



ALUMNO(A): GRISEYDA JOACHIN VELAZQUEZ

DOCENTE: ARQ. PEDRO ALBERTO GARCIA LOPEZ

MATERIA: ANALISIS DE ESTRUCTURAS

ACTIVIDAD: ACTIVIDADES

CUATRIMESTRE: 5° CUATRIMESTRE

GRUPO: A

LUGAR Y FECHA: 18/02/2023

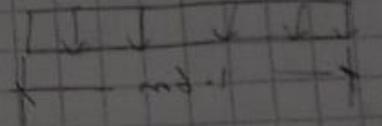
Comitán de Domínguez Chiapas 2023

Revision II continue

Table de données
de calcul de
la section de
acier

acier	
-------	--

$$NCR = 0.70 \times 0.9 (0.5 + 0.5) \times 1.0$$

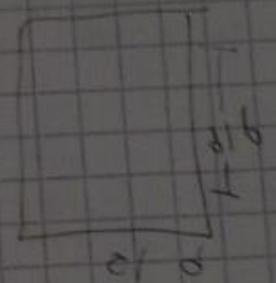


Datés

- $f_c = 300 \text{ MPa}$
- $f_y = 460 \text{ MPa}$
- $b = 12 \text{ cm}$
- $h = 30 \text{ cm}$
- $v = 4 \text{ cm}$
- $a = 1.5 \text{ cm}$

$$RA = 0.9 \times 0.9 \times 1.0 \times 1.0 = 0.81$$

$$N = \frac{0.70 \times 0.9}{1.0} = 0.63$$



- $NCR = 0.70 \times 0.9 = 0.63$
- $NCR = 0.63$
- $NCR = 0.63$

$$NCR = 0.63 \times 0.9 = 0.567$$

$$A_s = \frac{NCR}{f_y} = \frac{0.567}{460} = 0.00123$$

$$10000 \times 0.00123 = 12.3 \text{ cm}^2$$

$$NCR = 0.70 \times 0.9 \times 1.0 \times 1.0 = 0.63$$

$$A_s = \frac{NCR}{f_y} = \frac{0.63}{460} = 0.00137$$

Constantes

$$F^1 C = 200 \text{ kg/cent}^2$$

$$F^2 C = 0.8 F^1 C \rightarrow 0.8 \cdot 200 \text{ kg/cent}^2 = 160 \text{ kg/cent}^2$$

$$F^3 C = 0.8 F^2 C = 0.8 \cdot 160 \text{ kg/cent}^2 = 128 \text{ kg/cent}^2$$

$$P_{máx} = \frac{0.7 F^3 C}{F_1} \rightarrow \frac{0.7 \cdot 128 \text{ kg/cent}^2}{4200 \text{ kg/cent}} = 0.00215$$

$$P_{máx} = 0.73 \text{ ch} \rightarrow 0.73 (0.6 \text{ ch}^2) = 0.0143$$

$$P_b = \frac{F^3 C}{F_1} = \frac{4800}{4200} \rightarrow \frac{128 \text{ kg/cent}^2}{4200 \text{ kg/cent}} \cdot \frac{4800}{128 \text{ kg/cent}^2} = 0.002$$

$$F^1 C = 250 \text{ kg/cent}^2$$

$$F^2 C = 0.8 F^1 C \rightarrow 0.8 \cdot 250 \text{ kg/cent}^2 = 200 \text{ kg/cent}^2$$

$$F^3 C = 0.8 F^2 C = 0.8 \cdot 200 \text{ kg/cent}^2 = 160 \text{ kg/cent}^2$$

$$P_{máx} = \frac{0.7 F^3 C}{F_1} = \frac{0.7 \cdot 160 \text{ kg/cent}^2}{4200 \text{ kg/cent}} = 0.00265$$

$$P_{máx} = 0.73 \text{ ch}$$

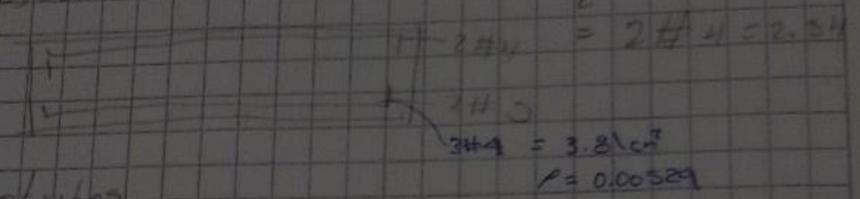
$$P_b = \frac{F^3 C}{F_1} = \frac{4800}{4200} = \frac{200 \text{ kg/cent}^2}{4200 \text{ kg/cent}} \cdot \frac{4800}{200 \text{ kg/cent}^2} = 0.001954$$

$$P_{máx} = 0.73 P_b (0.001954) = 0.00143$$

Diseno

$$\frac{2 \cdot 2 \cdot 1}{2} = 1.62 \quad 2 \# 3 = 1.99 \times 2 = 3.98$$

$$\frac{3.98}{(20)(36)} = 0.0055 \quad A_s = 0.00235(20)(36) = 1.602 = 0.846$$



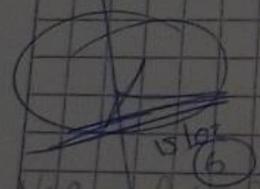
Columnas

$$\text{Sep. columnas} = \frac{4.80}{4} = 1.2 = 5 = \frac{1.2}{0.75} = 8$$

① Sep. min = $0.5(40) = 0.2 = 20 \text{ cm}$

② $1.04 = 27 + 10\%$

$$\frac{29.7}{1.12} = 26.52 = 27 \text{ cm}$$



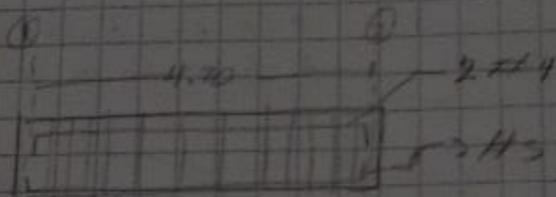
$$NCR = \frac{W_u}{\phi R_n} = \frac{3(1.47)}{2.13} = 2.13$$

$$= 0.70 + 0.90 = 20 \cdot 36 = 1.7 \cdot 30(0.0047)$$

$$\sqrt{170} = 1.706$$

③ $1.5(0.80) \times 20 \times 36 \sqrt{170} = 9.58$

$$\begin{aligned}
 VCR &= 1.5 \cdot f_v \cdot h \cdot d \cdot P_{AC} \\
 &= 1.5 \cdot 0.8 \cdot 20 \cdot 31 \cdot 13.0^2 \\
 &= 4.694 \cdot 32 = 9.644 \text{ for } 2 \sqrt{V_{0.5}}
 \end{aligned}$$



$$\begin{aligned}
 \text{CS}^2 @ 15 \\
 \text{CS} @ 20
 \end{aligned}$$

$$\begin{aligned}
 \text{CS} @ 15 \\
 \text{CS} @ 20
 \end{aligned}$$

S cells

$$S_{max} = 0$$

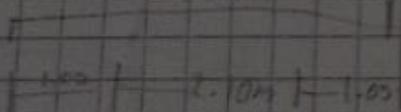
$$= \frac{4.70m \cdot 1.05m}{4}$$

$$0.5(0.35) = 0.175m$$

$$= 20$$

$$= \frac{1.05}{0.15} = 7$$

$$4.20$$



$$25,920 (1.04) = 26$$

$$\begin{aligned}
 2 \cdot 10 \cdot 2 \cdot 20 &= 10.3 = 11 \\
 11 \cdot 3 + 7 &= 25,920
 \end{aligned}$$

$$\begin{aligned}
 10 \cdot 10 + 3 \cdot 10 \\
 2 \cdot 10 = 1.0 \cdot 1
 \end{aligned}$$

$$= 16 + 16 + 21 + 31 + 10 = 1.04m$$

$$25,920 (1.04) = 26$$

$$26 + 10 = 28.6$$

$$28.6 \cdot 12m$$

$$28.6 / 120 = 2.38$$

$$= 2.38$$

$$= 3 \text{ Pcs}$$

$$= 3 \text{ Pcs}$$

$$= 3 \text{ Pcs}$$

$$= 3 \text{ Pcs}$$

Diseño

$$A_s = 0.0041 (20)(31) = 2.53 \text{ cm}^2 \quad f = 0.00426$$

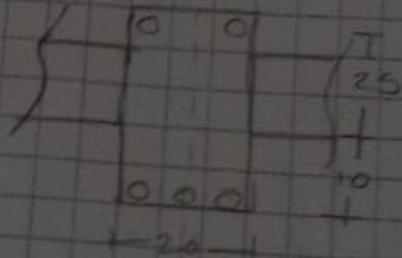
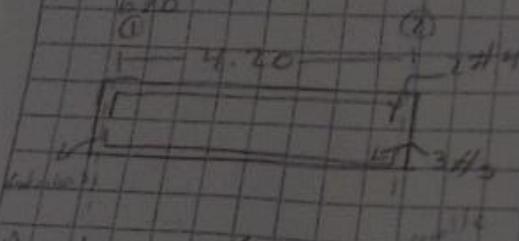
$$\frac{5.72 \text{ cm}^2}{2} = 2.86 \text{ cm}^2 \quad 2\#4 = 5.72 \text{ cm}^2$$

$$\frac{5.72 \text{ cm}^2}{3} = 1.91 \text{ cm}^2 \quad 3\#3 = 5.97 \text{ cm}^2$$

Comprobación de Tens

$$f = \frac{5.72}{(20)(31)} = 0.00926 \text{ cm}^2 \quad f = \frac{A_s}{(b)(d)}$$

$$\textcircled{1} \quad f = \frac{5.97}{(20)(31)} = 0.00962$$



$$A_s > A_s = f_{min}(b)d$$

$$f = 0.00230 (20)(31) = 1.457 \text{ cm}^2$$

$$\frac{1.457 \text{ cm}^2}{2} = 0.7285 = 2\#4 = 2.54 \text{ cm}^2$$

$$V_u = v(1.4) = 7.578 \text{ (1.4)} = 6.111 \text{ cm}$$

$$\textcircled{2} \quad V = \frac{w(L)}{2}$$

$$= \frac{2.18 \times 4.20}{2}$$

$$= 4.578 \text{ cm}$$

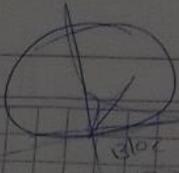
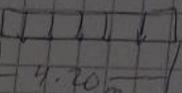
$$V_u < V_c = 0.7 \cdot (v_c \cdot b \cdot d) = (0.7)(30) \sqrt{f_c} \cdot 0.178$$

$$= 0.70 (0.8)(20)(31) (0.7)(30) (0.00426) \sqrt{170}$$

$$= 3.4720 (0.477) = 13.03$$

$$= 2, 157.45 \text{ kg} = 2.15745 \text{ Ton} < V_u \quad \text{O.K. control}$$

2.18 Hm



$\gamma = 4200 \text{ kg/cm}^3$
 $E_c = 200 \text{ kg/cm}^2$
 $\rho_{cc} = 160 \text{ kg/cm}^3$
 $\rho_{cc} = 136 \text{ kg/cm}^3$
 $f_{mc} = 0.00335$
 $f_{cc} = 0.001493$

Momento M (2.18 Hm) (4.20m)
 $M = 4.80 \text{ Hm}^2$

$M_{u,c} = M(E_s) \gamma$
 $M_{u,c} = 4.80 \times 1.2^3$

$I_{cc} = 1000 \text{ kg}$
 $M_{u,c} = 4.80 \times 1.2^3 = 576,840.00$

$h = \frac{M}{I} = \frac{4.80}{1000} = 0.35 \text{ m}$

$0 = 20 \text{ cm}$
 $h = 35 \text{ cm}$
 $x = 46 \text{ cm}$
 $d = h - x = 11 \text{ cm}$

$q = \frac{-576,840 \text{ kg/cm}^2}{0.4 \times 20 \times 31 \times 136 \text{ kg/cm}^3}$

$q = 0.7138$

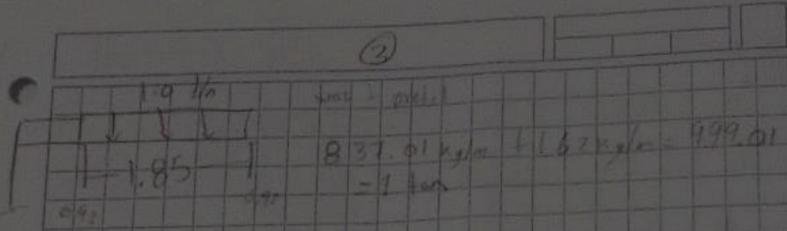
$f = \frac{E_c q (1 + \mu)}{f} = \frac{(0.7138 + 1)(136 \text{ kg/cm}^3)}{4200 \text{ kg/cm}^3}$

$f = 0.00926$

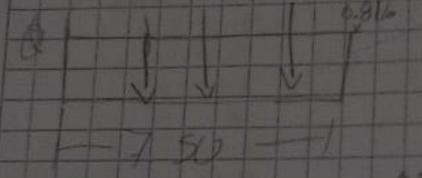
$H_3 = f (b) (d)$

$H_3 = 0.00926 (40 \text{ cm}) (31 \text{ cm}) = 5.741 \text{ cm}$





$\frac{1.85 \text{ kN/m} \times 7.50 \text{ m}}{2} = 6.84 \text{ kN}$
 $\frac{1.85 \text{ kN/m} \times 7.50 \text{ m}}{2} = 6.84 \text{ kN}$



$1.85 \text{ kN/m} \times 7.50 \text{ m} = 13.875 \text{ kN}$
 $13.875 \text{ kN} - 6.84 \text{ kN} = 7.035 \text{ kN}$

$1.85 \text{ kN/m} \times 7.50 \text{ m} = 13.875 \text{ kN}$
 $13.875 \text{ kN} - 6.84 \text{ kN} = 7.035 \text{ kN}$

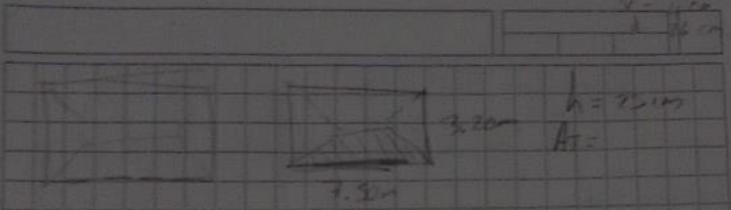
$\sum M = 1.85 \times 7.50 \times 3.75 - 1.85 \times 7.50 \times 3.75 + 1.85 \times 7.50 \times 3.75 = 0$

$-43.21 \text{ kNm} + B(7.50 \text{ m}) = 0$

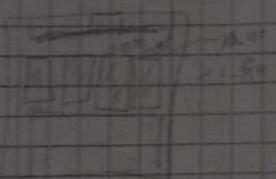
$B = \frac{43.21}{7.50}$
 $B = 5.76 \text{ ton}$



$b = 15 \text{ cm}$
 $r = 30 \text{ cm}$
 $x = 10 \text{ cm}$
 $d = 20 \text{ cm}$



$7.30 - 3.20 = 4.1$ $\text{D} = 7.50 - 3.20 = 4.30$



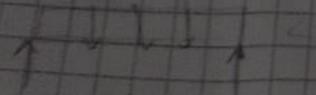
$A = \frac{7.30 + 3.20}{2} \times 2.50 = 9.44 \text{ m}^2$
 $A_{\text{tr}} = 9.44 \text{ m}^2 \times 635 \text{ kg/m}^3 = 5994.4 \text{ kg/m}^3$
 $w = \frac{5994.4}{7.50} = 799.25$

a) A_{total}

$w_{\text{tr}} = 9.44 \text{ m}^2 \times 635 \text{ kg/m}^3 = 6273.6 \text{ kg/m}^3$
 $w = \frac{6273.6 \text{ kg/m}^3}{7.50 \text{ m}} = 839.81 \text{ kg/m}$

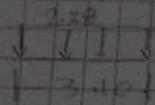
Praksi

$w_{\text{total}} = 0.60 \text{ m} \times 270 \text{ kg} = 162 \text{ kg/m}$



...
 ...

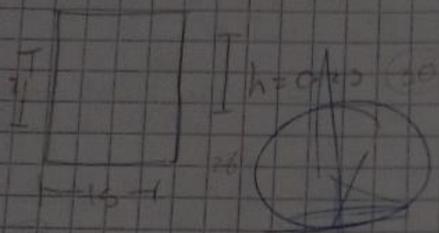
$VCR = 0.70 \sqrt{f_c} b d (0.2 + 30 \rho) \sqrt{f_c}$



$R_{eq} = R_{eq} \frac{2.28}{2} = 278 \text{ kg/cm} (3.10 \text{ m}) = 3834$

$\frac{3.10}{12} = 0.25$

- $f_c = 250 \text{ kg/cm}^2$
- $f_y = 4200 \text{ kg/cm}^2$
- $b = 15$
- $h = 0.30$
- $x = 4 \text{ cm}$
- $d = h - x = 21 \text{ cm}$
- $V_u = 4.9476$
- $A_s = 0.74 \text{ cm}^2$
- $\rho = 0.0120$
- $VCR = 1.71495 \text{ ton}$
- $S = 12.50$



(1)

$V_u = V(1.4) = 3.534(1.4) = 4.9476$

$A_s = \rho_{min}(h) d = 0.00235(15)(21 \text{ cm}) = 0.74$

$\rho = \frac{A_s}{b d} = \frac{0.74}{15(21)} = 0.0120$

$VCR = 0.70 \times 0.8 \times 15 \times 21 (0.2 + 30 \times 0.0120)$

$\sqrt{160} \text{ kg/cm}^2$
 $VCR = 1.71495 \text{ ton} < V_u < V_u$

$S = 0.30(h) = 0.30(25) = 12.50$

$VCR = 1.5(0.80)(15) \sqrt{160} \text{ kg/cm}^2 (26)$

$= 4.781.26 \text{ kg/cm} > V_u$

$A_s = 1.5(0.80)(15) \sqrt{160} \text{ kg/cm}^2 (26) = 2914.78$