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MATERIA: Análisis de estructuras

ACTIVIDAD: Ejercicios

PASIÓN POR EDUCAR

CUATRIMESTRE: 5

GRUPO: LAR04EMC0121-A

LUGAR Y FECHA: Comitán de Domínguez Chiapas, a; 19 de febrero de 2023

Análisis de Estructuras

08 de febrero de 2022.

Diseño a momento

- $f'c = 200 \text{ kg/cm}^2$
- $f_r = 4200 \text{ kg/cm}^2$
- $f'c = 160 \text{ kg/cm}^2$
- $f'c = 136 \text{ kg/cm}^2$
- $P_{min} = 0.00235$
- $P_{max} = 0.01143$

$$M_u = M(F_0) \quad | \quad \text{kg} \cdot \text{cm}$$

↓
1.2

$$11150.88$$

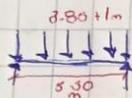
$$1,206,15341.4$$

$$q^2 = - \frac{M_u}{F_r \cdot b \cdot d^2 \cdot f'c} (2) + 1 \quad \rightarrow \quad q = \sqrt{- \frac{M_u}{F_r \cdot b \cdot d^2 \cdot f'c} (2) + 1}$$

$$0.7692924227607$$

$$P = \frac{(q + 1) \cdot f'c}{F_r} \quad \rightarrow \quad \begin{matrix} > P_{min} \\ < P_{max} \end{matrix}$$

1000 · 100 · Resultado



① momento

$$\frac{1}{8} (3.85 \text{ t/m}) (5.50^2)$$

$$\frac{471,508}{800} \text{ MN} \quad \text{②}$$

$$74.56 \cdot 1.2^3 = 1,747,200 \text{ kg/cm}$$

Momento = 74.56 t/m \rightarrow 1.2 exp 5

$b = 20 \text{ cm}$

$h = 45 \text{ cm}$

$r = 4 \text{ cm}$

$a = (h - r) = 41 \text{ cm}$

$$\text{③} \quad \sqrt{- \frac{1,747,200 \text{ kg/cm}}{0.9 \cdot 20 \cdot 41^2 \cdot 136 \text{ kg/cm}^2} (2) + 1} = 0.3884 = q$$

④

$$P = \frac{(-0.3884 + 1) (136 \text{ kg/cm}^2)}{4,200 \text{ kg/cm}}$$

$$h = \frac{L}{12} = \frac{5.50}{12} = 0.45 \text{ cm}$$

$P = 0.0981$

$$0.9949885109890$$

$1.20 \times 1.20 = 1.44$
 $1.20 \times 0.001 = 0.0012$

$V = 0.16 \text{ ton}$
 $V_{20} = 0.16$
 $V_{25} = 0.16 \text{ ton} (1.41) = 0.2256 \text{ ton}$

$$0.52040120797$$

$$\frac{1.44 \cdot 1.20}{1.20 + 20 \cdot 16 \cdot 136} (1.17) = 0.5704 = q$$

$$R = \frac{(-0.5704 + 1) \cdot 136}{4200 \text{ kg/m}} = 0.01374$$

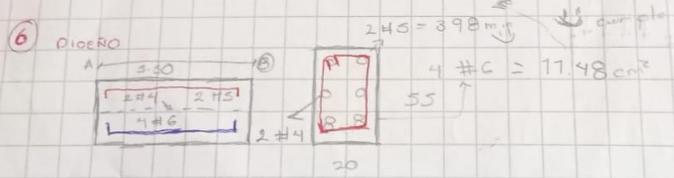
$$\sqrt{\frac{1.44 \cdot 1.20}{1.20 + 20 \cdot 16 \cdot 136} (2) + 1} = 0.6624$$

124.878
 150.060
 $0.226.974$

5) ΔS

$$\Delta S = f(b)(d)$$

$$\Delta S = 0.01063 (20 \text{ cm}) (51 \text{ cm}) = 10.84 \text{ cm}^2$$



$$6 \times 4 = 11.48 \text{ cm}^2$$

$$\Delta S_{min} = \rho_{min}(b)(d)$$

$$\Delta S_{min} = 2.397 \text{ cm}$$

$$\rho = \frac{\Delta S}{bd} = \frac{11.48}{20 \cdot 51} = 0.01125$$

$$2 \#6 = 3.98 > \text{min}$$

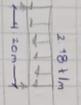
$5.77 =$
 6.135
 7.05

period
 $r = 3.00\% \text{ per year}$
 $F = 1,000,000 \text{ SEK}$
 $v = 3.00\%$
 $h = 1 \text{ year}$

$\frac{v^n}{1-v}$

$R_A = R_B = \frac{383 \times 550}{2} = 105825 \text{ SEK}$
 $V = 105825 \times 1.41 = 14981 \text{ SEK}$

$V_{EK} = 0.20 \times 0.80 \times 10 \times 51 \times (2.130(0.0125)^{1701}) = 524.3713$
 0.530102



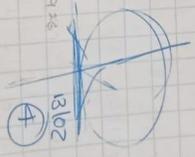
① Monoklo
 $\frac{1}{8} (2.1811m)(4.20) = 1.807 \text{ km}^2$

② MV
 $4.80 - 1.2^3 = 5.20 \text{ SEK}$

$h = \frac{4}{1.2} = 3.33 = 3.33$

③
 $\frac{570.84000}{69.80.539766} \cdot (2) \cdot 1.1 = 0.158$

④ $P = (0.20(8+1)) (136 \text{ kg/ha}) = 0.00948$
 4.200



⑤ AS

$A_0 = P(A) \cdot (h)$
 $A_0 = 0.00926(20)(8.1) = 5.1711$

⑥ 0.0560

$5.20 \cdot 2.86 = 14.872 = 5.94 = 0.00456$
 $5.93 = 1.91 = 5.94 = 0.00962$

$A_0 = 0.00235(20)(9.1) = 0.00235$
 $1.451(0.00235) = 0.00339$



$$Q = 1.4 \times 10^6 \text{ m}^3 \text{ (1760)} = 9.14 \times 10^6$$

$$Q = 1.4 \times 10^6 \text{ m}^3 \text{ (1760)} = 9.14 \times 10^6 \text{ kg/m}^3$$

$$V = 5.36 \text{ km}$$

$$VU = 4.11 \text{ km}$$

$$VU = 1.18 \text{ km (1741) - 9.14 \times 10^6}$$

$$\sqrt{V^2} = 0.12 \cdot T^2 \cdot b \cdot d \cdot (2.140) / \sqrt{r^2}$$

$$V = \frac{1}{2} \cdot 18(4.20) = 4.38$$

$$VU = \sqrt{411} = 4.578 \text{ (1741)} = 6.91$$

$$VQ = 0.7 \cdot 0.18 \cdot 20 = 1.31 \text{ (2.130 (1000000))} \sqrt{170} = 2.10195 \text{ km}$$

$$VCP = 1.5 \cdot 1.8 \cdot b \cdot d \cdot \sqrt{r^2}$$

$$1.5 = 0.8 + 20 \cdot 31 \sqrt{170} = 9.8991 \text{ km (1741)}$$

tsl. obos

Deponicion estremo

$$\frac{420}{1} = 105 \quad 0 = \frac{105}{0.15} = 7$$

tsl. obos

$$2.5 \text{ pizos (1041)} = 20 = 28.6 = 2.88 = 8 \text{ pizos}$$

$$107\% = 12$$

$\rho_{min} = 0.004$
 $\rho_{max} = 0.02$
 $f_c = 15 \text{ MPa}$
 $f_y = 235 \text{ MPa}$



$$M_u = \frac{C_u}{Z}$$

$$Q_u = R_u = \frac{8.8}{Z}$$

cálculo y diseño a flexión (1)
 revisión a craneo (2)

1 Momento

$$M = 1.42(1.8) = 2.41$$

2 MU

$$3.41 \cdot 1.2 = 409,200$$

3 Q_u

$$\frac{-409,200 \pm \sqrt{180^2 - 4(1)(-409,200)}}{2(1)} = 0.861$$

4

$$(-0.861 + 1)(156 \text{ kg/cm}^2) = 0.0045$$

5 AS

$$A_s = P(b) (d)$$

$$0.0045(20)(36) = 3.24$$

6 Diseño

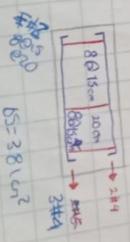
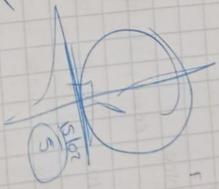
$$3.24 \cdot 162 = 524.88$$

$$\frac{524.88}{20} = 26.244$$

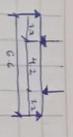
$$A_s = 0.0045(20)(36) = 3.24$$

$$0.8616 = 1.44 = 1.54$$

DATOS:
 $f_c = 250 \text{ kg/cm}^2$
 $f_y = 160 \text{ kg/cm}^2$
 $\rho_{min} = 0.002$
 $\rho_{max} = 0.02$
 $b = 90 \text{ cm}$
 $h = 10 \text{ cm}$
 $d = 8 \text{ cm}$
 $e = 1.8$
 $h = \frac{1}{11} = 1.8$



$D_{min} = 200 \text{ kg/cm}^2$
 $F_c = 41,900 \text{ kg/cm}^2$
 $V = 2,5 \text{ cm}$
 $H = 75 \text{ cm}$



$M \leq F_c A_c$
 $R_A = R_B = F$

1 Momento
 $M = 1.00 (1.20) = 1.98 \text{ t.m}$

2 Mu
 $M_u = 1.98 \text{ t.m} (1.25^2) = 2.87,600 \text{ kg.cm}$

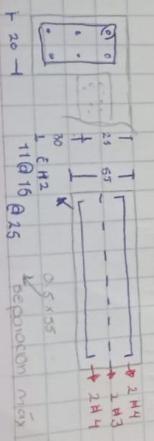
3 h = $\frac{0.8}{12} = 0.45$
 Vers $\rho = 0.00235$

4 $\rho = \frac{2.87,600}{240 \cdot 20 \cdot 57^2 \cdot 136} (2) (1) = 0.962$

5 $\rho = 1.0 \cdot 9.82 \cdot 11 (136) = 0.00120$ No sigue ρ_{min}
 $4,200$
 En caso de que el ρ sea menor que el establecido se tomará 0.00135
 dato

6 AS
 $A_s = 0.00235 (20) (57) = 2.893 \text{ cm}$

7 Doseño
 $\frac{2.893}{2} = 1.4465 \text{ cm} = 1.45 \text{ cm} = 1.45 \text{ cm} = 1.45 \text{ cm}$



Dato:
 $F_c = 200 \text{ kg/cm}^2$
 $F_y = 41,900 \text{ kg/cm}^2$

$b = 40 \text{ cm}$
 $h = 75 \text{ cm}$
 $d = 57 \text{ cm}$

$M = 1.98 \text{ t.m}$
 $V =$
 $\rho = 0.00235$

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$$m(160) = 9.44 \text{ m}^2$$
$$= 44.4 \text{ kcal/m}^2$$

$$V = 5.36 \text{ ton}$$
$$VU = V(F)$$
$$Nu = 9.16 \text{ ton (1.4)} = 8.06 \text{ ton}$$

$$VGR = 0.10 \cdot 0.8 \cdot 20 \cdot 51 (1.2 + 30 (0.00235) \sqrt{10}) = 2.01$$
$$511.2 \times 0.2305 \times 13.03$$

$$b = 25.9$$
$$m = 0.00$$