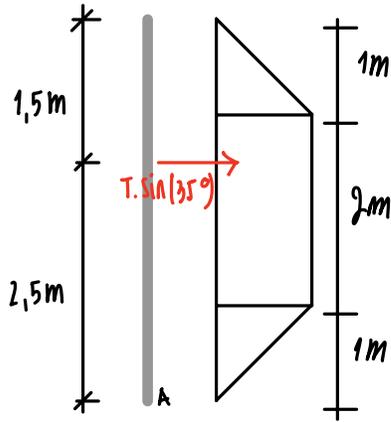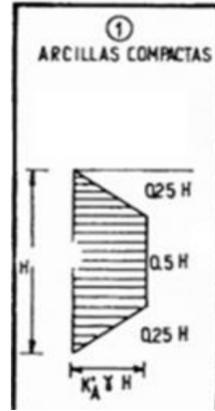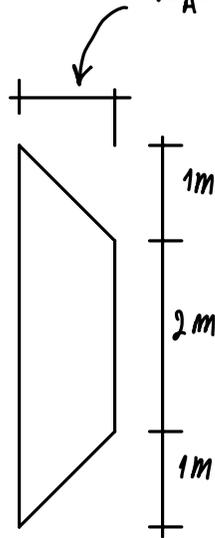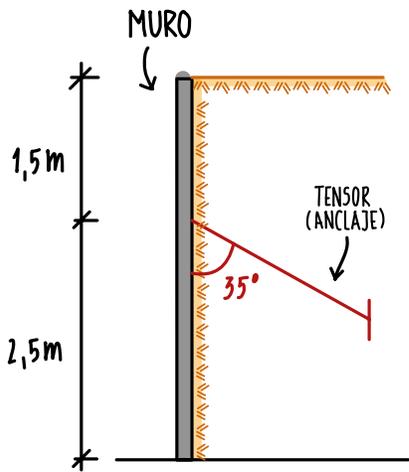
$R_1 = (2.66 \ t/m \cdot 1m) \cdot 0.5 \cdot 1m = 1.33 \ t$

$R_2 = (2.66 \ t/m \cdot 2m) \cdot 1m = 5.32 \ t$

$R_3 = (2.66 \ t/m \cdot 1m) \cdot 0.5 \cdot 1m = 1.33 \ t$

$\Sigma M^A = -2.5m \ T \cdot \sin(35°) + \frac{2}{3} 1m \cdot R_3 + \left(1m + \frac{2m}{2}\right) \cdot R_2 + \left(3m + \frac{1}{3}m\right) \cdot R_1$

$= -2.5m \ T \cdot 0.57 + \frac{2}{3}m \cdot 1.33 \ t + 2m \cdot 5.32 \ t + \frac{10}{3}m \cdot 1.33 \ t = 0$

$= -1.43 \ m \ T + 0.8867 \ tm + 10.64 \ tm + 4.43 \ tm = 0$

$= \boxed{T = \dfrac{15.96 \ tm}{1.43 \ m} = 11.1608 \ t}$

Diagram 1 (top):

1m | 3m | 2m

2m

2m

b_1 | b_2 | b_3

3m

OBRA DE ARTE

10 Kg

20 Kg

$q = 2\,Kg/m$

Diagram 2 (middle):

1m | 3m | 2m

V_2 | H_2 | b_3

A_{13}

2m

V_1 | H_1

b_1 | b_2

2m

A_{12} | b_3

10 Kg

OBRA DE ARTE

3m

20 Kg

$q = 2\,Kg/m$

$R = 2\,Kg/m . 5m$

Calculations:
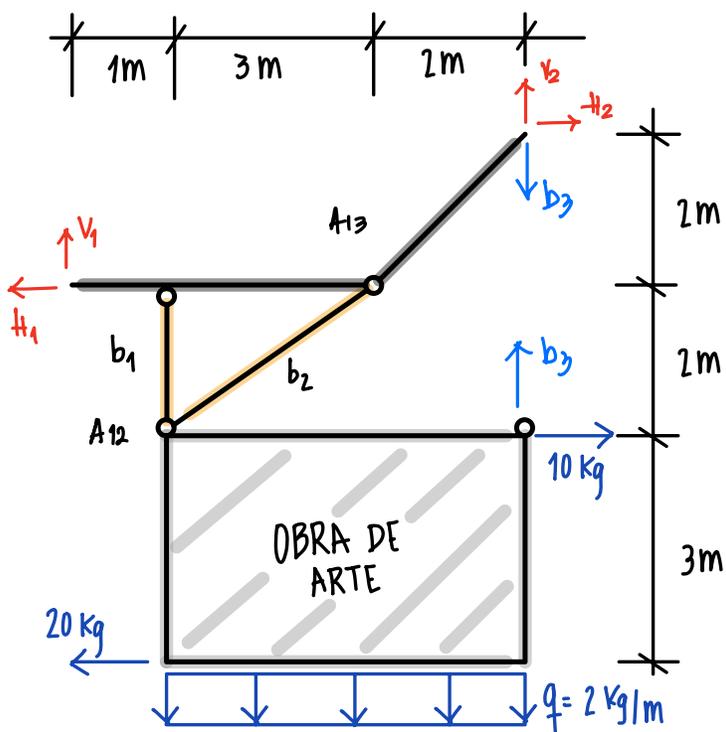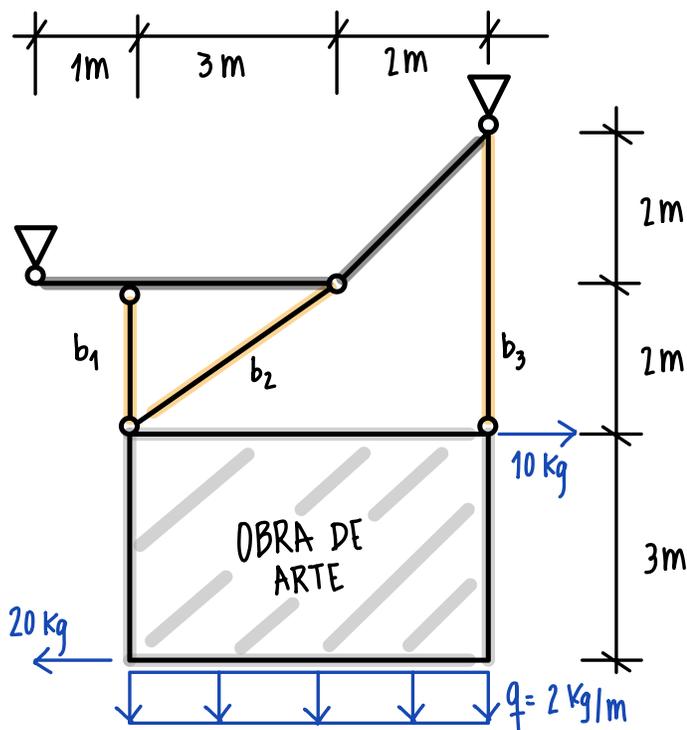
1) $\sum M^{A12}_{OARTE} = 5m \cdot b_3 - 3m \cdot 20kg - 2kg/m \cdot 5m \cdot 2,5m = 0$

$= 5m \cdot b_3 - 60kgm - 25kgm = 0 \rightarrow \boxed{b_3 = \dfrac{85\,kgm}{5m} = 17\,kg}$

2) $\sum M^{A13}_{[S_1][OA]} = -4m\,V_1 + 2m\,b_3 + 2m \cdot 10kg -$

$- 20kg \times 5m + 2kg/m \cdot 5m \cdot 0,5m = 0$

$\rightarrow -4m\,V_1 + 2m \cdot 17\,kg + 20kgm - 100kgm + 5kgm = 0$

$-4m\,V_1 + 34\,kgm + 20\,kgm - 100\,kgm + 5\,kgm = 0$

$V_1 = \dfrac{34\,kgm + 20\,kgm + 5\,kgm - 100\,kgm}{4m}$

$\boxed{V_1 = -10,25\,kg}$

3) $\sum F_V = V_1 + V_2 - R = 0 \rightarrow -10,25\,kg + V_2 - 2\,Kg/m \cdot 5m = 0 \rightarrow \boxed{V_2 = 20,25\,kg}$

4) $\sum M^{A13}_{[S_1]} = -2m\,b_3 - 2m\,H_2 + 2m\,V_2 = 0$

$= -2m\,17\,kg - 2m\,H_2 + 2m \cdot 20,25 = 0$

$$= -34 \text{ kgm} + 40{,}5 \text{ kgm} = 2\text{u} \, H_2 \rightarrow \boxed{H_2 = 3{,}25 \text{ kg}}$$

5) $\sum f_H = 0 = -20 \text{ kg} + 10 \text{ kg} - H_1 + H_2 = 0$

$$= -20 \text{ kg} + 10 \text{ kg} - H_1 + 3{,}25 \text{ kg} = 0$$

$$H_1 = -20 \text{kg} + 10 \text{kg} + 3{,}25 \text{ kg} = 0 \rightarrow \boxed{H_1 = -6{,}75 \text{ kg}}$$

$$\cos \alpha = 3/\sqrt{13}$$
$$\sin \alpha = 2/\sqrt{13}$$
$$\sqrt{13} = 3{,}61$$
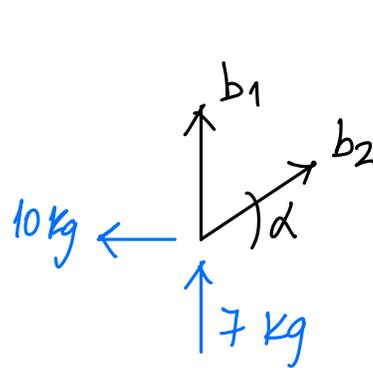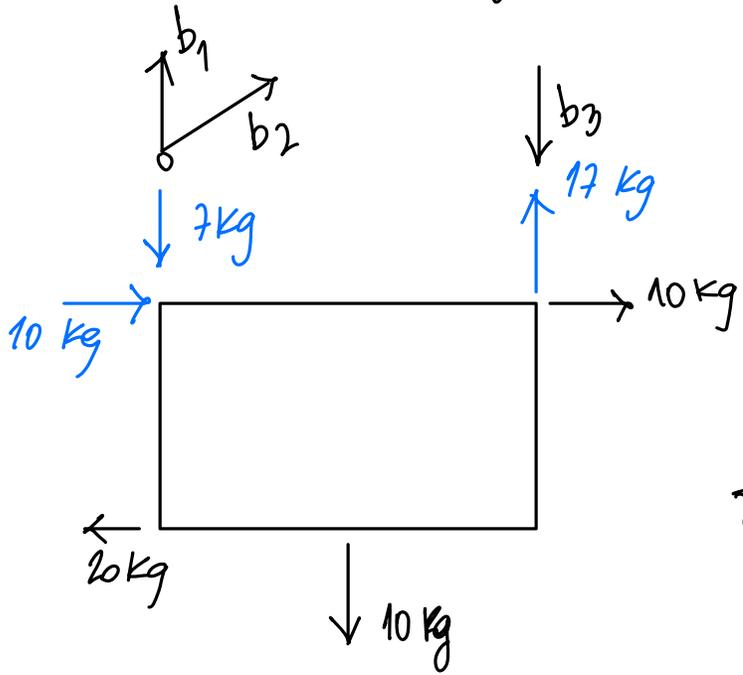
$$\sum f_H = -10 \text{ kg} + b_2 \cdot \cos(\alpha) = 0$$

$$-10 \text{kg} + b_2 \cdot 3/\sqrt{13} = 0$$

$$b_2 = \frac{10 \text{ kg}}{0{,}83} \Rightarrow \boxed{b_2 = 12{,}048}$$

$$\sum f_y = b_1 + 7 \text{kg} + b_2 \cdot \sin(\alpha) = 0$$

$$= b_1 + 7 \text{kg} + 12{,}048 \cdot \frac{2}{\sqrt{13}} = 0$$

$$= b_1 + 7 \text{kg} + 12{,}048 \cdot 0{,}554 = 0$$

$$= b_1 + 7 \text{kg} + 6{,}67 \text{ kg} = 0$$

$$\rightarrow \boxed{b_1 = -13{,}67 \text{ kg}}$$