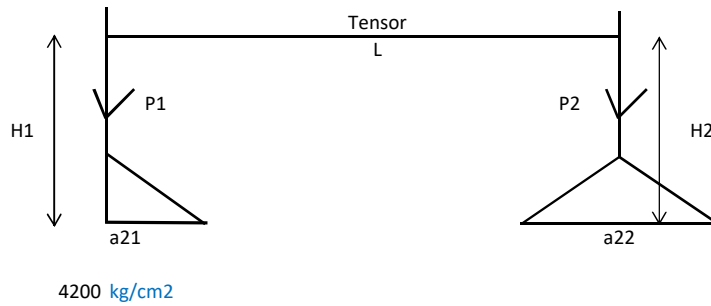


## DATOS

P1	100.0 t
P2	200.0 t
H1	2.50 m
H2	2.50 m
L	6.00 m
sigma	3.0 kg/cm <sup>2</sup>
mu	0.5
h30	300 kg/cm <sup>2</sup>
acero	42000 t/m <sup>2</sup>
E acero	2100000 kg/cm <sup>2</sup>
	21000000 t/m <sup>2</sup>



## 0. COLUMNAS

## TRONCO

d1=	0.30 m	area col1	900 cm <sup>2</sup>	rec	0.05	b1=	0.35 m
d2=	0.30 m					b2=	0.33 m

## 1. BASE EXCENTRICA - AREA NECESARIA

$$\text{Area nec} = 1.1 \cdot N / \sigma$$

$$\text{Area nec} = 3.67 \text{ m}^2$$

$$\text{predim a1} = 2.71 \text{ m}$$

$$\text{predim a2} = 1.35 \text{ m}$$

$$\text{a1} = 2.70 \text{ m}$$

$$\text{a2} = 1.40 \text{ m}$$

1.36

$$\text{area B} = 3.78 \text{ m}^2$$

$$\text{area B} = a1 \cdot a2$$

$$\text{relacion a1/a2} = 1.9$$

## 2. EXCENTRICIDAD y TENSOR

$$e = (a2 - d2) / 2$$

$$e = 0.55 \text{ m}$$

$$T = (N \cdot e) / H$$

$$T_s = 22.0 \text{ t}$$

$$T_u = 28.6 \text{ t}$$

$$\text{verifico: } e \leq H/4$$

$$H/4 = 0.63 \text{ m}$$

VERIFICA

## 3. VERIFICACIONES y RECOMENDACIONES

$$\text{Carga: } N_s \leq 120 \text{ t} \quad \text{OK}$$

$$\text{Prof: } H \geq 1.5 \text{ m} \quad \text{OK}$$

$$\text{excent max: } e \leq H/4 \quad \text{OK}$$

verifico:

$$\text{deslizam: } \mu \cdot N_s \geq v \cdot T_s$$

$$\mu \cdot N_s > v \cdot T_s$$

$$40 > 33.0 \quad \text{t}$$

VERIFICA

$$\mu = 0.4 \quad \text{tg}(3/4\phi)$$

$$v = 1.5$$

#### 4. PARAMETROS GEOMETRICOS

recubrim>= 5 cm

D= max(D1,D2)                      D1= (a1-b1)/3  
D= 0.78 m                            D2= (a2-b3)/1.5  
b3= d2+((H-D)\*e/H)  
b3= 0.68 m  
b3.adopt 0.70 m  
D.adop= 0.80 m

h= D-rec  
h= 0.75 m

z= 0.2\*D (min 20cm)  
z= 0.16 m  
z.adop= 0.20 m

#### 5. FACTORIZACION

p=L 0.25 q                            U1= 1.4D  
g=D 0.75 q                            U2= 1.2D+1.6L  
q=g+p P

p1= 25.0 t                            NU1= 105.0 t  
g1= 75.0 t                            NU2= 130.0 t

#### 6. ARMADURAS BASE

##### Tension efectiva de trabajo BASE

$\sigma_{0.serv} = N_{ser}/(a1*a2)$   
 $\sigma_{0.serv} = 26.5 \text{ t/m}^2$                       2.65 kg/cm<sup>2</sup>      verifica

$\sigma_{0.ult} = NU/(a1*a2)$   
 $\sigma_{0.ult} = 34.4 \text{ t/m}^2$                       3.44 kg/cm<sup>2</sup>

##### Momentos

$M_{lr1} = \left(\frac{a_1-b_1}{2}\right)^2 \times \frac{q_1}{2} \times a_2$   
Mlr1= 33.2 tm

$M_{lr2} = \left(\frac{a_2-b_2}{2}\right)^2 \times 2 \times q_2 \times a_1$   
Mlr2= 22.8 tm

##### Armaduras base

$\phi = 0.9$

As1= 1.2\*Mlr1/(0.8\*h\* $\phi$ \*Fy)  
As1= 17.6 cm<sup>2</sup>  
As1/m= Fe1/a2  
As1/m= 12.6 cm<sup>2</sup>/m  
se adopta As1                       $\phi b = 16$  mm  
cant 9  
sep 14 cm

As2= 1.2\*Mlr2/(0.8\*h\* $\phi$ \*Fy)  
As2= 12.0 cm<sup>2</sup>  
As2/m= Fe2/a1  
As2/m= 4.5 cm<sup>2</sup>/m  
se adopta As2                       $\phi b = 10$  mm  
cant 16  
sep 16 cm

## 7. TENSOR

$\phi = 0.9$

$A_s.T = 1.2 * T_u / (\phi / F_y)$

$A_s.T = 9.1 \text{ cm}^2$

$\phi b = 16$

cant 5

cant adop 6

adop 12.06  $\text{cm}^2$

verifico: 
$$\Delta l = \frac{T_s L}{E_s A s_{adop}} \leq \frac{H'}{1000}$$

def max 0.65 cm (suponiendo altura de entrepiso superior de 4.0m)

def tensor 0.52 cm

verifica

## 8. CALCULO TRONCO / FUSTE

$e.tr = (b3 - d2) / 2$

$e.tr = 0.20 \text{ m}$

$MU.tr = NU * e.tr$

$MU.tr = 26.0 \text{ tm}$

$NU.tr = 130.0 \text{ t}$

con estos valores -> diagramas de interaccion (H1)

## 9. ESQUEMA ARMADO

