394.524
13-11-40

Talleres Gomez Martorell

Calculo de las correcciones y modificaciones

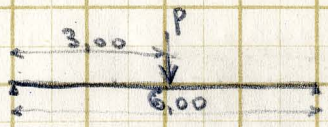
Nave de gran altura

Viga para apoyo del puente grúa de 10 Tons en el pórtico nº 3

2 ruedas a 3,00 mts, carga por rueda de 10,5 Tons. Peso propio = 600 Kg/m.

Calculamos los elementos estáticamente

V1 $l = 6{,}00$ — Peso propio 600 Kg/m. l.



$M_{f\,c} = 600 \times \frac{6{,}0^2}{8} + 10{,}5 \times \frac{6{,}0}{4} = 18.500$ mKgs

$T_{max.} = 10{,}5 \times 1{,}5 + 600 \times 3{,}0 = 17.550$ Kgs

$T_{min} = 600 \times 3{,}0 = 1.800$ Kgs.

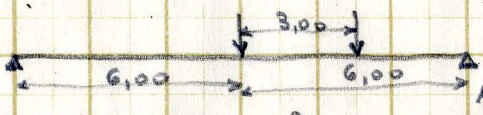
M1 $l = 3{,}00$

$M_{f\,a\,(max)} = 17.550 \times 3{,}0 + 600 \times \frac{3{,}0^2}{2} = 55.350$ mKgs

$M_{f\,a\,(min.)} = 1.800 \times 3{,}00 + 600 \times \frac{3{,}0^2}{2} = 8.100$ mKgs.

$T_{max} = 1.800 + 600 \times 3{,}0 + 10{,}5 \times 2 = 24.600$ Kgs.

V2 $l = 12{,}00$



$A = 5{,}25 + \frac{10{,}5 \times 9}{12} = 13{,}15$

$M_{f\,c\,(max.)} = 13{,}15 \times 6{,}0 - 10{,}5 \times 3{,}0 + 600 \times \frac{12{,}0^2}{8} = 58.200$ mKgs.

$M_{f\,c\,(min.)} = 600 \times \frac{12{,}0^2}{8} = 10.800$ mKgs

$T_{max} = 10{,}5 + 10{,}5 \times 0{,}75 + 600 \times 6{,}0 = 22.000$ Kgs

V3 $l = 6{,}00$ — Momentos hallados con el Anagud

$M_{f\,c\,(max)} = 1.350 + 10{,}5 \times 0{,}2 \times 6{,}0 = 13.950$ mKgs

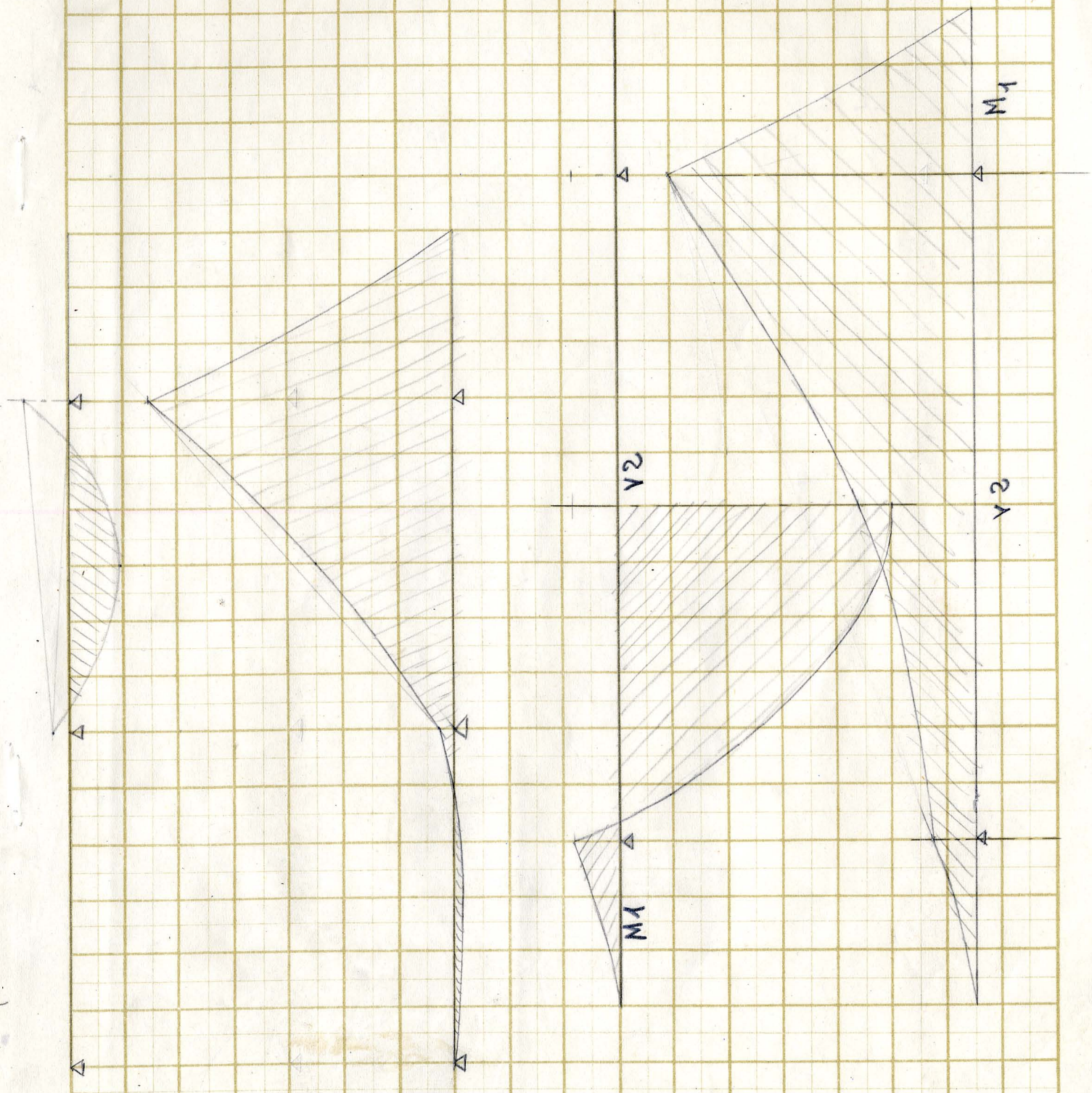
$M_{f\,c\,(min)} = 600 \times \frac{6{,}0^2}{16} = 1.350$ mKgs

$M_{f\,a\,(max)} = 2.700 + 10{,}5 \times 0{,}16 \times 6{,}0 = 13.800$ mKgs

$T_{max} = 17.550$

$M_{f\,a\,(min)} = 600 \times \frac{6{,}0^2}{8} = 2.700$ mKgs

con los momentos hallados dibujamos las hipótesis mas desfavorables



de donde sacamos los momentos maximos

V1 $M_c = 18.500$ mKgs d=120 b=30 t=16 =

$T = 14.550$ Kgs 1e8a6,5c

V2 $M_c = 50.000$ mKgs d=120 b=30 t=43 = 9φ25

M_c = (cara superior) = 21.000 mKgs t=4φ25

$T = 22.000$ Kgs 1e8a5,2c

M1 $M_a = 55.350$ mKgs d=120 b=30 t=48 = 10φ25

$T = 24.600$ Kgs. v=10 = 2φ25

H=65 1e8a4,7c

V3 $M_c = 13.950$ mKgs d=60 b=30 t=25 = 5φ25

M_c = (cara superior) = 25.000 mKgs t=47 = 9φ25

$M_a = 55.350$ mKgs (lado mesa) v=47 = 10φ25

$M_a = 13.800$ mKgs (lado viga) t=25 = 5φ25

$T = 14550$ Kgs. 2e8a10c

Viga para apoyo del puente guía
de 10 tons en el pórtico nº 2

Igual al pórtico nº 3 con una luz de 12,00 mts a continuación de las V3.

V4 $M_{w_c} = 10{,}5 \times 0{,}30 \times 12{,}0 + 6000 \times \frac{12{,}0^2}{14} = 44.000$ mKgs $\quad t = 38 =$

$M_{w_a} = 10{,}5 \times 0{,}08 \times 12{,}0 + 6000 \times \frac{12{,}0^2}{10} = 20.000$ mKgs. $\quad t = 17{,}2 =$

$T = 32.000$ Kgs $\quad 1\text{e}8\text{a}5{,}2_c$

$d = 120 \quad b = 30$

Viga para apoyo del puente grúa de 15 tons en la nave de gran altura

2 ruedas a 3,00 mts ; carga por rueda = 14,15 tons
Peso propio = 600 Kgs/m.l.

V5 $l = 6{,}00$

$M_{f_C} = 600 \times \frac{6{,}0^2}{8} + 14{,}15 \times \frac{6{,}0}{4} = 24.900$ mKgs.

$T_{max} = 14{,}15 \times 1{,}5 + 600 \times 3{,}0 = 24.000$ Kgs

$T_{min} = 600 \times 3{,}00 = 1.800$ Kgs

M2 $l = 3{,}00$

$M_{a(max.)} = 24.000 \times 3{,}0 + 600 \times \frac{3{,}0^2}{2} = 74.700$ mKgs

$M_{a(min)} = 1.800 \times 3{,}0 + 600 \times \frac{3{,}0^2}{2} = 8.100$ mKgs

$T_{max} = 1.800 + 600 \times 3{,}0 + 14{,}15 \times 2 = 31.900$ Kgs

---

V6 $l = 12{,}00$

$M_{f_{C(max)}} = 14{,}600 \times 6{,}0 - 14{,}15 \times 3{,}0 + 600 \times \frac{12{,}0^2}{8} = 74.000$ mKgs

$M_{f_{C(min)}} = 600 \times \frac{12^2}{8} = 10.800$ mKgs

$T = 14{,}15 + 14{,}15 \times 0{,}75 + 3.600 = 28.350$ mKgs.

V7 y V8 $l = 12{,}00$ Momentos tomados con el Anaguel

$M_{f_{C(max)}} = 5.400 + 14.150 \times 0{,}3 \times 12{,}0 = 56.300$ mKgs.

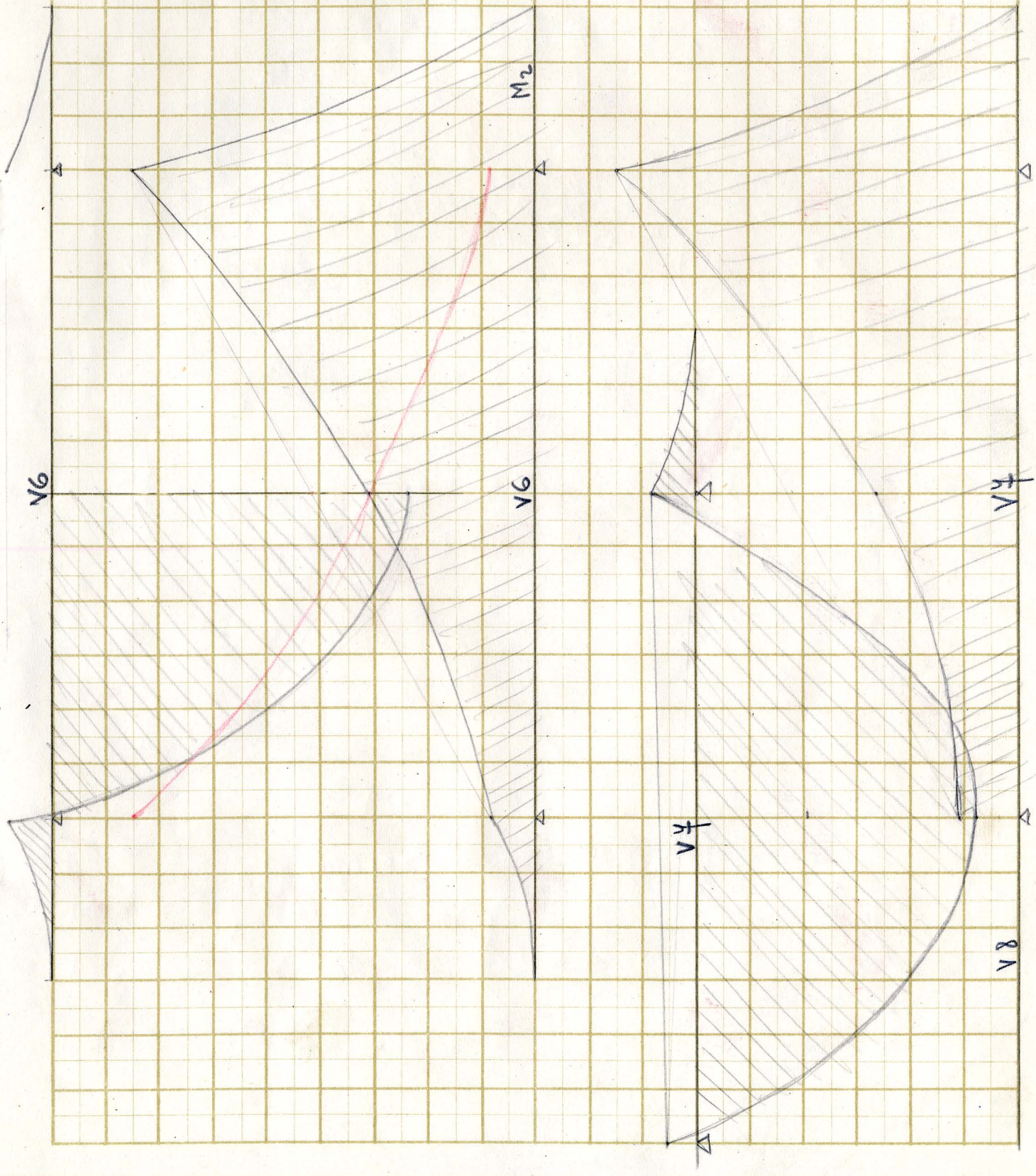
$M_{f_{C(min)}} = 600 \times \frac{12{,}0^2}{16} = 5.400$ mKgs

$M_{f_{a(max)}} = 10.800 + 14.150 \times 0{,}14 \times 12{,}0 = 39.700$ mKgs

$M_{f_{a(min)}} = 600 \times \frac{12{,}0^2}{8} = 10.800$ mKgs.

$T = 28.350$ Kgs

y con estos momentos dibujamos las hipótesis mas desfavorables



de donde sacamos los momentos máximos

V5 $M_c = 24.900$ mKgs. $d=120$ $b=30$ $t=21,5 = 4\phi25$

$T = 24.000$ Kgs. $2e12a22_c$

V6 $M_c = 67.000$ mKgs $d=120$ $b=30$ $t=58$ $6\phi35$

M_c(cara superior) $= 31.000$ mKgs $u=22 = 2\phi35$

$T = 28,350$ Kgs. $t=27$

$2e12a18_c$

M2 $M_a = 74.700$ mKgs $d=120$ $b=30$ $t=65 = 6\phi35+2\phi20$

$T = 31.900$ Kgs $u=36 = 4\phi35$

$2e12a16_c$

V4 $M_c = 52.000$ mKgs. $d=120$ $b=30$ $t=45 = 4\phi35+2\phi20$

M_c(cara superior) $= 27.000$ mKgs $t=23 = 2\phi35+1\phi20$

M_a(lado viga 8) $= 39.700$ mKgs $t=34,5 = 2\phi35+2\phi25+2\phi20$

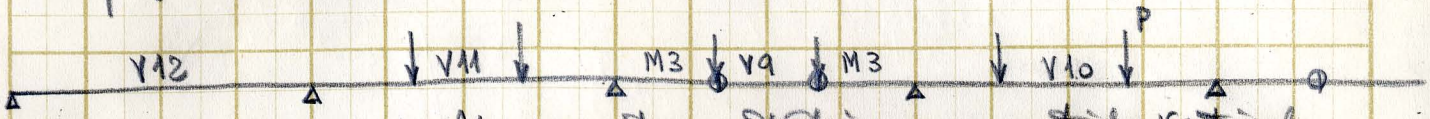
$T = 28.350$ Kgs $2e12a18_c$

V8 $M_c = 56.300$ mKgs $t=49 = 4\phi35+2\phi25$

$T = 28.350$ Kgs. $2e12a18_c$

Viga para apoyo de cerchas, con empuje de viento

Carga P = 7.500 Kgs
Peso propio = 1.070 Kgs/m.l.
Empuje de viento a los 1/3 = P' = 2.400 Kgs.



Momentos estáticos en sentido vertical

V9 $l = 4{,}00$

$M_c = 1.070 \times \frac{4{,}00^2}{8} = 2.140$ mKgs

$T = 1.070 \times 2{,}00 = 2.140$ Kgs

M3 $l = 4{,}00$

$M_a = 1.070 \times \frac{4{,}00^2}{2} + (7.500 + 2.140) \times 4{,}00 = 47.120$ mKgs

$T = 9640 + 1.070 \times 4{,}0 = 13.920$ Kgs

V10 $l = 12{,}00$

$M_c = 1.070 \times \frac{12{,}0^2}{8} + 7.500 \times (6{,}0 - 2{,}00) = 49.200$ mKgs

$T = 13.920$ Kgs

Momentos hallados con el Maquet

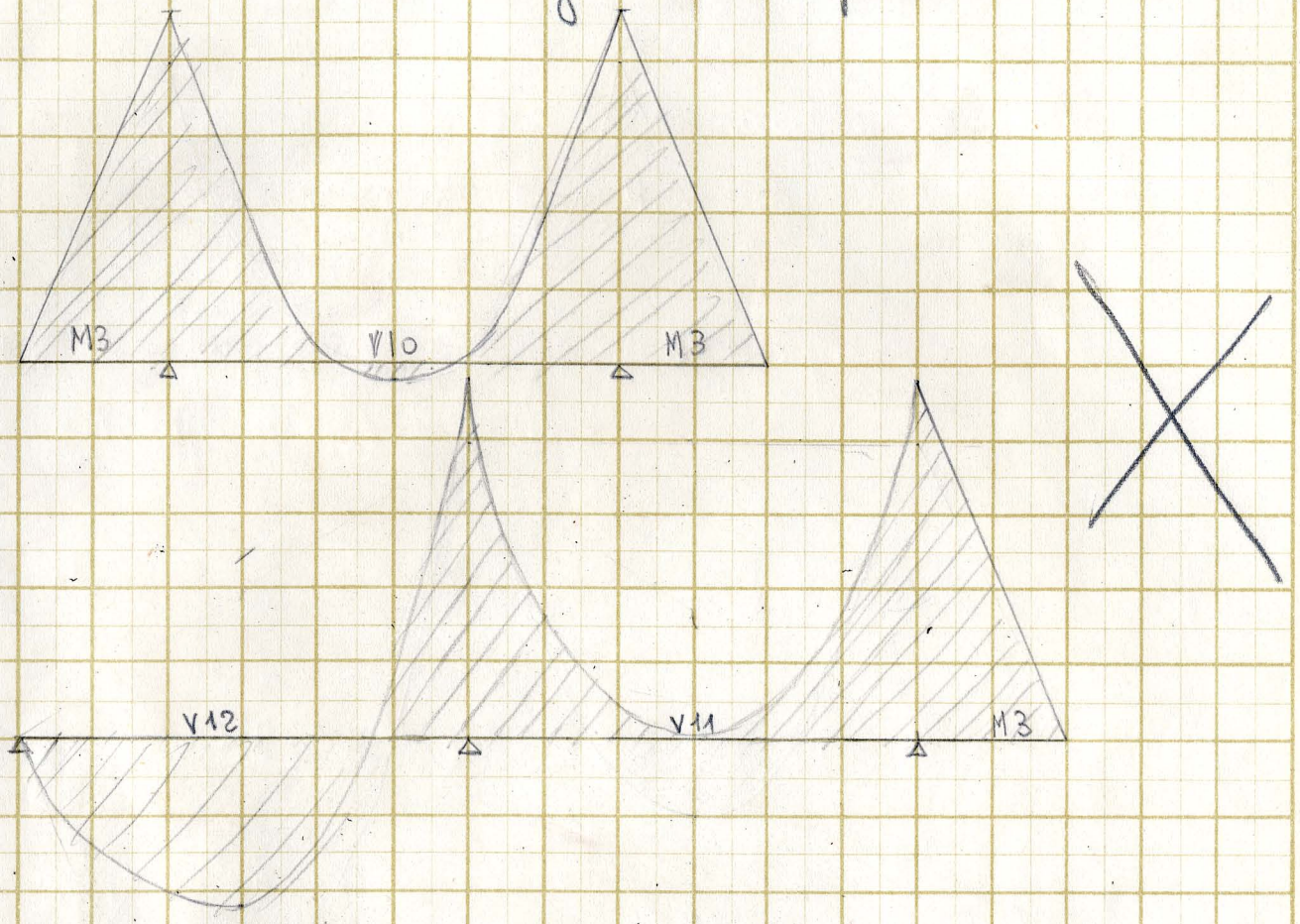
V11 y 12 $l = 12{,}00$

$M_c = 1.070 \times 12{,}0^2 \times 0{,}0625 + 7.500 \times 12{,}0 \times 0{,}14 = 22.200$ mKgs.

$M_a = 1.070 \times 12{,}0^2 \times 0{,}125 + 7.500 \times 12{,}0 \times 0{,}32 = 48.000$ mKgs

$T = 13.920$ Kgs

con estos momentos dibujamos las hipotesis



de donde sacamos los momentos maximos

V9. $M_c = 2.140$ mKgs $\quad d = 120 \quad b = 60 \quad t = 2,0$
$T = 2.140$ Kgs

M3 $M_a = 44.120$ mKgs
$T = 13.920$ Kgs
$t = 41,0 = 8\phi 25$
$2e\,8a\,18_{c\,1/3}$

V10 $M_c = 2.000$ mKgs
$T = 13.920$ Kgs
$t = 1,8 =$
$2e\,8a\,18_{c\,1/3}$

V11 $M_c = 0$
$T = 13.920$ Kgs
$t =$
$2e\,8a\,18_{c\,1/3}$

V12 $M_c = 22.000$ mKgs
$M_{a\,(lado\ viga\ 11)} = 48.000$ mKgs
$T = 13.920$ Kgs
$t = 19,0 = 4\phi 25$
$t = 41,0 = 8\phi 25$
$2e\,8a\,18_{c\,1/3}$

Momentos estáticos en sentido horizontal

M3 $l = 4{,}00$

$q_{m/l} = 2.400 \times 4{,}0 = 9.600$ mKgs

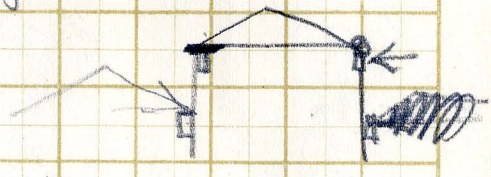
$T/l = 2.400$

V10 $l = 12{,}0$

$M_{f_c} = 2.400 \times (6{,}00 - 2{,}0) = 9.600$ mKgs.

Momentos hallados con el Maquel

V11 y 12 $l = 12{,}00$

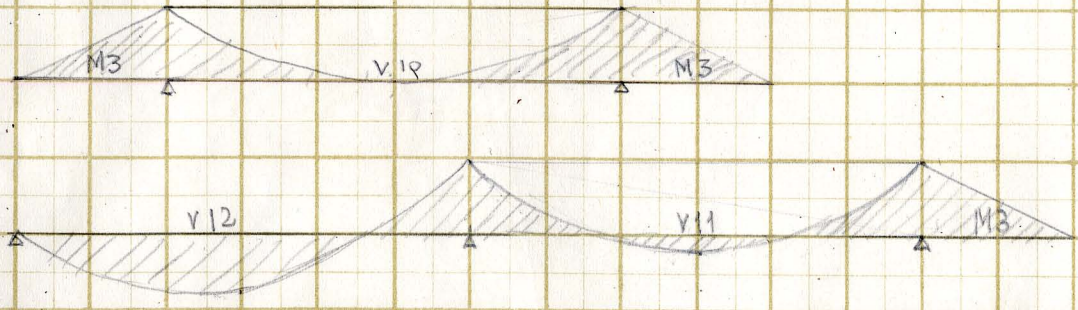


$M_{f_c} = 2.400 \times 12{,}0 \times 0{,}275 = 7.900$ mKgs.

$M_{f_a} = 2.400 \times 12{,}0 \times 0{,}32 = 9.200$ mKgs

---

con estos momentos dibujamos las hipótesis



de donde sacamos los momentos máximos

M3.– $q_{m/l_a} = 9.600$ mKgs — $d = 60$ — $t = 14$ = 2ϕ25 + 2ϕ20

V10.– $M_{f_c} = 0$ — $t =$ 2ϕ12

V11.– $M_{f_c} = 2.000$ mKgs — $d = 60$ — $t = 3{,}4$ = 2ϕ16

V12 – $M_{f_c} = 9.200$ " — $d = 60$ — $t = 14$ = 2ϕ25 + 2ϕ20

M_{f_a} (cada viga 11) $= 7.900$ mKgs. $d = 60$ — $t = 14$ = 2ϕ25 + 2ϕ16

2 ϕ 8 a 46 cms

Pórtico nº 1

Modificación de la cruja de paso del F.C.

Viga para puente grua de 10 tons. 2 ruedas a 3,00 mts. Carga por rueda 10,5 Tons. Peso propio 450 Kgs/m.l.

Viga continua método de G. Aguilar

d = 60 b = 30

$M_C = 450 \times 6,0^2 \times 0,072 + 10.500 \times 6,0 \times 0,20 = 13470$ mKgs — $t = 25 = 4\phi 25 + 2\phi 20$, $U = 9 = 2\phi 25$

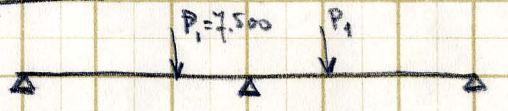
$M_A = 450 \times 6,0^2 \times 0,106 + 10.500 \times 6,0 \times 0,16 = 11.820$ " — $t = 21,5 = 4\phi 25$

$M_{C'} = 450 \times 6,0^2 \times 0,042 + 10.500 \times 6,0 \times 0,17 = 11.380$ " — $t = 20,8 = 4\phi 25$

$M_{A'} = 450 \times 6,0^2 \times 0,083 + 10.500 \times 6,0 \times 0,15 = 10.810$ " — $t = 19,7 = 4\phi 25$

$T = 450 \times 3,0 + 10.500 \times 1,5 = 14.100$ Kgs — $2\,e\,12$ a 14_c

Viga para apoyo de cerchas



$M_C = 300 \times 6,0^2 \times 0,0625 + 7500 \times 6,0 \times 0,077 = 3.840$ mKgs — $t = 7,7 = 2\phi 25$

$M_A = 300 \times 6,0^2 \times 0,125 + 7500 \times 6,00 \times 0,18 = 9.460$ " — $t = 19 = 4\phi 25$

$T = 300 \times 3,0 + 7.500 \times 0,66 = 5.900$ Kgs — $2\,e\,8$ a $17_{1/3\,c}$

d = 55 b = 28

Pórtico nº 5

Modificación de la crujía de paso del F.C.

Datos igual al del pórtico nº 1.

Viga de dos luces Método G. Aguilar

d=60 b=30

$M_{f_o} = 450 \times 6{,}0^2 \times 0{,}0625 + 10.500 \times 6{,}0 \times 0{,}20 = 14.600$ mKgs

$t = 26{,}0 = 4\phi 25 + 2\phi 20$
$v = 11{,}4 = 4\phi 20 \circ 2\phi 25$

$M_{f_a} = 450 \times 6{,}0^2 \times 0{,}125 + 10.500 \times 6{,}0 \times 0{,}16 = 12.100$ mKgs

$t = 22 = 2\phi 25 + 4\phi 20$

T = 17.100 Kgs

2 e 12 a 14 c

Viga-dintel de la puerta de la nave de gran altura

Muro = 0,25 × 7,0 × 1.400 = 2.450 Kgs
P.p. = 0,28 × 0,7 × 2.400 = 470
2.920

$Q_{u/B_1} = 2.920 \times \overline{6,8}^2 \times 0,075 = 9.800$ kgs — $t = 13,6 = 2\phi 25 + 2\phi 16$

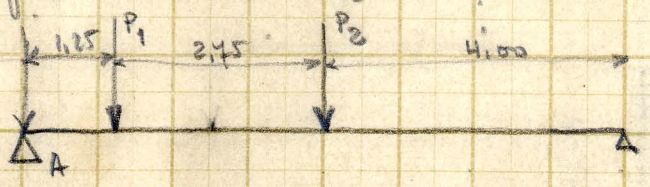
$Q_{u/A_1} = 2.920 \times \overline{6,8}^2 \times 0,10 = 13.100$ " — $t = 18,2 =$

$Q_{u/B_2} = 2.920 \times \overline{6,8}^2 \times 0,025 = 3.300$ " — $t = 4,6 = 2\phi 16 + 2\phi 12$

$T = 4000 \times 3,40 = 13.600$ Kgs. — 2 e 8 all$_V$

d=80 c=72 b=25

Comprobación de la viga de 8,00 mts



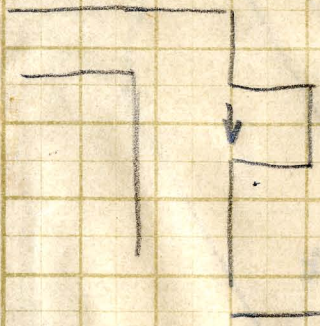
$P_1 = 2.500 + 100 \times 2 \times 10 = 4.500$

$P_2 = 2.500 + 100 \times 3{,}375 \times 10 = 5.875$

Reacción en A: $540 \times 4{,}00 + 5.875 \times 0{,}5 + 4.500 \times \frac{6{,}75}{8{,}0} = 8.900$ Kgs.

$M_C = 540 \times \frac{8{,}0^2}{10} + (6.440 \times 4{,}0 - 4500 \times 2{,}75) \times \frac{8}{10} = 15.100$ mKgs

$d = 80 \quad c = 28 \quad t = 21 = 4\phi 25 \quad 2 \text{ e } 8 \text{ a } 14_{fc}$

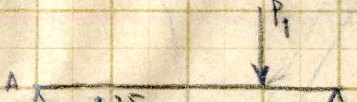


Carga en el hormigón debida al esfuerzo cortante

$\frac{8900}{28 \times 40} = 8$ Kgs/cm²

Carga en el hierro: $\frac{8900}{10} = 890$ Kgs/cm²

Comprobación de la VG del pórtico n° 2 para apoyo de las ménsulas (Véase hoja n° 8 del cálculo de las conexiones y modificaciones n° 394.524)



$P_1 = 4500$ Kgs

Empuje horizontal de viento en $P_1' = 1.200$ Kgs

Reacción en $A = 4500 \times \frac{1{,}25}{4} = 1.400$

$M_C = 2.000 + 1.400 \times 2 = 4.800$ mKgs

$d = 120 \quad b = 45 \quad a = 60$

$t = 4{,}3 = 2\phi 16$

$2 \text{ e } 8 \text{ a } 50$

$T_A = 1.000 + 3.100 = 4.100$ Kgs

M_C horizontal (debido al viento) $= 1.200 \times \frac{2{,}75}{4} \times 1{,}25 = 1000$ mKgs

$d = 60 \quad t = 1{,}8$

¿Quién resiste el empuje de viento?