

MEMORIAL DE CÁLCULO

PROJETO ESTRUTURAL: EMEI PASTOR RAMÃO

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CAMPO BOM / RS

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Determinação da Capacidade de suporte do solo

Sondagem

Furos HJ01, HJ01-A, HJ01-B – IMPENETRÁVEL A 1,05 METRO

Furos HJ02, HJ03, HJ04, HJ05 – AREIA DE GRANULAÇÃO FINA, ARGILOSA

Tabela 3.2 NBR 6122

AREIA MEDIANAMENTE COMPACTA = 0,2 Mpa

Tensão adotada = 0,18Mpa = 1,8 kgf/cm²

Relatório de Resultados das Sapatas

TERREO	fck = 300.00 kgf/cm ²	E = 268384 kgf/cm ²	Peso Espec = 2500.00 kgf/m ³
Lance 1		cobr = 5.00 cm	

Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
S1	95.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	8 ø 8.0 c/11 (4.02 cm²)		
S2	105.00 150.00	20.00 30.00	13 ø 8.0 c/11 (6.53 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S3	95.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	8 ø 8.0 c/11 (4.02 cm²)		
S4	85.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S5	85.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S6	95.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	8 ø 8.0 c/11 (4.02 cm²)		
S7	85.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S8	85.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S9	85.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S10	105.00 125.00	20.00 30.00	10 ø 8.0 c/12 (5.03 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S11	80.00 110.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S12	95.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	8 ø 8.0 c/11 (4.02 cm²)		
S13	80.00 110.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S14	100.00 115.00	20.00 30.00	10 ø 8.0 c/11 (5.03 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S15	80.00 110.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S16	80.00 110.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S17	115.00 135.00	20.00 35.00	12 ø 8.0 c/11 (6.03 cm²)	10 ø 8.0 c/11 (5.03 cm²)		
S18	110.00 130.00	20.00 30.00	10 ø 8.0 c/12 (5.03 cm²)	9 ø 8.0 c/12 (4.52 cm²)		
S19	110.00 130.00	20.00 30.00	10 ø 8.0 c/12 (5.03 cm²)	9 ø 8.0 c/12 (4.52 cm²)		
S20	100.00 120.00	20.00 30.00	10 ø 8.0 c/12 (5.03 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S21	90.00 110.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	8 ø 8.0 c/11 (4.02 cm²)		

S22	120.00 95.00	35.00 55.00	8 ø 10.0 c/11 (6.28 cm²)	10 ø 10.0 c/11 (7.85 cm²)		
S23	115.00 95.00	30.00 50.00	11 ø 8.0 c/8 (5.53 cm²)	9 ø 10.0 c/12 (7.07 cm²)		
S24	90.00	25.00	10 ø 8.0 c/11	8 ø 8.0 c/11		

	110.00	25.00	(5.03 cm²)	(4.02 cm²)		
S25	90.00 110.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	8 ø 8.0 c/11 (4.02 cm²)		

S26	135.00 155.00	20.00 40.00	15 ø 8.0 c/10 (7.54 cm²)	13 ø 8.0 c/10 (6.53 cm²)		
S27	180.00 200.00	20.00 55.00	24 ø 8.0 c/8 (12.06 cm²)	22 ø 8.0 c/8 (11.06 cm²)		
S28	135.00 155.00	20.00 40.00	15 ø 8.0 c/10 (7.54 cm²)	13 ø 8.0 c/10 (6.53 cm²)		
S29	105.00 145.00	20.00 30.00	13 ø 8.0 c/11 (6.53 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S30	95.00 125.00	25.00 25.00	11 ø 8.0 c/11 (5.53 cm²)	8 ø 8.0 c/11 (4.02 cm²)		
S31	110.00 145.00	20.00 30.00	13 ø 8.0 c/11 (6.53 cm²)	9 ø 8.0 c/12 (4.52 cm²)		
S32	60.00 80.00	25.00 25.00	7 ø 8.0 c/11 (3.52 cm²)	6 ø 8.0 c/10 (3.02 cm²)		
S33	115.00 145.00	20.00 35.00	14 ø 8.0 c/10 (7.04 cm²)	10 ø 8.0 c/11 (5.03 cm²)		
S34	145.00 170.00	20.00 45.00	18 ø 8.0 c/9 (9.05 cm²)	14 ø 8.0 c/10 (7.04 cm²)		
S35	120.00 145.00	45.00 70.00	17 ø 10.0 c/8 (13.35 cm²)	13 ø 10.0 c/9 (10.21 cm²)		
S36	110.00 145.00	35.00 60.00	14 ø 10.0 c/10 (11.00 cm²)	10 ø 10.0 c/11 (7.85 cm²)		
S37	140.00 170.00	20.00 40.00	16 ø 8.0 c/10 (8.04 cm²)	13 ø 8.0 c/10 (6.53 cm²)		
S38	145.00 175.00	20.00 45.00	19 ø 8.0 c/9 (9.55 cm²)	14 ø 8.0 c/10 (7.04 cm²)		
S39	80.00 100.00	25.00 25.00	9 ø 8.0 c/11 (4.52 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S40	85.00 105.00	25.00 25.00	9 ø 8.0 c/11 (4.52 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S41	165.00 185.00	20.00 50.00	22 ø 8.0 c/8 (11.06 cm²)	18 ø 8.0 c/9 (9.05 cm²)		
S42	150.00 170.00	20.00 45.00	18 ø 8.0 c/9 (9.05 cm²)	14 ø 8.0 c/10 (7.04 cm²)		

S43	110.00 130.00	20.00 30.00	10 ø 8.0 c/12 (5.03 cm²)	9 ø 8.0 c/12 (4.52 cm²)		
S44	115.00 145.00	20.00 35.00	14 ø 8.0 c/10 (7.04 cm²)	10 ø 8.0 c/11 (5.03 cm²)		
S45	90.00 120.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	8 ø 8.0 c/11 (4.02 cm²)		
S46	105.00 135.00	20.00 30.00	12 ø 8.0 c/11 (6.03 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S47	105.00 130.00	20.00 30.00	11 ø 8.0 c/11 (5.53 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S48	110.00 140.00	20.00 30.00	12 ø 8.0 c/11 (6.03 cm²)	9 ø 8.0 c/12 (4.52 cm²)		
S49	155.00 180.00	20.00 45.00	19 ø 8.0 c/9 (9.55 cm²)	15 ø 8.0 c/10 (7.54 cm²)		
S50	115.00 150.00	40.00 65.00	16 ø 10.0 c/9 (12.57 cm²)	11 ø 10.0 c/10 (8.64 cm²)		
S51	115.00 140.00	40.00 65.00	15 ø 10.0 c/9 (11.78 cm²)	11 ø 10.0 c/10 (8.64 cm²)		
S52	145.00 175.00	20.00 45.00	19 ø 8.0 c/9 (9.55 cm²)	14 ø 8.0 c/10 (7.04 cm²)		
S53	135.00 165.00	20.00 40.00	18 ø 8.0 c/9 (9.05 cm²)	13 ø 8.0 c/10 (6.53 cm²)		
S54	90.00 110.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	8 ø 8.0 c/11 (4.02 cm²)		
S55	85.00 105.00	25.00 25.00	9 ø 8.0 c/11 (4.52 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S56	80.00 110.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S57	85.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S58	90.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	8 ø 8.0 c/11 (4.02 cm²)		
S59	100.00 125.00	20.00 30.00	11 ø 8.0 c/11 (5.53 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S60	105.00 135.00	20.00 30.00	12 ø 8.0 c/11 (6.03 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S61	100.00 130.00	20.00 30.00	11 ø 8.0 c/11 (5.53 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S62	95.00 125.00	25.00 25.00	11 ø 8.0 c/11 (5.53 cm²)	8 ø 8.0 c/11 (4.02 cm²)		
S63	125.00 95.00	35.00 55.00	8 ø 10.0 c/11 (6.28 cm²)	11 ø 10.0 c/11 (8.64 cm²)		
S64	105.00 90.00	30.00 50.00	10 ø 8.0 c/8 (5.03 cm²)	12 ø 8.0 c/8 (6.03 cm²)		

S65	100.00 130.00	20.00 30.00	11 ø 8.0 c/11 (5.53 cm²)	8 ø 8.0 c/12 (4.02 cm²)		
S66	85.00 115.00	25.00 25.00	10 ø 8.0 c/11 (5.03 cm²)	7 ø 8.0 c/11 (3.52 cm²)		
S67	120.00 150.00	20.00 35.00	14 ø 8.0 c/10 (7.04 cm²)	10 ø 8.0 c/11 (5.03 cm²)		
S68	110.00 140.00	20.00 30.00	12 ø 8.0 c/11 (6.03 cm²)	9 ø 8.0 c/12 (4.52 cm²)		

Relatório de Cálculos das Sapatas

TERREO	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 1		cobr = 5.00 cm	

Esforços e pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm²)	Pressão Sig2 (kgf/cm²)	Pressão Sig3 (kgf/cm²)	Pressão Sig4 (kgf/cm²)
S1	92.69 185.38	0.64 0.67	13.90 16.61	1.56 (lim = 1.80)	1.66 (lim = 1.80)	1.49 (lim = 1.80)	1.38 (lim = 1.80)
S2	144.50 469.61	0.58 0.37	21.67 25.55	1.68 (lim = 1.80)	1.78 (lim = 1.80)	1.55 (lim = 1.80)	1.44 (lim = 1.80)
S3	92.78 185.55	0.65 0.54	13.92 16.62	1.56 (lim = 1.80)	1.66 (lim = 1.80)	1.49 (lim = 1.80)	1.38 (lim = 1.80)
S4	85.53 213.82	0.04 0.71	12.83 15.20	1.60 (lim = 1.80)	1.72 (lim = 1.80)	1.50 (lim = 1.80)	1.37 (lim = 1.80)
S5	80.52 201.31	0.04 0.95	12.08 14.44	1.53 (lim = 1.80)	1.64 (lim = 1.80)	1.43 (lim = 1.80)	1.31 (lim = 1.80)
S6	95.13 190.26	0.31 0.81	14.27 16.98	1.59 (lim = 1.80)	1.70 (lim = 1.80)	1.52 (lim = 1.80)	1.41 (lim = 1.80)
S7	80.29 200.73	0.24 0.38	12.04 14.41	1.52 (lim = 1.80)	1.64 (lim = 1.80)	1.42 (lim = 1.80)	1.31 (lim = 1.80)
S8	88.43 221.09	0.19 0.68	13.27 15.63	1.65 (lim = 1.80)	1.78 (lim = 1.80)	1.54 (lim = 1.80)	1.42 (lim = 1.80)
S9	83.21 208.03	0.08 0.27	12.48 14.85	1.57 (lim = 1.80)	1.69 (lim = 1.80)	1.47 (lim = 1.80)	1.35 (lim = 1.80)
S10	116.86 233.72	0.18 0.44	17.53 20.81	1.62 (lim = 1.80)	1.72 (lim = 1.80)	1.55 (lim = 1.80)	1.45 (lim = 1.80)
S11	76.99 192.48	0.64 0.87	11.55 13.66	1.61 (lim = 1.80)	1.74 (lim = 1.80)	1.50 (lim = 1.80)	1.37 (lim = 1.80)
S12	99.45 198.89	0.46 0.31	14.92 17.62	1.65 (lim = 1.80)	1.77 (lim = 1.80)	1.58 (lim = 1.80)	1.46 (lim = 1.80)
S13	77.07 192.66	0.33 0.90	11.56 13.67	1.61 (lim = 1.80)	1.74 (lim = 1.80)	1.50 (lim = 1.80)	1.37 (lim = 1.80)

S14	106.58 213.17	0.27 0.78	15.99 18.85	1.68 (lim = 1.80)	1.79 (lim = 1.80)	1.60 (lim = 1.80)	1.49 (lim = 1.80)
S15	75.05 187.62	0.40 0.72	11.26 13.37	1.57 (lim = 1.80)	1.70 (lim = 1.80)	1.47 (lim = 1.80)	1.34 (lim = 1.80)
S16	78.31 195.77	0.73 0.69	11.75 13.86	1.62 (lim = 1.80)	1.76 (lim = 1.80)	1.52 (lim = 1.80)	1.38 (lim = 1.80)
S17	139.24 278.48	0.20 0.04	20.89 24.83	1.63 (lim = 1.80)	1.72 (lim = 1.80)	1.56 (lim = 1.80)	1.47 (lim = 1.80)
S18	126.14 252.28	0.30 0.54	18.92 22.51	1.61 (lim = 1.80)	1.70 (lim = 1.80)	1.54 (lim = 1.80)	1.44 (lim = 1.80)
S19	124.78 249.56	0.05 0.17	18.72 22.31	1.59 (lim = 1.80)	1.68 (lim = 1.80)	1.52 (lim = 1.80)	1.43 (lim = 1.80)
S20	105.77 211.54	0.04 0.85	15.87 18.86	1.60 (lim = 1.80)	1.70 (lim = 1.80)	1.53 (lim = 1.80)	1.42 (lim = 1.80)
S21	87.67 175.33	0.10 0.74	13.15 15.59	1.61 (lim = 1.80)	1.72 (lim = 1.80)	1.53 (lim = 1.80)	1.41 (lim = 1.80)
S22	0.00	1.44	9.40	0.00	0.00	1.80	1.80

	0.00	0.43	12.47	(lim = 1.80)	(lim = 1.80)	(lim = 1.80)	(lim = 1.80)
S23	0.00 0.00	0.98 0.22	8.61 11.48	0.00 (lim = 1.80)	0.00 (lim = 1.80)	1.80 (lim = 1.80)	1.80 (lim = 1.80)
S24	88.84 177.68	0.11 1.18	13.33 15.76	1.63 (lim = 1.80)	1.75 (lim = 1.80)	1.55 (lim = 1.80)	1.43 (lim = 1.80)
S25	86.04 172.09	0.05 0.94	12.91 15.35	1.59 (lim = 1.80)	1.70 (lim = 1.80)	1.51 (lim = 1.80)	1.40 (lim = 1.80)
S26	189.20 378.39	0.90 1.02	28.38 33.79	1.64 (lim = 1.80)	1.72 (lim = 1.80)	1.58 (lim = 1.80)	1.50 (lim = 1.80)
S27	340.79 681.58	0.67 0.67	51.12 60.73	1.71 (lim = 1.80)	1.77 (lim = 1.80)	1.66 (lim = 1.80)	1.60 (lim = 1.80)
S28	194.57 389.14	0.27 0.87	29.19 34.60	1.68 (lim = 1.80)	1.77 (lim = 1.80)	1.62 (lim = 1.80)	1.54 (lim = 1.80)
S29	136.12 408.35	0.46 0.54	20.42 24.18	1.65 (lim = 1.80)	1.75 (lim = 1.80)	1.53 (lim = 1.80)	1.43 (lim = 1.80)
S30	105.32 263.30	0.63 0.92	15.80 18.72	1.63 (lim = 1.80)	1.74 (lim = 1.80)	1.53 (lim = 1.80)	1.41 (lim = 1.80)
S31	145.56 400.29	0.35 0.80	21.83 25.80	1.67 (lim = 1.80)	1.77 (lim = 1.80)	1.56 (lim = 1.80)	1.46 (lim = 1.80)
S32	30.40 60.80	0.20 0.86	4.56 5.66	1.21 (lim = 1.80)	1.34 (lim = 1.80)	1.15 (lim = 1.80)	1.02 (lim = 1.80)
S33	152.35 380.86	0.31 1.08	22.85 27.07	1.67 (lim = 1.80)	1.77 (lim = 1.80)	1.58 (lim = 1.80)	1.48 (lim = 1.80)
S34	232.52 581.30	0.45 1.61	34.88 41.30	1.72 (lim = 1.80)	1.80 (lim = 1.80)	1.63 (lim = 1.80)	1.55 (lim = 1.80)
S35	0.00 0.00	2.43 1.38	14.92 19.84	0.00 (lim = 1.80)	0.00 (lim = 1.80)	1.80 (lim = 1.80)	1.80 (lim = 1.80)
S36	0.00 0.00	2.19 1.59	13.69 18.03	0.00 (lim = 1.80)	0.00 (lim = 1.80)	1.80 (lim = 1.80)	1.80 (lim = 1.80)
S37	221.63 554.07	0.08 1.34	33.24 39.39	1.70 (lim = 1.80)	1.78 (lim = 1.80)	1.61 (lim = 1.80)	1.53 (lim = 1.80)

S38	236.93 592.33	0.16 2.78	35.54 42.16	1.70 (lim = 1.80)	1.77 (lim = 1.80)	1.61 (lim = 1.80)	1.54 (lim = 1.80)
S39	70.83 141.67	0.31 0.10	10.63 12.57	1.60 (lim = 1.80)	1.74 (lim = 1.80)	1.52 (lim = 1.80)	1.39 (lim = 1.80)
S40	74.21 148.42	0.28 0.19	11.13 13.31	1.53 (lim = 1.80)	1.65 (lim = 1.80)	1.46 (lim = 1.80)	1.34 (lim = 1.80)
S41	285.84 571.68	0.45 0.98	42.88 50.95	1.69 (lim = 1.80)	1.76 (lim = 1.80)	1.64 (lim = 1.80)	1.57 (lim = 1.80)
S42	231.18 462.36	0.32 0.69	34.68 41.35	1.65 (lim = 1.80)	1.72 (lim = 1.80)	1.59 (lim = 1.80)	1.52 (lim = 1.80)
S43	132.90 265.80	0.39 0.79	19.93 23.53	1.67 (lim = 1.80)	1.78 (lim = 1.80)	1.60 (lim = 1.80)	1.50 (lim = 1.80)
S44	155.39 388.48	0.50 0.79	23.31 27.53	1.70 (lim = 1.80)	1.80 (lim = 1.80)	1.60 (lim = 1.80)	1.51 (lim = 1.80)
S45	97.61 244.02	0.18 1.14	14.64 17.28	1.65 (lim = 1.80)	1.77 (lim = 1.80)	1.55 (lim = 1.80)	1.43 (lim = 1.80)
S46	124.22 310.54	0.21 0.85	18.63 22.16	1.61 (lim = 1.80)	1.71 (lim = 1.80)	1.52 (lim = 1.80)	1.42 (lim = 1.80)
S47	125.65 314.14	0.30 0.54	18.85 22.23	1.68 (lim = 1.80)	1.78 (lim = 1.80)	1.57 (lim = 1.80)	1.46 (lim = 1.80)
S48	140.66 351.66	0.26 0.80	21.10 24.94	1.67 (lim = 1.80)	1.77 (lim = 1.80)	1.57 (lim = 1.80)	1.47 (lim = 1.80)
S49	263.82 659.55	1.03 2.22	39.57 46.86	1.72 (lim = 1.80)	1.79 (lim = 1.80)	1.63 (lim = 1.80)	1.56 (lim = 1.80)
S50	0.00 0.00	2.41 0.85	14.77 19.57	0.00 (lim = 1.80)	0.00 (lim = 1.80)	1.80 (lim = 1.80)	1.80 (lim = 1.80)
S51	0.00 0.00	2.36 1.06	13.86 18.32	0.00 (lim = 1.80)	0.00 (lim = 1.80)	1.80 (lim = 1.80)	1.80 (lim = 1.80)
S52	237.85 594.63	0.63 2.15	35.68 42.29	1.70 (lim = 1.80)	1.78 (lim = 1.80)	1.62 (lim = 1.80)	1.54 (lim = 1.80)
S53	207.51 518.77	0.23 1.98	31.13 36.87	1.69 (lim = 1.80)	1.77 (lim = 1.80)	1.61 (lim = 1.80)	1.52 (lim = 1.80)
S54	85.75 171.49	0.18 0.66	12.86 15.30	1.58 (lim = 1.80)	1.70 (lim = 1.80)	1.51 (lim = 1.80)	1.39 (lim = 1.80)
S55	75.95 151.91	0.20 0.45	11.39 13.58	1.56 (lim = 1.80)	1.68 (lim = 1.80)	1.48 (lim = 1.80)	1.36 (lim = 1.80)
S56	76.97 192.43	0.01 0.00	11.55 13.66	1.61 (lim = 1.80)	1.74 (lim = 1.80)	1.50 (lim = 1.80)	1.37 (lim = 1.80)
S57	87.36 218.39	0.01 0.00	13.10 15.47	1.64 (lim = 1.80)	1.76 (lim = 1.80)	1.53 (lim = 1.80)	1.40 (lim = 1.80)
S58	89.08 200.43	0.37 0.45	13.36 15.90	1.57 (lim = 1.80)	1.69 (lim = 1.80)	1.49 (lim = 1.80)	1.37 (lim = 1.80)
S59	109.74 246.91	0.49 0.31	16.46 19.56	1.61 (lim = 1.80)	1.71 (lim = 1.80)	1.52 (lim = 1.80)	1.42 (lim = 1.80)
S60	126.77 316.92	0.06 0.23	19.02 22.54	1.63 (lim = 1.80)	1.73 (lim = 1.80)	1.53 (lim = 1.80)	1.43 (lim = 1.80)
S61	114.17 285.42	0.27 1.06	17.13 20.34	1.61 (lim = 1.80)	1.72 (lim = 1.80)	1.52 (lim = 1.80)	1.41 (lim = 1.80)
S62	100.60 251.50	0.69 0.84	15.09 18.01	1.56 (lim = 1.80)	1.67 (lim = 1.80)	1.47 (lim = 1.80)	1.36 (lim = 1.80)
S63	0.00 0.00	1.29 0.25	9.55 12.73	0.00 (lim = 1.80)	0.00 (lim = 1.80)	1.80 (lim = 1.80)	1.80 (lim = 1.80)

S64	0.00 0.00	1.23 0.20	7.90 10.40	0.00 (lim = 1.80)	0.00 (lim = 1.80)	1.80 (lim = 1.80)	1.80 (lim = 1.80)
S65	110.56 276.39	0.71 1.14	16.58 19.80	1.57 (lim = 1.80)	1.67 (lim = 1.80)	1.48 (lim = 1.80)	1.37 (lim = 1.80)
S66	85.48 213.71	0.40 1.39	12.82 15.19	1.61 (lim = 1.80)	1.73 (lim = 1.80)	1.50 (lim = 1.80)	1.38 (lim = 1.80)
S67	163.07 407.68	0.29 1.17	24.46 29.03	1.66 (lim = 1.80)	1.75 (lim = 1.80)	1.57 (lim = 1.80)	1.48 (lim = 1.80)
S68	142.28 355.71	0.79 0.92	21.34 25.19	1.68 (lim = 1.80)	1.78 (lim = 1.80)	1.59 (lim = 1.80)	1.49 (lim = 1.80)

Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msd (kgf.m)	Mrd / Msd	Mrd Msd (kgf.m)	Mrd / Msd	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
S1	7890.53 92.69	85.13 (lim = 1.50)	9551.69 185.38	51.52 (lim = 1.50)	4.92 0.90	5.46 lim = (1.50)		
S2	13415.91 144.50	92.85 (lim = 1.50)	19165.58 469.61	40.81 (lim = 1.50)	7.09 0.62	11.47 lim = (1.50)		
S3	7896.45 92.78	85.11 (lim = 1.50)	9558.86 185.55	51.52 (lim = 1.50)	4.92 0.82	5.98 lim = (1.50)		
S4	6457.92 85.53	75.51 (lim = 1.50)	8737.19 213.82	40.86 (lim = 1.50)	4.40 0.71	6.20 lim = (1.50)		
S5	6138.86 80.52	76.24 (lim = 1.50)	8305.52 201.31	41.26 (lim = 1.50)	4.40 0.95	4.65 lim = (1.50)		
S6	8064.12 95.13	84.77 (lim = 1.50)	9761.83 190.26	51.31 (lim = 1.50)	4.92 0.85	5.77 lim = (1.50)		
S7	6124.08 80.29	76.27 (lim = 1.50)	8285.52 200.73	41.28 (lim = 1.50)	4.40 0.41	10.75 lim = (1.50)		
S8	6643.23 88.43	75.12 (lim = 1.50)	8987.90 221.09	40.65 (lim = 1.50)	4.40 0.68	6.43 lim = (1.50)		
S9	6310.30 83.21	75.83 (lim = 1.50)	8527.21 207.73	41.05 (lim = 1.50)	4.40 0.28	15.89 lim = (1.50)		
S10	10927.24 116.86	93.51 (lim = 1.50)	13008.62 233.72	55.66 (lim = 1.50)	5.91 0.45	13.01 lim = (1.50)		
S11	5463.56 76.99	70.96 (lim = 1.50)	7512.39 192.48	39.03 (lim = 1.50)	3.96 1.02	3.89 lim = (1.50)		
S12	8371.81	84.18	10134.30	50.95	4.92	10.47		

	99.45	(lim = 1.50)	198.89	(lim = 1.50)	0.47	lim = (1.50)		
S13	5467.91 77.07	70.95 (lim = 1.50)	7518.37 192.66	39.02 (lim = 1.50)	3.96 0.94	4.23 lim = (1.50)		
S14	9423.66 106.58	88.42 (lim = 1.50)	10837.21 213.17	50.84 (lim = 1.50)	5.17 0.81	6.38 lim = (1.50)		

S15	5346.97 75.05	71.25 (lim = 1.50)	7352.08 187.62	39.19 (lim = 1.50)	3.96 0.80	4.98 lim = (1.50)		
S16	5540.67 78.28	70.78 (lim = 1.50)	7618.42 195.69	38.93 (lim = 1.50)	3.96 0.95	4.17 lim = (1.50)		
S17	14279.64 139.24	102.55 (lim = 1.50)	16763.05 278.48	60.19 (lim = 1.50)	6.99 0.20	35.60 lim = (1.50)		
S18	12381.92 126.14	98.16 (lim = 1.50)	14633.18 252.28	58.00 (lim = 1.50)	6.44 0.59	10.82 lim = (1.50)		
S19	12269.73 124.78	98.33 (lim = 1.50)	14500.58 249.56	58.10 (lim = 1.50)	6.44 0.17	38.06 lim = (1.50)		
S20	9427.99 105.77	89.14 (lim = 1.50)	11313.59 211.54	53.48 (lim = 1.50)	5.40 0.85	6.37 lim = (1.50)		
S21	7014.95 87.67	80.02 (lim = 1.50)	8573.83 175.33	48.90 (lim = 1.50)	4.46 0.74	6.00 lim = (1.50)		
S22					5.13 1.47	3.48 lim = (1.50)		
S23					4.92 0.98	4.99 lim = (1.50)		
S24	7094.18 88.84	79.85 (lim = 1.50)	8670.66 177.68	48.80 (lim = 1.50)	4.46 1.18	3.77 lim = (1.50)		
S25	6905.38 86.04	80.25 (lim = 1.50)	8439.91 172.09	49.04 (lim = 1.50)	4.46 0.94	4.75 lim = (1.50)		
S26	22810.28 189.20	120.56 (lim = 1.50)	26189.58 378.39	69.21 (lim = 1.50)	9.42 1.25	7.54 lim = (1.50)		
S27	54657.04 340.79	160.38 (lim = 1.50)	60730.04 681.58	89.10 (lim = 1.50)	16.20 0.77	21.15 lim = (1.50)		
S28	23354.37 194.57	120.03 (lim = 1.50)	26814.27 389.14	68.91 (lim = 1.50)	9.42 0.88	10.66 lim = (1.50)		
S29	12693.52 136.12	93.26 (lim = 1.50)	17529.14 408.35	42.93 (lim = 1.50)	6.85 0.65	10.52 lim = (1.50)		
S30	8889.78 105.32	84.41 (lim = 1.50)	11697.08 263.30	44.42 (lim = 1.50)	5.34 1.06	5.05 lim = (1.50)		

S31	14191.43 145.56	97.49 (lim = 1.50)	18706.89 400.29	46.73 (lim = 1.50)	7.18 0.82	8.74 lim = (1.50)		
S32	1698.09 30.40	55.85 (lim = 1.50)	2264.12 60.80	37.24 (lim = 1.50)	2.16 0.86	2.51 lim = (1.50)		
S33	15564.68 152.35	102.17 (lim = 1.50)	19625.03 380.86	51.53 (lim = 1.50)	7.50 1.11	6.76 lim = (1.50)		
S34	29944.16 232.52	128.78 (lim = 1.50)	35106.94 581.30	60.39 (lim = 1.50)	11.09 1.66	6.68 lim = (1.50)		
S35					7.83 2.72	2.88 lim = (1.50)		
S36					7.18 2.63	2.73 lim = (1.50)		
S37	27572.09 221.63	124.41 (lim = 1.50)	33480.40 554.07	60.43 (lim = 1.50)	10.71 1.34	8.01 lim = (1.50)		
S38	30563.43 236.93	129.00 (lim = 1.50)	36886.90 592.33	62.27 (lim = 1.50)	11.42 2.78	4.11 lim = (1.50)		
S39	5026.05 70.83	70.96 (lim = 1.50)	6282.56 141.67	44.35 (lim = 1.50)	3.60 0.31	11.54 lim = (1.50)		
S40	5658.66 74.21	76.25 (lim = 1.50)	6990.11 148.42	47.10 (lim = 1.50)	4.02 0.33	12.22 lim = (1.50)		
S41	42035.23 285.84	147.06 (lim = 1.50)	47130.41 571.68	82.44 (lim = 1.50)	13.74 1.05	13.11 lim = (1.50)		
S42	31015.85 231.18	134.16 (lim = 1.50)	35151.30 462.36	76.03 (lim = 1.50)	11.47 0.72	15.98 lim = (1.50)		
S43	12939.62 132.90	97.36 (lim = 1.50)	15292.28 265.80	57.53 (lim = 1.50)	6.44 0.85	7.54 lim = (1.50)		

S44	15827.55 155.39	101.85 (lim = 1.50)	19956.48 388.48	51.37 (lim = 1.50)	7.50 0.87	8.62 lim = (1.50)		
S45	7774.39 97.61	79.65 (lim = 1.50)	10365.85 244.02	42.48 (lim = 1.50)	4.86 1.14	4.26 lim = (1.50)		
S46	11631.52 124.22	93.64 (lim = 1.50)	14954.81 310.54	48.16 (lim = 1.50)	6.38 0.85	7.48 lim = (1.50)		
S47	11666.24 125.57	92.90 (lim = 1.50)	14443.92 313.93	46.01 (lim = 1.50)	6.14 0.58	10.56 lim = (1.50)		
S48	13718.39 140.66	97.53 (lim = 1.50)	17459.76 351.66	49.65 (lim = 1.50)	6.93 0.83	8.36 lim = (1.50)		
S49	36318.38 263.82	137.66 (lim = 1.50)	42176.18 659.55	63.95 (lim = 1.50)	12.55 2.41	5.21 lim = (1.50)		
S50					7.76 2.49	3.12 lim = (1.50)		
S51					7.25 2.50	2.90 lim = (1.50)		
S52	30663.79 237.85	128.92 (lim = 1.50)	36988.43 594.26	62.24 (lim = 1.50)	11.42 2.21	5.18 lim = (1.50)		
S53	24885.25 207.51	119.92 (lim = 1.50)	30415.31 518.77	58.63 (lim = 1.50)	10.02 1.99	5.04 lim = (1.50)		
S54	6885.24 85.75	80.30 (lim = 1.50)	8415.30 171.49	49.07 (lim = 1.50)	4.46 0.67	6.69 lim = (1.50)		
S55	5769.71 75.95	75.96 (lim = 1.50)	7127.28 151.91	46.92 (lim = 1.50)	4.02 0.48	8.40 lim = (1.50)		
S56	5462.36 76.97	70.96 (lim = 1.50)	7510.74 192.43	39.03 (lim = 1.50)	3.96 0.01	775.53 lim = (1.50)		
S57	6574.44 87.36	75.26 (lim = 1.50)	8894.84 218.39	40.73 (lim = 1.50)	4.40 0.01	662.87 lim = (1.50)		
S58	7154.56 89.08	80.32 (lim = 1.50)	9141.94 200.43	45.61 (lim = 1.50)	4.66 0.51	9.16 lim = (1.50)		
S59	9781.80 109.74	89.14 (lim = 1.50)	12227.25 246.91	49.52 (lim = 1.50)	5.63 0.50	11.25 lim = (1.50)		
S60	11832.43 126.77	93.34 (lim = 1.50)	15213.12 316.92	48.00 (lim = 1.50)	6.38 0.23	28.23 lim = (1.50)		
S61	10170.27 114.17	89.08 (lim = 1.50)	13221.36 285.42	46.32 (lim = 1.50)	5.85 1.07	5.46 lim = (1.50)		
S62	8553.41 100.60	85.02 (lim = 1.50)	11254.49 251.50	44.75 (lim = 1.50)	5.34 1.02	5.24 lim = (1.50)		
S63					5.34 1.30	4.13 lim = (1.50)		
S64					4.25 1.23	3.46 lim = (1.50)		
S65	9895.04 110.50	89.55 (lim = 1.50)	12863.55 276.24	46.57 (lim = 1.50)	5.85 1.29	4.54 lim = (1.50)		
S66	6455.14 85.48	75.51 (lim = 1.50)	8733.43 213.71	40.87 (lim = 1.50)	4.40 1.41	3.12 lim = (1.50)		
S67	17413.32 163.04	106.80 (lim = 1.50)	21766.65 407.61	53.40 (lim = 1.50)	8.10 1.17	6.90 lim = (1.50)		

S68	13851.89 142.28	97.35 (lim = 1.50)	17629.68 355.71	49.56 (lim = 1.50)	6.93 1.18	5.89 lim = (1.50)		
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Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H
	Md (kgf.m/m) As (cm ² /m)	Md (kgf.m/m) As (cm ² /m)	Md (kgf.m/m) A's (cm ² /m)	Md (kgf.m/m) A's (cm ² /m)
S1	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00

Dimensionamento

S2	2823.03 4.55	2596.71 4.18	0.00 0.00	0.00 0.00
S3	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S4	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S5	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S6	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S7	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S8	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S9	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S10	2722.36 4.38	2596.71 4.18	0.00 0.00	0.00 0.00
S11	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S12	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S13	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S14	2747.84 4.42	2606.37 4.20	0.00 0.00	0.00 0.00
S15	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S16	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S17	3570.80 4.79	3369.10 4.52	0.00 0.00	0.00 0.00
S18	2710.93 4.36	2587.86 4.17	0.00 0.00	0.00 0.00
S19	2710.93 4.36	2587.86 4.17	0.00 0.00	0.00 0.00
S20	2734.63 4.40	2606.37 4.20	0.00 0.00	0.00 0.00
S21	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00

S22	8682.81 7.07	9107.50 7.33	0.00 0.00	0.00 0.00
S23	7075.10 6.33	7495.43 6.70	0.00 0.00	0.00 0.00
S24	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S25	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S26	4501.65 5.18	4226.43 4.86	0.00 0.00	0.00 0.00
S27	7989.44 6.43	7458.73 6.00	0.00 0.00	0.00 0.00
S28	4501.65 5.18	4226.43 4.86	0.00 0.00	0.00 0.00
S29	2806.24 4.52	2596.71 4.18	0.00 0.00	0.00 0.00
S30	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S31	2776.05 4.47	2587.86 4.17	0.00 0.00	0.00 0.00
S32	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S33	3644.44	3369.10	0.00	0.00

	4.89	4.52	0.00	0.00
S34	5744.59 5.78	5219.48 5.25	0.00 0.00	0.00 0.00
S35	14840.67 9.27	13843.63 8.94	0.00 0.00	0.00 0.00
S36	10738.68 7.86	9986.21 7.47	0.00 0.00	0.00 0.00
S37	4584.59 5.27	4212.25 4.84	0.00 0.00	0.00 0.00
S38	5718.92 5.75	5219.48 5.25	0.00 0.00	0.00 0.00
S39	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S40	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S41	6722.76 6.01	6280.60 5.62	0.00 0.00	0.00 0.00
S42	5559.14 5.59	5202.31 5.23	0.00 0.00	0.00 0.00
S43	2710.93 4.36	2587.86 4.17	0.00 0.00	0.00 0.00
S44	3644.44 4.89	3369.10 4.52	0.00 0.00	0.00 0.00
S45	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S46	2768.10 4.46	2596.71 4.18	0.00 0.00	0.00 0.00

S47	2780.74 4.48	2596.71 4.18	0.00 0.00	0.00 0.00
S48	2756.25 4.44	2587.86 4.17	0.00 0.00	0.00 0.00
S49	5694.43 5.73	5186.15 5.22	0.00 0.00	0.00 0.00
S50	12646.68 8.50	11828.37 8.20	0.00 0.00	0.00 0.00
S51	12759.63 8.56	11828.37 8.20	0.00 0.00	0.00 0.00
S52	5718.92 5.75	5219.48 5.25	0.00 0.00	0.00 0.00
S53	4604.58 5.30	4226.43 4.86	0.00 0.00	0.00 0.00
S54	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S55	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S65	2780.74 4.48	2606.37 4.20	0.00 0.00	0.00 0.00
S66	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S67	3627.30 4.87	3356.37 4.50	0.00 0.00	0.00 0.00
S68	2756.25 4.44	2587.86 4.17	0.00 0.00	0.00 0.00
S56	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S57	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S58	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S59	2758.82 4.44	2606.37 4.20	0.00 0.00	0.00 0.00
S60	2768.10 4.46	2596.71 4.18	0.00 0.00	0.00 0.00
S61	2780.74 4.48	2606.37 4.20	0.00 0.00	0.00 0.00
S62	2241.31 4.51	2241.31 4.51	0.00 0.00	0.00 0.00
S63	8682.81 7.07	9194.34 7.40	0.00 0.00	0.00 0.00
S64	7112.96 6.36	7311.63 6.54	0.00 0.00	0.00 0.00

Lajeado/RS, fevereiro de 2025.

Proprietário:
Prefeitura de Campo Bom

MARCELO
LUIS
DECONTO:5
0833464000

Assinado de forma
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LUIS
DECONTO:508334640
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Eng.º Civil Marcelo Luis de Conto
CREA/RS 91.767