

EDUARDO TORROJA - OFICINA TÉCNICA

SOLUCION B

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CUBICACIONES

FECHA Abril de 1948

N.º 665.110

CIMENTACION
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EXCAVACION.

3,70x1,40x3,00 = 15,540
Total 15,540 m3
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RELLENO DE TIERRAS

Excavación - Hormigon 7,922
Total 7,922 m3
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HORMIGON

1,40x3,70x0,30 = 1,554
1,40x $\frac{3,7+1,7}{2}$ x8 = 3,024
1,00x1,60x1,9 = 3,040
Total: 7,618 m3
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ENCOFRADO

(1,6+1,0)x1,90x2 = 8,88
Total: 9,88 m2
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ACERO EN REDONDOS

7"20x3,70x2,47	=	63,973
19"10x1,40x0,62	=	16,492
5"8x3,60x0,39	=	7,020
4"18x2,70x2,00	=	21,600
7"20x2,70x2,47	=	<u>46,683</u>

Suma: 155,768

5% de tolerancia en peso 7,788

Total: 163,556 kg.

ESTRUCTURA

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HORMIGON

Soporte	$0,70 \times 1,10 \times 8,65$	=	<u>6,661</u>	
			Suma	6,661
Zona alta de soporte				
	$\frac{0,85+0,55}{2} \times 0,40 \times 3,45$	=	0,966	
	$0,40 \times 0,35 \times 0,40$	=	0,056	
	$\frac{0,55+0,32}{2} \times 0,40 \times 3,50$	=	0,609	
	$0,30 \times 0,25 \times 4,20$	=	0,315	
	$0,30 \times 0,25 \times 3,82$	=	0,286	
	$0,40 \times 0,40 \times 2,45$	=	0,392	
	$\frac{0,15+0,35}{2} \times 0,40 \times 1,93$	=	<u>0,193</u>	
			Suma	2,827
Jáceras	$0,25 \times 0,25 \times 20,00 \times 2$	=	2,500	
	$0,12 \times 0,20 \times 20,00 \times 2$	=	0,960	
	$0,20 \times 0,20 \times 2,615 \times 4$	=	0,418	
	$0,10 \times 0,20 \times 2,615 \times 6$	=	0,314	
	$0,10 \times 0,20 \times 3,50 \times 8$	=	0,560	
	$0,20 \times 0,20 \times 3,50 \times 4$	=	0,560	
	$0,15 \times 0,20 \times 3,50 \times 4$	=	<u>0,420</u>	
			Suma	5,732
Vigas	$0,22 \times 0,10 \times 9,52 \times 4$	=	0,750	
	$\frac{0,22+0,10}{2} \times 0,02 \times 9,52 \times 4$	=	0,109	

$$\frac{0,28+0,43}{2} \times 0,10 \times 9,52 \times 4 = 1,210$$

$$\frac{0,40+0,20}{2} \times 0,10 \times 2,375 \times 4 = 0,285$$

$$0,25 \times 0,10 \times 9,10 \times 3 = 0,608$$

$$\frac{0,25+0,10}{2} \times 0,02 \times 9,10 \times 3 = 0,085$$

$$\frac{0,20+0,43}{2} \times 0,10 \times 9,10 \times 3 = \underline{0,765}$$

Suma: 3,812

Total: 19,022 m3
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ENCOFRADOS

Soporte	$(1,1+0,7) \times 8,65 \times 2$	=	<u>31,14</u>	
		=	<u>- 0,44</u>	
		Suma:		30,70
Zona alta de soporte				
	$0,40 \times 3,50 \times 2$	=	2,80	
	$\frac{0,85+0,55}{2} \times 3,45 \times 2$	=	4,83	
	$0,40 \times 0,35 \times 2$	=	0,28	
	$\frac{0,55+0,32}{2} \times 3,50 \times 2$	=	3,05	
	$0,30 \times 3,30$	=	0,99	
	$0,30 \times 3,65$	=	1,09	
	$0,25 \times 4,20 \times 2$	=	2,10	
	$0,25 \times 3,82 \times 2$	=	1,91	
	$0,40 \times 2,45 \times 3$	=	2,94	
	$0,40 \times 2,00$	=	0,80	
	$\frac{0,15+0,35}{2} \times 1,93$	=	0,48	
	$0,40 \times 2,00$	=	<u>0,80</u>	
		Suma.		22,07
Jáceenas	$0,25 \times 20,00 \times 6$	=	30,00	
	$0,25 \times 0,25 \times 4$	=	0,25	
	$0,12 \times 20,00 \times 2$	=	4,80	
	$0,12 \times 0,20 \times 4$	=	0,10	
	$0,20 \times 20,00 \times 4$	=	16,00	
	$0,20 \times 2,615 \times 8$	=	4,18	
	$0,20 \times 2,25 \times 4$	=	1,80	
	$0,10 \times 2,615 \times 6$	=	1,56	
	$0,20 \times 2,42 \times 12$	=	5,81	
	$0,10 \times 3,50 \times 8$	=	2,80	
	$0,20 \times 3,30 \times 12$	=	7,92	

	0,20x3,15x4	=	2,52	
	0,20x3,50x4	=	2,80	
	0,20x3,30x8	=	5,28	
	0,15x3,50x4	=	2,10	
	0,20x3,30x8	=	<u>5,28</u>	
	Suma:		93,20	
	A deducir: 0,20x2,40x4	= -	<u>1,92</u>	
	Suma:			91,28
Vigas	0,10x8,00x4	=	3,20	
	0,12x9,52x4	=	4,09	
	$\frac{0,38+0,53}{2} \times 9,52 \times 8$	=	31,01	
	0,10x0,40x4	=	0,16	
	$\frac{0,12+0,10}{2} \times 0,06 \times 16$	=	0,11	
	0,10x2,38x4	=	0,95	
	$\frac{0,40 \times 0,20}{2} \times 2,375 \times 8$	=	5,70	
	0,20x0,10x4	=	0,08	
	0,10x8,20x3	=	2,46	
	0,15x8,10x3	=	3,65	
	$\frac{0,30+0,53}{2} \times 8,10 \times 6$	=	<u>20,17</u>	
	Suma:			<u>71,58</u>
	Total:			<u>215,63 m2</u>

ACERO EN REDONDOS

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Soporte	4 ϕ 18x8,8x2,00	=	70,400	
	4 ϕ 20x8,8x2,47	=	86,944	
	1"20x6,3x2,47	=	15,561	
	1"20x4,3x2,47	=	10,621	
	1"20x2,2x2,47	=	5,434	
	35"8x3,7x0,39	=	<u>50,505</u>	
		Suma:		239,465
Zona alta del soporte				
	3 ϕ 18x6,90x2,00	=	41,400	
	1"18x2,05x2,00	=	4,100	
	4"18x5,80x2,00	=	46,400	
	1"20x2,80x2,47	=	6,916	
	1"20x3,30x2,47	=	8,151	
	1"20x4,05x2,47	=	10,003	
	2"20x4,50x2,47	=	22,230	
	25"8x1,50x0,39	=	14,625	
	25"8x2,30x0,39	=	22,425	
	3"18x3,05x2,00	=	10,300	
	8"8x1,00x0,39	=	3,120	
	8"8x1,80x0,39	=	5,616	
	2"16x4,40x1,58	=	13,904	
	1"12x4,40x0,89	=	3,916	
	2"12x1,73x0,89	=	3,079	
	2"16x4,65x1,58	=	14,694	
	1"12x4,65x0,89	=	4,139	

	1/12x1,93x0,89	=	1,718	
	25"8x0,97x0,39	=	9,458	
	25"8x1,77x0,39	=	17,258	
	4"22x3,20x2,98	=	38,144	
	8"8x1,70x0,39	=	5,304	
	4"25x11,20x3,85	=	172,480	
	4"25x9,90x3,85	=	152,460	
	41"8x1,20x0,39	=	<u>19,188</u>	
		Suma:		659,028
Jáccenas	2/12x5,35x0,89x8	=	76,184	
	2"14x10,70x1,21x4	=	103,576	
	130"6x1,05x0,22x2	=	60,060	
	3"10x1,50x0,62x2	=	5,580	
	2"12x2,63x0,89x4	=	18,726	
	2"12x2,73x0,89x4	=	19,738	
	2"25x6,75x3,85x4	=	207,900	
	2"22x6,66x2,98x4	=	158,774	
	2"25x6,75x3,85	=	51,975	
	3"25x6,75x3,85	=	77,963	
	3"22x6,66x2,98x2	=	119,081	
	1"10x1,05x0,62x8	=	5,209	
	197"6x0,70x0,22x2	=	60,676	
	2"14x3,15x1,21x8	=	60,984	
	19"6x0,87x0,22x4	=	14,546	
	2"10x3,55x0,62x12	=	52,824	
	25"6x0,68x0,22x6	=	22,440	
	2"20x5,50x2,47x4	=	108,680	
	2"20x5,00x2,47x4	=	98,800	
	32"6x0,69x0,22x4	=	19,430	

2"12x4,10x0,89x8	=	58,384
23"6x0,90x0,22x4	=	18,216
2"14x5,52x1,21x2	=	26,717
2"14x5,32x1,21x2	=	25,749
2"12x5,46x0,89x2	=	19,438
2"12x5,26x0,89x2	=	18,726
34"6x0,70x0,22x4	=	20,944
2"12x4,00x0,89x8	=	56,960
28"6x0,80x0,22x4	=	<u>19,712</u>

Suma:

1.607,692

Vigas:	4"6x8,70x0,22x4	=	30,624
	2"18x5,50x2,00x8	=	176,000
	2"14x5,20x1,21x8	=	100,672
	35"8x1,40x0,39x4	=	76,440
	1"12x1,55x0,89x4	=	5,518
	2"16x4,15x1,58x4	=	52,456
	2"6x2,80x0,22x4	=	4,928
	15"6x0,90x0,22x4	=	11,880
	4"6x4,50x0,22x6	=	23,760
	2"18x8,65x2,00x3	=	103,800
	2"18x8,75x2,00x3	=	105,000
	38"8x1,35x0,39x3	=	<u>60,021</u>

Suma

751,099

Suma: 3.257,284

5% de tolerancia en peso

162,864

TOTAL:

3.420,148 kg.

ACERO EN PERFILES

Cortees	23IP8x20,00x5,95	=	2.737,000
Tirantillas	16(-30x6(x3,85x1,413	=	87,041
	4(-30x6)x8,40x1,413	=	47,477
	8(-30x6)x9,70x1,413	=	<u>109,649</u>
	Suma		2.981,167
	5% de tolerancia en peso		<u>149,058</u>
	Total:		<u>3.130,225 kg.</u> =====

CUBIERTA DE FIBROCEMENTO

19,20x20,00	=	<u>384,00</u>
	Total:	<u>384,00 m2</u> =====

CANALON

Total:	<u>20,00 m.l.</u> =====
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AISLAMIENTO TERMINO EN CUBIERTA

16,90x19,25	=	<u>325,325</u>
	Total:	<u>325,325 m2</u> =====