

Cálculo dos Pilares – trecho1

 terreo fck = 250.00 kgf/cm²

 E = 241500 kgf/cm²

 Peso Espec = 2500.00 kgf/m³

Lance 1

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
E1	Circ 0.00 X 32.00 0.00	200.00 EL 25.00	3.40 2.27 0.02 0.00 0.00	4 2 130 65	4 4 2 130 130 65	79 79 81 21 0 21 0	Msd(x) = 105 kgf.m Msd(y) = 130 kgf.m Mrd(x) = 2810 kgf.m Mrd(y) = 0 kgf.m Mrd/Msd=16.78	4.71 6 ø 10.0 0.6
P1	19.00 X 60.00	100.00 RR 18.21 100.00 RR 5.77	27.42 15.86 0.13 0.00 0.00	419 210 1782 891	419 168 210 1782 713 891	148 400 358 33 1 6 0	(*2) Msd(x) = 568 kgf.m Msd(y) = 1782 kgf.m Mrd(x) = 4988 kgf.m Mrd(y) = 15658 kgf.m Mrd/Msd=8.79	6.28 2 ø 20.0 12.57 4 ø 20.0 2.2
P2	19.00 X 60.00	506.00 RR 92.15 100.00 RR 5.77	36.24 19.65 0.18 0.00 0.00	124 62 1527 764	124 50 62 1527 611 764	626 701 688 2442 25 30 0	(*2) Msd(x) = 3217 kgf.m Msd(y) = 611 kgf.m Mrd(x) = 5133 kgf.m Mrd(y) = 975 kgf.m Mrd/Msd=1.60	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P3	19.00 X 60.00	506.00 RR 92.15 100.00 RR 5.77	19.70 11.34 0.10 0.00 0.00	11 6 184 92	11 4 6 23 9 11	397 403 402 1328 5 16 0	(*2) Msd(x) = 1741 kgf.m Msd(y) = 9 kgf.m Mrd(x) = 9825 kgf.m Mrd(y) = 52 kgf.m Mrd/Msd=5.64	6.28 2 ø 20.0 15.71 5 ø 20.0 2.8
P4	35.00 X 80.00	100.00 RR 9.89 100.00 RR 4.33	19.80 12.59 0.04 0.00 0.00	777 389 893 446	777 311 389 893 357 446	89 142 89 9 0 3 0	(*2) Msd(x) = 866 kgf.m Msd(y) = 893 kgf.m Mrd(x) = 23660 kgf.m Mrd(y) = 24390 kgf.m Mrd/Msd=27.32	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6
P5		100.00 RR	15.11	111	111	202	(*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(cm ²)
		lih vínc esb H (cm)	Zr	MHd topo MHd base (kgf.m)		MB2d MBcd		MH2d MHcd (kgf.m)
	19.00 X 60.00	18.21 506.00 RR 29.18	8.42 0.07 0.00 0.00	55 488 244	44 55 177 71 89	268 257 18 0 100 1	Msd(x) = 331 kgf.m Msd(y) = 71 kgf.m Mrd(x) = 3960 kgf.m Mrd(y) = 849 kgf.m Mrd/Msd=11.96	2 ø 12.5 4.91 4 ø 12.5 0.9
P6	35.00 X 80.00	100.00 RR 9.89 506.00 RR 21.88	43.30 23.79 0.09 0.00 0.00	25 13 1152 576	25 10 13 1152 461 576	1079 1094 1092 21 0 184 2	(*2) Msd(x) = 1104 kgf.m Msd(y) = 1152 kgf.m Mrd(x) = 25489 kgf.m Mrd(y) = 26596 kgf.m Mrd/Msd=23.08	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6
P7	19.00 X 60.00	100.00 RR 18.21 506.00 RR 29.18	16.84 9.17 0.08 0.00 0.00	103 52 355 177	103 41 52 13 5 6	246 307 297 20 0 111 0	(*2) Msd(x) = 369 kgf.m Msd(y) = 5 kgf.m Mrd(x) = 4202 kgf.m Mrd(y) = 57 kgf.m Mrd/Msd=11.39	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P8	19.00 X 60.00	100.00 RR 18.21 100.00 RR 5.77	46.14 24.29 0.23 0.00 0.00	30 15 196 98	30 12 15 196 79 98	925 943 940 55 1 10 0	(*2) Msd(x) = 1011 kgf.m Msd(y) = 79 kgf.m Mrd(x) = 5735 kgf.m Mrd(y) = 445 kgf.m Mrd/Msd=5.67	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P9	25.00 X 60.00	506.00 RR 70.03 100.00 RR 5.77	67.33 30.74 0.25 0.00 0.00	3 2 3411 1706	3 1 2 3411 1365 1706	1512 1514 1513 2278 19 15 1	(*2) Msd(x) = 3812 kgf.m Msd(y) = 1365 kgf.m Mrd(x) = 15949 kgf.m Mrd(y) = 5710 kgf.m Mrd/Msd=4.18	6.28 2 ø 20.0 15.71 5 ø 20.0 2.1
P10	35.00 X 80.00	100.00 RR 9.89 506.00 RR 21.88	46.53 25.17 0.09 0.00 0.00	0 0 1710 855	0 0 0 1710 684 855	1186 1186 1186 22 0 198 3	(*2) Msd(x) = 1187 kgf.m Msd(y) = 1710 kgf.m Mrd(x) = 23649 kgf.m Mrd(y) = 34090 kgf.m Mrd/Msd=19.93	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6

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(cm²)
		lih vínc esb H (cm)	Zr	MHd topo MHd base (kgf.m)	MHsdtopo MHsdcentro MHsdbase (kgf.m)	MB2d MBcd		As h
						MH2d MHcd (kgf.m)		% armad
P11	19.00 X 60.00	100.00 RR 18.21 506.00 RR 29.18	16.46 8.99 0.08 0.00 0.00	75 37 356 178	75 30 37 1 0 0	266 311 303 20 0 109 0	(*2) Msd(x) = 361 kgf.m Msd(y) = 0 kgf.m Mrd(x) = 4193 kgf.m Mrd(y) = 3 kgf.m Mrd/Msd=11.62	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P12	35.00 X 80.00	100.00 RR 9.89 506.00 RR 21.88	46.67 25.23 0.09 0.00 0.00	0 0 1690 845	0 0 1690 676 845	1190 1190 1190 23 0 198 3	(*2) Msd(x) = 1190 kgf.m Msd(y) = 1690 kgf.m Mrd(x) = 23761 kgf.m Mrd(y) = 33742 kgf.m Mrd/Msd=19.97	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6
P13	19.00 X 60.00	100.00 RR 18.21 506.00 RR 29.18	16.41 8.97 0.08 0.00 0.00	74 37 358 179	74 30 37 4 2 2	266 310 303 20 0 108 0	(*2) Msd(x) = 360 kgf.m Msd(y) = 2 kgf.m Mrd(x) = 4187 kgf.m Mrd(y) = 20 kgf.m Mrd/Msd=11.64	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P14	19.00 X 60.00	100.00 RR 18.21 100.00 RR 5.77	45.55 24.08 0.22 0.00 0.00	30 15 187 93	30 12 15 187 75 93	913 931 928 55 1 10 0	(*2) Msd(x) = 998 kgf.m Msd(y) = 75 kgf.m Mrd(x) = 5714 kgf.m Mrd(y) = 427 kgf.m Mrd/Msd=5.72	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P15	25.00 X 60.00	506.00 RR 70.03 100.00 RR 5.77	66.67 30.52 0.25 0.00 0.00	3 2 3369 1684	3 1 2 3369 1348 1684	1497 1499 1498 2255 19 15 1	(*2) Msd(x) = 3774 kgf.m Msd(y) = 1348 kgf.m Mrd(x) = 15926 kgf.m Mrd(y) = 5686 kgf.m Mrd/Msd=4.22	6.28 2 ø 20.0 15.71 5 ø 20.0 2.1
P16	35.00 X 80.00	100.00 RR 9.89 506.00 RR 21.88	46.06 24.97 0.09 0.00 0.00	1 0 1605 802	1 0 0 1605 642 802	1174 1174 1174 22 0 196 3	(*2) Msd(x) = 1174 kgf.m Msd(y) = 1605 kgf.m Mrd(x) = 23985 kgf.m Mrd(y) = 32774 kgf.m Mrd/Msd=20.42	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6

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(cm²)
		lih vínc esb H (cm)	Zr	MHd topo MHd base (kgf.m)	MHsdtopo MHsdcentro MHsdbase (kgf.m)	MB2d MBcd		As h
						MH2d MHcd (kgf.m)		% armad
P17	19.00 X 60.00	100.00 RR 18.21	16.79 9.15	102 51	102 41 51	245 307 296 20 0 111 0	(*2) Msd(x) = 368 kgf.m Msd(y) = 4 kgf.m Mrd(x) = 4203 kgf.m Mrd(y) = 40 kgf.m Mrd/Msd=11.42	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P18	35.00 X 80.00	100.00 RR 9.89	45.99 24.95	2 1	2 1 1	1171 1172 1172 22 0 195 3	(*2) Msd(x) = 1173 kgf.m Msd(y) = 1593 kgf.m Mrd(x) = 24023 kgf.m Mrd(y) = 32630 kgf.m Mrd/Msd=20.49	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6
P19	19.00 X 60.00	100.00 RR 18.21	15.16 8.44	113 56	113 45 56	201 269 258 18 0 100 1	(*2) Msd(x) = 332 kgf.m Msd(y) = 70 kgf.m Mrd(x) = 3967 kgf.m Mrd(y) = 831 kgf.m Mrd/Msd=11.94	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P20	19.00 X 60.00	100.00 RR 18.21	28.66 16.28	417 209	417 167 209	176 426 385 34 1 6 0	(*2) Msd(x) = 593 kgf.m Msd(y) = 1804 kgf.m Mrd(x) = 5077 kgf.m Mrd(y) = 15436 kgf.m Mrd/Msd=8.56	6.28 2 ø 20.0 12.57 4 ø 20.0 2.2
P21	19.00 X 60.00	506.00 RR 92.15	37.76 20.17	124 62	124 49 62	658 732 720 2544 26 31 0	(*2) Msd(x) = 3352 kgf.m Msd(y) = 648 kgf.m Mrd(x) = 5204 kgf.m Mrd(y) = 1006 kgf.m Mrd/Msd=1.55	2.45 2 ø 12.5 4.91 4 ø 12.5 0.9
P22	35.00 X 80.00	100.00 RR 9.89	46.35 25.12	1 0	1 0 0	1181 1182 1182 22 0 197	(*2) Msd(x) = 1182 kgf.m Msd(y) = 1662 kgf.m Mrd(x) = 23810 kgf.m Mrd(y) = 33482 kgf.m	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6

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(cm²)
		lih vínc esb H (cm)	Zr	MHd topo MHd base (kgf.m)	MHsdtopo MHsdcentro MHsdbase (kgf.m)	MB2d MBcd		As h
						MH2d MHcd (kgf.m)		% armad
					831	3	Mrd/Msd=20.14	
P23	19.00 X 40.00	100.00 RR 18.21	46.18 16.62	343 172	343 137 172	612 819 784	(*2) Msd(x) = 956 kgf.m Msd(y) = 460 kgf.m	4.02 2 ø 16.0 8.04 4 ø 16.0
		100.00 RR 8.65	0.34 0.00 0.00	460 230	460 184 230	55 2 18 1	Mrd(x) = 5678 kgf.m Mrd(y) = 2730 kgf.m Mrd/Msd=5.94	2.1
P24	19.00 X 40.00	100.00 RR 18.21	75.68 24.14	1 0	1 0 0	1566 1566 1566	(*2) Msd(x) = 1660 kgf.m Msd(y) = 138 kgf.m	4.02 2 ø 16.0 8.04 4 ø 16.0
		100.00 RR 8.65	0.56 0.00 0.00	345 173	345 138 173	91 2 30 1	Mrd(x) = 5774 kgf.m Mrd(y) = 480 kgf.m Mrd/Msd=3.48	2.1
P25	19.00 X 40.00	100.00 RR 18.21	45.81 16.38	344 172	344 138 172	604 811 776	(*2) Msd(x) = 948 kgf.m Msd(y) = 438 kgf.m	4.02 2 ø 16.0 8.04 4 ø 16.0
		100.00 RR 8.65	0.34 0.00 0.00	441 220	438 175 219	55 2 18 0	Mrd(x) = 5714 kgf.m Mrd(y) = 2641 kgf.m Mrd/Msd=6.03	2.1
P26	35.00 X 80.00	100.00 RR 9.89	46.46 25.12	2 1	0 0 0	1185 1185 1185	(*2) Msd(x) = 1185 kgf.m Msd(y) = 1733 kgf.m	9.42 3 ø 20.0 18.85 6 ø 20.0
		506.00 RR 21.88	0.09 0.00 0.00	1733 867	1733 693 867	22 0 197 4	Mrd(x) = 23547 kgf.m Mrd(y) = 34446 kgf.m Mrd/Msd=19.87	1.6
P27	19.00 X 40.00	100.00 RR 18.21	65.54 28.10	316 158	316 126 158	1041 1230 1199	(*2) Msd(x) = 1439 kgf.m Msd(y) = 119 kgf.m	4.02 2 ø 16.0 8.04 4 ø 16.0
		100.00 RR 8.65	0.48 0.00 0.00	317 159	298 119 149	79 4 26 1	Mrd(x) = 6127 kgf.m Mrd(y) = 507 kgf.m Mrd/Msd=4.26	2.1
P28	19.00 X 40.00	100.00 RR 18.21	69.76 19.01	12 6	12 5 6	1432 1439 1438	(*2) Msd(x) = 1529 kgf.m Msd(y) = 126 kgf.m	4.02 2 ø 16.0 8.04 4 ø 16.0
		100.00 RR 8.65	0.51 0.00	316 158	315	84 2	Mrd(x) = 5983 kgf.m	

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)	MHsdtopo MHsdcentro MHsdbase (kgf.m)	MB2d MBcd		As h
						MH2d MHcd (kgf.m)		% armad
			0.00		126 158	28 1	Mrd(y) = 493 kgf.m Mrd/Msd=3.91	2.1
P29	19.00 X 40.00	100.00 RR 18.21	56.49 23.95	348 174	348 139 174	821 1030 995 68 3 22 1	(*2) Msd(x) = 1169 kgf.m Msd(y) = 412 kgf.m Mrd(x) = 5795 kgf.m Mrd(y) = 2043 kgf.m Mrd/Msd=4.96	4.02 2 ø 16.0 8.04 4 ø 16.0 2.1
P30	Circ 0.00 X 40.00 0.00	200.00 RR 20.00	97.44 57.33	333 167	333 133 167	2298 2497 2464 487 12 23 487 10	Msd(x) = 133 kgf.m Msd(y) = 3128 kgf.m Mrd(x) = 14969 kgf.m Mrd(y) = 0 kgf.m Mrd/Msd=4.78	18.85 6 ø 20.0 1.5
P31	Circ 0.00 X 40.00 0.00	200.00 RR 20.00	103.89 62.37	238 119	238 95 119	2567 2710 2686 519 13 519 11	Msd(x) = 3337 kgf.m Msd(y) = 9 kgf.m Mrd(x) = 14750 kgf.m Mrd(y) = 0 kgf.m Mrd/Msd=4.42	18.85 6 ø 20.0 1.5
P32	35.00 X 80.00	100.00 RR 9.89	46.86 25.54	250 125	221 88 111	974 1106 1084 23 0 199 3	(*2) Msd(x) = 1195 kgf.m Msd(y) = 1226 kgf.m Mrd(x) = 25825 kgf.m Mrd(y) = 26489 kgf.m Mrd/Msd=21.61	9.42 3 ø 20.0 18.85 6 ø 20.0 1.6
P33	14.00 X 30.00	506.00 RR 125.05	8.37 5.69	29 14	26 10 13	103 118 116 613 6 11 0	(*2) Msd(x) = 934 kgf.m Msd(y) = 146 kgf.m Mrd(x) = 1704 kgf.m Mrd(y) = 266 kgf.m Mrd/Msd=1.82	2.45 2 ø 12.5 3.68 3 ø 12.5 1.8
P34	14.00 X 30.00	506.00 RR 125.05	13.31 8.88	14 7	13 5 6	192 199 198 973	(*2) Msd(x) = 1487 kgf.m Msd(y) = 121 kgf.m	2.45 2 ø 12.5 3.68 3 ø 12.5

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	MB2d MHcd (kgf.m)
		11.53	0.00 0.00	121	242 97 121	12 18 0	Mrd(x) = 1897 kgf.m Mrd(y) = 155 kgf.m Mrd/Msd=1.28	1.8	
P35	14.00 X 30.00	506.00 RR 125.05 100.00 RR 11.53	7.60 5.19 0.10 0.00 0.00	3 2 319 160	3 1 2 319 128 160	114 115 115 556 3 10 0	(*2) Msd(x) = 845 kgf.m Msd(y) = 160 kgf.m Mrd(x) = 1664 kgf.m Mrd(y) = 314 kgf.m Mrd/Msd=1.97	2.45 2 ø 12.5 3.68 3 ø 12.5 1.8	
P36	14.00 X 30.00	506.00 RR 125.05 100.00 RR 11.53	11.43 7.70 0.15 0.00 0.00	14 7 364 182	14 6 7 364 145 182	161 170 168 836 9 15 0	(*2) Msd(x) = 1276 kgf.m Msd(y) = 182 kgf.m Mrd(x) = 1806 kgf.m Mrd(y) = 257 kgf.m Mrd/Msd=1.41	2.45 2 ø 12.5 3.68 3 ø 12.5 1.8	
P37	14.00 X 30.00	100.00 RR 24.71 100.00 RR 11.53	5.19 3.62 0.07 0.00 0.00	1066 533 59 29	1066 427 533 59 23 29	20 10 20 15 2 2 0	Msd(x) = 1359 kgf.m Msd(y) = 73 kgf.m Mrd(x) = 1631 kgf.m Mrd(y) = 88 kgf.m Mrd/Msd=1.20	2.45 2 ø 12.5 3.68 3 ø 12.5 1.8	
P38	14.00 X 30.00	100.00 RR 24.71 100.00 RR 11.53	10.42 7.33 0.14 0.00 0.00	465 232 134 67	465 186 232 134 54 67	41 20 41 18 2 5 0	(*2) Msd(x) = 632 kgf.m Msd(y) = 168 kgf.m Mrd(x) = 1710 kgf.m Mrd(y) = 454 kgf.m Mrd/Msd=2.71	2.45 2 ø 12.5 3.68 3 ø 12.5 1.8	
P39	14.00 X 30.00	100.00 RR 24.71 100.00 RR 11.53	3.77 2.49 0.05 0.00 0.00	18 9 55 27	18 7 9 55 22 27	40 51 49 6 0 2 0	(*2) Msd(x) = 72 kgf.m Msd(y) = 68 kgf.m Mrd(x) = 1325 kgf.m Mrd(y) = 1249 kgf.m Mrd/Msd=18.31	2.45 2 ø 12.5 3.68 3 ø 12.5 1.8	
P40	14.00 X	100.00 RR 24.71	5.36 3.58	67 34	67 27 34	21 55 49	(*2) Msd(x) = 111 kgf.m Msd(y) = 99 kgf.m	2.45 2 ø 12.5 3.68	

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(cm²) As h % armad
	30.00	100.00 RR 11.53	0.07 0.00 0.00	79 40	79 32 40	8 0 3 0	Mrd(x) = 1372 kgf.m Mrd(y) = 1224 kgf.m Mrd/Msd=12.36	3 ø 12.5 1.8
P41	19.00 X 60.00	506.00 RR 92.15 100.00 RR 5.77	19.83 11.20 0.10 0.00 0.00	9 5 316 158	9 4 5 161 64 80	401 407 406 1336 5 17 0	(*2) Msd(x) = 1752 kgf.m Msd(y) = 64 kgf.m Mrd(x) = 9759 kgf.m Mrd(y) = 358 kgf.m Mrd/Msd=5.57	6.28 2 ø 20.0 15.71 5 ø 20.0 2.8
P42	19.00 X 60.00	100.00 RR 18.21 100.00 RR 5.77	13.90 8.60 0.07 0.00 0.00	698 349 56 28	698 279 349 56 23 28	60 30 60 16 1 3 0	(*2) Msd(x) = 698 kgf.m Msd(y) = 395 kgf.m Mrd(x) = 8324 kgf.m Mrd(y) = 4719 kgf.m Mrd/Msd=11.93	6.28 2 ø 20.0 15.71 5 ø 20.0 2.8

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