

Cálculo dos Pilares – trecho 3

pav2 fck = 250.00 kgf/cm² E = 241500 kgf/cm² Peso Espec = 2500.00 kgf/m³
 Lance 3 cobr = 2.00 cm

Dados					Resultados			
Pilar	Seção (cm)	lib vínc esb B lih vínc esb H (cm)	Nd máx Nd mín (tf) ni Zr	MBd topo MBd base MHd topo MHd base (kgf.m)	MBsdtopo MBsdcentro MBsdbase MHsdtopo MHsdcentro MHsdbase (kgf.m)	Madtopo Madcentro Madbase MB2d MBcd MH2d MHcd (kgf.m)	Processo de Cálculo	As b(cm ²) As h % armad
P1	19.00 X 60.00	315.00 RR 57.36 315.00 RR 18.16	13.48 6.14 0.07 0.00 0.00	5061 2392 2168 813	5061 2080 2392 2168 975 813	212 106 212 366 47 57 2	(*2) Msd(x) = 5273 kgf.m Msd(y) = 2168 kgf.m Mrd(x) = 7247 kgf.m Mrd(y) = 2980 kgf.m Mrd/Msd=1.37	6.28 2 ø 20.0 12.57 4 ø 20.0 2.2
P2	19.00 X 60.00	315.00 RR 57.36 315.00 RR 18.16	14.64 6.46 0.07 0.00 0.00	193 122 7644 6500	193 77 122 7644 3057 6500	231 226 231 234 4 98 7	(*2) Msd(x) = 193 kgf.m Msd(y) = 7874 kgf.m Mrd(x) = 335 kgf.m Mrd(y) = 13699 kgf.m Mrd/Msd=1.74	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P3	19.00 X 60.00	315.00 RR 57.36 315.00 RR 18.16	8.94 4.04 0.04 0.00 0.00	120 86 2409 2516	120 48 86 2409 1006 2516	141 137 141 143 2 47 2	(*2) Msd(x) = 227 kgf.m Msd(y) = 2516 kgf.m Mrd(x) = 2397 kgf.m Mrd(y) = 26538 kgf.m Mrd/Msd=10.55	6.28 2 ø 20.0 15.71 5 ø 20.0 2.8
P4	35.00 X 80.00	315.00 RR 31.14 315.00 RR 13.62	6.44 2.12 0.01 0.00 0.00	1700 1500 600 1059	1700 680 1500 522 427 1059	101 51 101 73 1 16 0	(*2) Msd(x) = 1802 kgf.m Msd(y) = 522 kgf.m Mrd(x) = 26349 kgf.m Mrd(y) = 7627 kgf.m Mrd/Msd=14.62	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6
P6	35.00 X 80.00	315.00 RR 31.14 315.00 RR 13.62	18.68 7.82 0.04 0.00 0.00	57 108 20758 15570	57 43 108 20758 8303 15570	419 433 368 101 1 107 5	(*2) Msd(x) = 57 kgf.m Msd(y) = 21052 kgf.m Mrd(x) = 178 kgf.m Mrd(y) = 65922 kgf.m Mrd/Msd=3.13	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6
P8		315.00 RR	29.53	1381	1381	465	(*2)	2.45

Dados					Resultados			
Pilar	Seção (cm)	lib vínc esb B	Nd máx Nd mín (tf) ni	MBd topo MBd base	MBSdtopo MBSdcentro MBSdbase	Madtopo Madcentro Madbase	Processo de Cálculo	As b(cm²)
		lih vínc esb H (cm)	Zr	MHd topo MHd base (kgf.m)		MB2d MBcd		MH2d MHcd (kgf.m)
	19.00 X 60.00	57.36 315.00 RR 18.16	13.29 0.15 0.00 0.00	654 6809 2964	567 654 6809 2900 2964	233 465 520 35 146 13	Msd(x) = 1846 kgf.m Msd(y) = 6809 kgf.m Mrd(x) = 2815 kgf.m Mrd(y) = 10385 kgf.m Mrd/Msd=1.53	2 ø 12.5 4.91 4 ø 12.5 0.9
P9	25.00 X 60.00	315.00 RR 43.60 315.00 RR 18.16	31.96 12.94 0.12 0.00 0.00	51 33 23687 19486	51 20 33 23687 9475 19486	668 699 686 310 5 238 30	(*2) Msd(x) = 51 kgf.m Msd(y) = 24190 kgf.m Mrd(x) = 70 kgf.m Mrd(y) = 33399 kgf.m Mrd/Msd=1.38	6.28 2 ø 20.0 15.71 5 ø 20.0 2.1
P10	35.00 X 80.00	315.00 RR 31.14 315.00 RR 13.62	20.18 8.46 0.04 0.00 0.00	50 35 26224 19576	50 20 35 26224 10489 19576	464 495 480 109 1 120 7	(*2) Msd(x) = 50 kgf.m Msd(y) = 26541 kgf.m Mrd(x) = 125 kgf.m Mrd(y) = 66200 kgf.m Mrd/Msd=2.49	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6
P12	35.00 X 80.00	315.00 RR 31.14 315.00 RR 13.62	20.28 8.51 0.04 0.00 0.00	13 8 26242 19540	13 5 8 26242 10497 19540	505 512 509 110 1 121 7	(*2) Msd(x) = 13 kgf.m Msd(y) = 26562 kgf.m Mrd(x) = 31 kgf.m Mrd(y) = 66273 kgf.m Mrd/Msd=2.50	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6
P14	19.00 X 60.00	315.00 RR 57.36 315.00 RR 18.16	29.21 13.18 0.14 0.00 0.00	1381 654 6714 2897	1381 567 654 6714 2869 2897	460 230 460 515 35 145 13	(*2) Msd(x) = 1842 kgf.m Msd(y) = 6714 kgf.m Mrd(x) = 2823 kgf.m Mrd(y) = 10291 kgf.m Mrd/Msd=1.53	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P15	25.00 X 60.00	315.00 RR 43.60 315.00 RR 18.16	31.63 12.82 0.12 0.00 0.00	51 33 23387 19236	51 20 33 23387 9355 19236	661 691 679 307 5 235 30	(*2) Msd(x) = 51 kgf.m Msd(y) = 23886 kgf.m Mrd(x) = 71 kgf.m Mrd(y) = 33372 kgf.m Mrd/Msd=1.40	6.28 2 ø 20.0 15.71 5 ø 20.0 2.1

Dados					Resultados			
Pilar	Seção (cm)	lib	Nd	MBd	MBSdtopo MBSdcentro MBSdbase	Madtopo	Processo de Cálculo	As
		vínc esb B	máx Nd mín (tf) ni	topo MBd base		Madcentro Madbase		b(cm ²)
		lih	Zr	MHd	MHsdtopo	MB2d		As h
		vínc esb H		topo MHd base	MHsdcentro	MBcd		% armad
		(cm)		(kgf.m)	(kgf.m)	(kgf.m)		
P16	35.00 X 80.00	315.00 RR	19.97	9	9	501	(*2)	9.42
		31.14	8.38	8	3	506	Msd(x) = 9 kgf.m	3 ø 20.0
		315.00 RR	0.04	25424	25424	501	Msd(y) = 25738 kgf.m	18.85
		13.62	0.00	18936	10170	108	Mrd(x) = 22 kgf.m	6 ø 20.0
			0.00		18936	1	Mrd(y) = 66224 kgf.m	1.6
						118	Mrd/Msd=2.57	
						7		
P18	35.00 X 80.00	315.00 RR	19.93	5	5	504	(*2)	9.42
		31.14	8.36	8	3	505	Msd(x) = 5 kgf.m	3 ø 20.0
		315.00 RR	0.04	25312	25312	500	Msd(y) = 25626 kgf.m	18.85
		13.62	0.00	18852	10125	108	Mrd(x) = 12 kgf.m	6 ø 20.0
			0.00		18852	1	Mrd(y) = 66219 kgf.m	1.6
						118	Mrd/Msd=2.58	
						7		
P20	19.00 X 60.00	315.00 RR	14.09	5062	5062	222	(*2)	6.28
		57.36	6.34	2387	2082	111	Msd(x) = 5284 kgf.m	2 ø 20.0
		315.00 RR	0.07	2389	2389	222	Msd(y) = 2389 kgf.m	12.57
		18.16	0.00	967	1046	380	Mrd(x) = 7219 kgf.m	4 ø 20.0
			0.00		967	48	Mrd(y) = 3263 kgf.m	2.2
						61	Mrd/Msd=1.37	
						3		
P21	19.00 X 60.00	315.00 RR	15.42	191	191	243	(*2)	2.45
		57.36	6.73	121	76	243	Msd(x) = 191 kgf.m	2 ø 12.5
		315.00 RR	0.08	8278	8278	243	Msd(y) = 8521 kgf.m	4.91
		18.16	0.00	7041	3311	247	Mrd(x) = 311 kgf.m	4 ø 12.5
			0.00		7041	5	Mrd(y) = 13842 kgf.m	0.9
						104	Mrd/Msd=1.62	
						8		
P22	35.00 X 80.00	315.00 RR	20.14	24	24	489	(*2)	9.42
		31.14	8.46	15	10	504	Msd(x) = 24 kgf.m	3 ø 20.0
		315.00 RR	0.04	26020	26020	499	Msd(y) = 26337 kgf.m	18.85
		13.62	0.00	19365	10408	109	Mrd(x) = 61 kgf.m	6 ø 20.0
			0.00		19365	1	Mrd(y) = 66230 kgf.m	1.6
						120	Mrd/Msd=2.51	
						7		
P23	19.00 X 40.00	315.00 RR	37.30	233	233	587	(*2)	4.02
		57.36	10.38	335	134	638	Msd(x) = 1391 kgf.m	2 ø 16.0
		315.00 RR	0.27	295	335	587	Msd(y) = 193 kgf.m	8.04
		27.25	0.00	484	295	597	Mrd(x) = 6296 kgf.m	4 ø 16.0
			0.00		193	22	Mrd(y) = 876 kgf.m	2.1
					484	162	Mrd/Msd=4.53	
						6		

Dados					Resultados			
Pilar	Seção (cm)	lib vínc esb B	Nd máx Nd mín (tf) ni	MBd topo MBd base	MBSdtopo MBSdcentro MBSdbase	Madtopo Madcentro Madbase	Processo de Cálculo	As b(cm ²)
		lih vínc esb H (cm)	Zr	MHd topo MHd base (kgf.m)	MHsdtopo MHsdcentro MHsdbase (kgf.m)	MB2d MBcd MH2d MHcd (kgf.m)		As h % armad
P24	19.00 X 40.00	315.00 RR 57.36	66.41 15.77	0 1	0 0 0	1375 1374 1374 1062	(*2) Msd(x) = 2479 kgf.m Msd(y) = 48 kgf.m	4.02 2 ø 16.0 8.04 4 ø 16.0
		315.00 RR 27.25	0.49 0.00 0.00	75 120	75 48 120	42 289 10	Mrd(x) = 6250 kgf.m Mrd(y) = 121 kgf.m Mrd/Msd=2.52	2.1
P25	19.00 X 40.00	315.00 RR 57.36	37.13 10.22	233 336	233 134 336	585 634 585 594	(*2) Msd(x) = 1385 kgf.m Msd(y) = 139 kgf.m	4.02 2 ø 16.0 8.04 4 ø 16.0
		315.00 RR 27.25	0.27 0.00 0.00	255 377	221 139 348	22 162 5	Mrd(x) = 6388 kgf.m Mrd(y) = 642 kgf.m Mrd/Msd=4.61	2.1
P26	35.00 X 80.00	315.00 RR 31.14	20.12 8.42	99 61	99 40 61	414 473 452 109	(*2) Msd(x) = 99 kgf.m Msd(y) = 26740 kgf.m	9.42 3 ø 20.0 18.85 6 ø 20.0
		315.00 RR 13.62	0.04 0.00 0.00	26423 19726	26423 10569 19726	1 120 7	Mrd(x) = 245 kgf.m Mrd(y) = 66123 kgf.m Mrd/Msd=2.47	1.6
P27	19.00 X 40.00	315.00 RR 57.36	53.24 19.48	289 332	179 74 184	923 1028 918 852	(*2) Msd(x) = 2003 kgf.m Msd(y) = 91 kgf.m	4.02 2 ø 16.0 8.04 4 ø 16.0
		315.00 RR 27.25	0.39 0.00 0.00	184 229	184 91 229	49 232 11	Mrd(x) = 6645 kgf.m Mrd(y) = 304 kgf.m Mrd/Msd=3.32	2.1
P28	19.00 X 40.00	315.00 RR 57.36	62.09 11.86	5 40	5 22 40	1281 1263 1245 993	(*2) Msd(x) = 2309 kgf.m Msd(y) = 156 kgf.m	4.02 2 ø 16.0 8.04 4 ø 16.0
		315.00 RR 27.25	0.46 0.00 0.00	241 391	227 156 391	30 270 8	Mrd(x) = 6280 kgf.m Mrd(y) = 425 kgf.m Mrd/Msd=2.72	2.1
P29	19.00 X 40.00	315.00 RR 57.36	46.32 16.88	259 349	128 71 177	831 888 782 741	(*2) Msd(x) = 1737 kgf.m Msd(y) = 48 kgf.m	4.02 2 ø 16.0 8.04 4 ø 16.0
		315.00 RR 27.25	0.34 0.00 0.00	86 38	86 48	37 202	Mrd(x) = 6831 kgf.m Mrd(y) = 190 kgf.m	2.1

Dados					Resultados			
Pilar	Seção (cm)	lib vínc esb B	Nd máx Nd mín (tf) ni Zr	MBd topo MBd base MHd topo MHd base (kgf.m)	MBsdtopo MBsdcentro MBsdbase MHsdtopo MHsdcentro MHsdbase (kgf.m)	Madtopo Madcentro Madbase MB2d MBcd MH2d MHcd (kgf.m)	Processo de Cálculo	As b(cm²) As h % armad
					8	8	Mrd/Msd=3.93	
P30	Circ 0.00 X 40.00 0.00	315.00 RR 31.50	71.74 40.52 0.32 0.00 0.00	3351 3539 20 27	3351 1416 3539 20 10 26	1130 565 1130 890 68 890 20	Msd(x) = 4669 kgf.m Msd(y) = 26 kgf.m Mrd(x) = 15068 kgf.m Mrd(y) = 0 kgf.m Mrd/Msd=3.23	18.85 6 ø 20.0 1.5
P31	Circ 0.00 X 40.00 0.00	315.00 RR 31.50	71.45 40.72 0.32 0.00 0.00	3254 3109 31 56	3254 1302 3109 27 38 46	1125 627 1125 886 64 886 21	Msd(x) = 4380 kgf.m Msd(y) = 27 kgf.m Mrd(x) = 15067 kgf.m Mrd(y) = 0 kgf.m Mrd/Msd=3.44	18.85 6 ø 20.0 1.5
P32	35.00 X 80.00	315.00 RR 31.14 315.00 RR 13.62	20.26 8.56 0.04 0.00 0.00	476 418 22236 16680	476 190 418 22236 8894 16680	319 326 319 110 1 116 6	(*2) Msd(x) = 476 kgf.m Msd(y) = 22555 kgf.m Mrd(x) = 1383 kgf.m Mrd(y) = 65523 kgf.m Mrd/Msd=2.90	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6
P41	19.00 X 60.00	315.00 RR 57.36 315.00 RR 18.16	9.10 4.03 0.04 0.00 0.00	131 95 2633 2652	131 52 95 2633 1061 2652	143 136 143 145 2 49 2	(*2) Msd(x) = 274 kgf.m Msd(y) = 2633 kgf.m Mrd(x) = 2707 kgf.m Mrd(y) = 25975 kgf.m Mrd/Msd=9.86	6.28 2 ø 20.0 15.71 5 ø 20.0 2.8
P42	19.00 X 60.00	315.00 RR 57.36 315.00 RR 18.16	4.24 1.79 0.02 0.00 0.00	525 576 838 438	525 231 576 838 335 438	67 33 67 95 2 19 0	(*2) Msd(x) = 591 kgf.m Msd(y) = 838 kgf.m Mrd(x) = 6861 kgf.m Mrd(y) = 9726 kgf.m Mrd/Msd=11.60	6.28 2 ø 20.0 15.71 5 ø 20.0 2.8

(*) Quantidade de barras alterada pelo usuário (para mais)