

ELEMENTOS DE CONTENÇÃO

CORTINAS AUTO-PORTANTES, CÁLCULO MANUAL E AUTOMÁTICO

Exemplo:

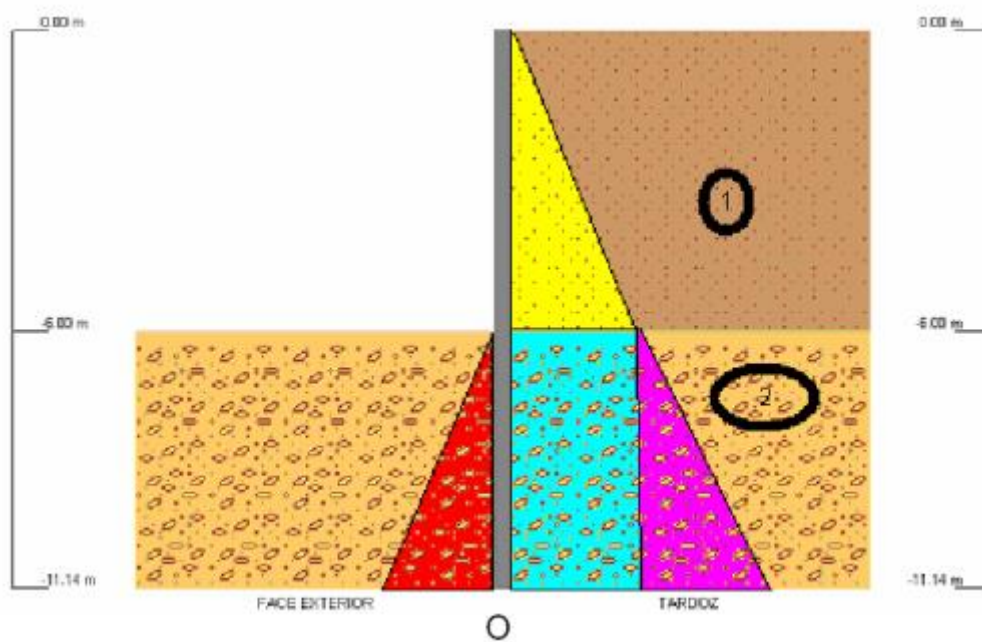


Fig. 1

1

$$\gamma = 18 \text{ kN/m}^3$$

$$\phi = 30^\circ$$

2

$$\gamma = 19 \text{ kN/m}^3$$

$$\phi = 33^\circ$$

$$K_a = \frac{1 - \sin \phi}{1 + \sin \phi}$$

$$K_p = \frac{1 + \sin \phi}{1 - \sin \phi}$$

$$K_{a1} = \frac{1 - \sin 30^\circ}{1 + \sin 30^\circ} = 0,333$$

Cortinas Auto-Portantes

$$K_{a2} = \frac{1 - \sin 33^\circ}{1 + \sin 33^\circ} = 0,295$$

$$K_{p1} = \frac{1 + \sin 33^\circ}{1 - \sin 33^\circ} = 3,392$$

$$I_{a1} = \frac{1}{2} K_{a1} \cdot \gamma_1 \cdot h_1^2 = \frac{1}{2} \cdot \frac{1}{3} \cdot 18,6,0^2 = 108 \text{ kN/m}$$

$$I_{a2} = K_{a2} \cdot \gamma_1 \cdot h_1 \cdot h_2 = 0,295 \cdot 18,6,0 \cdot f_0 = 31,86 \cdot f_0 \text{ kN/m}$$

$$I_{a3} = \frac{1}{2} K_{a2} \cdot \gamma_2 \cdot h_2^2 = \frac{1}{2} \cdot 0,295 \cdot 19 \cdot f_0^2 = 2,803 f_0^2 \text{ kN/m}$$

$$I_{p1} = \frac{1}{2} K_{p1} \cdot \gamma_2 \cdot h_2^2 = \frac{1}{2} \cdot 3,392 \cdot 19 \cdot f_0^2 = 32,22 f_0^2 \text{ kN/m}$$

- Determinação da ficha

$$\sum M_0 = 0 \Leftrightarrow 108 \cdot \left(\frac{6}{3} + f_0 \right) + 31,86 \cdot f_0 \cdot \frac{f_0}{2} + 2,803 \cdot f_0^2 \cdot \frac{f_0}{3} - 32,22 \cdot f_0^2 \cdot \frac{f_0}{3} = 0 \Leftrightarrow f_0 = 4,84 \text{ m}$$

$$f = 1,2 \cdot f_0 = 1,2 \cdot 4,84 = 5,81 \text{ m}$$

$$\text{Altura total da parede} = 6,0 + 5,81 = 11,81 \text{ m}$$

- Determinação do momento máximo

$$M = -9,806 \cdot x^3 + 15,93 \cdot x^2 + 108 \cdot x + 216$$

$$M_{\text{máx}} \Rightarrow \frac{dM}{dx} = 0$$

$$-29,42 \cdot x^2 + 31,86 \cdot x + 108 = 0 \Leftrightarrow x = 2,533 \text{ m}$$

$$M_{\text{máx}} = 432,4 \text{ kN.m/m}$$

z m	x m	V _{sd} kN/m	M _{sd} kNm/m
0	0	0.00	0
0.2	0.2	0.12	0.008
0.4	0.4	0.48	0.064
0.6	0.6	1.08	0.216
0.8	0.8	1.92	0.512
1	1	3.00	1
1.2	1.2	4.32	1.728
1.4	1.4	5.88	2.744
1.6	1.6	7.68	4.096
1.8	1.8	9.72	5.832
2	2	12.00	8
2.2	2.2	14.52	10.648
2.4	2.4	17.28	13.824
2.6	2.6	20.28	17.576
2.8	2.8	23.52	21.952
3	3	27.00	27
3.2	3.2	30.72	32.768
3.4	3.4	34.68	39.304
3.6	3.6	38.88	46.656
3.8	3.8	43.32	54.872
4.00	4.00	48.00	64
4.2	4.2	52.92	74.088
4.4	4.4	58.08	85.184
4.6	4.6	63.48	97.336
4.8	4.8	69.12	110.592
5	5	75.00	125
5.2	5.2	81.12	140.608
5.4	5.4	87.48	157.464
5.6	5.6	94.08	175.616
5.8	5.8	100.92	195.112
6	6	108.00	216
6.2	0.2	113.19	238.1587
6.4	0.4	116.04	261.121
6.6	0.6	116.52	284.4161
6.8	0.8	114.65	307.573
7	1	110.43	330.121
7.2	1.2	103.86	351.5892
7.4	1.4	94.93	371.5069
7.6	1.6	83.64	389.4031
7.8	1.8	70.00	404.8071
8	2	54.01	417.248
8.2	2.2	35.67	426.255
8.4	2.4	14.96	431.3572
8.6	2.6	-8.09	432.0838
8.8	2.8	-33.50	427.964
9	3	-61.26	418.527
9.2	3.2	-91.38	403.3019
9.4	3.4	-123.85	381.8179
9.6	3.6	-158.68	353.6041
9.8	3.8	-195.86	318.1898
10	4	-235.39	275.104
10.2	4.2	-277.28	223.876
10.4	4.4	-321.52	164.0349
10.6	4.6	-368.12	95.10998
10.8	4.8	-417.07	16.63027
10.84	4.84	-427.14	-0.25367

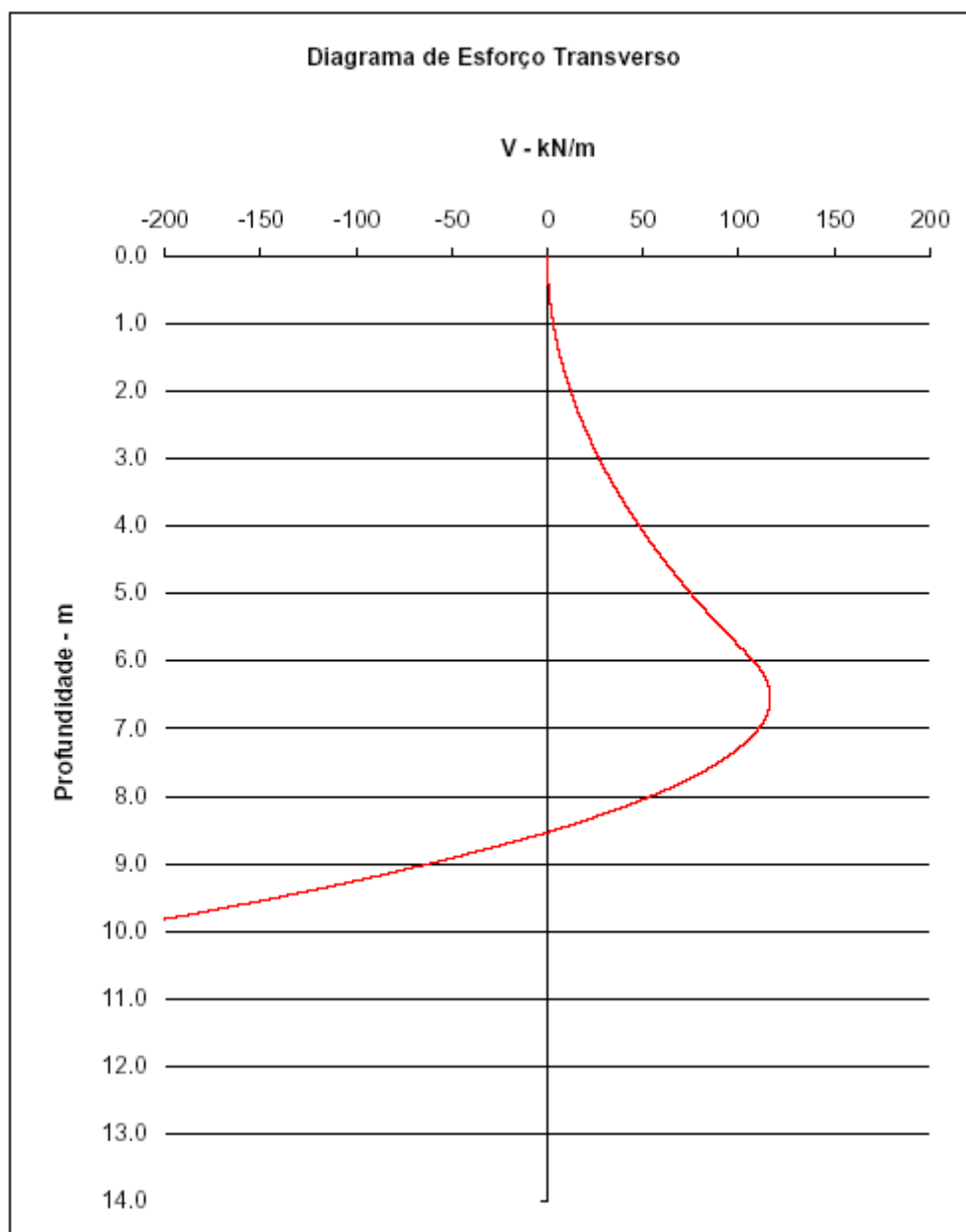


Fig. 2

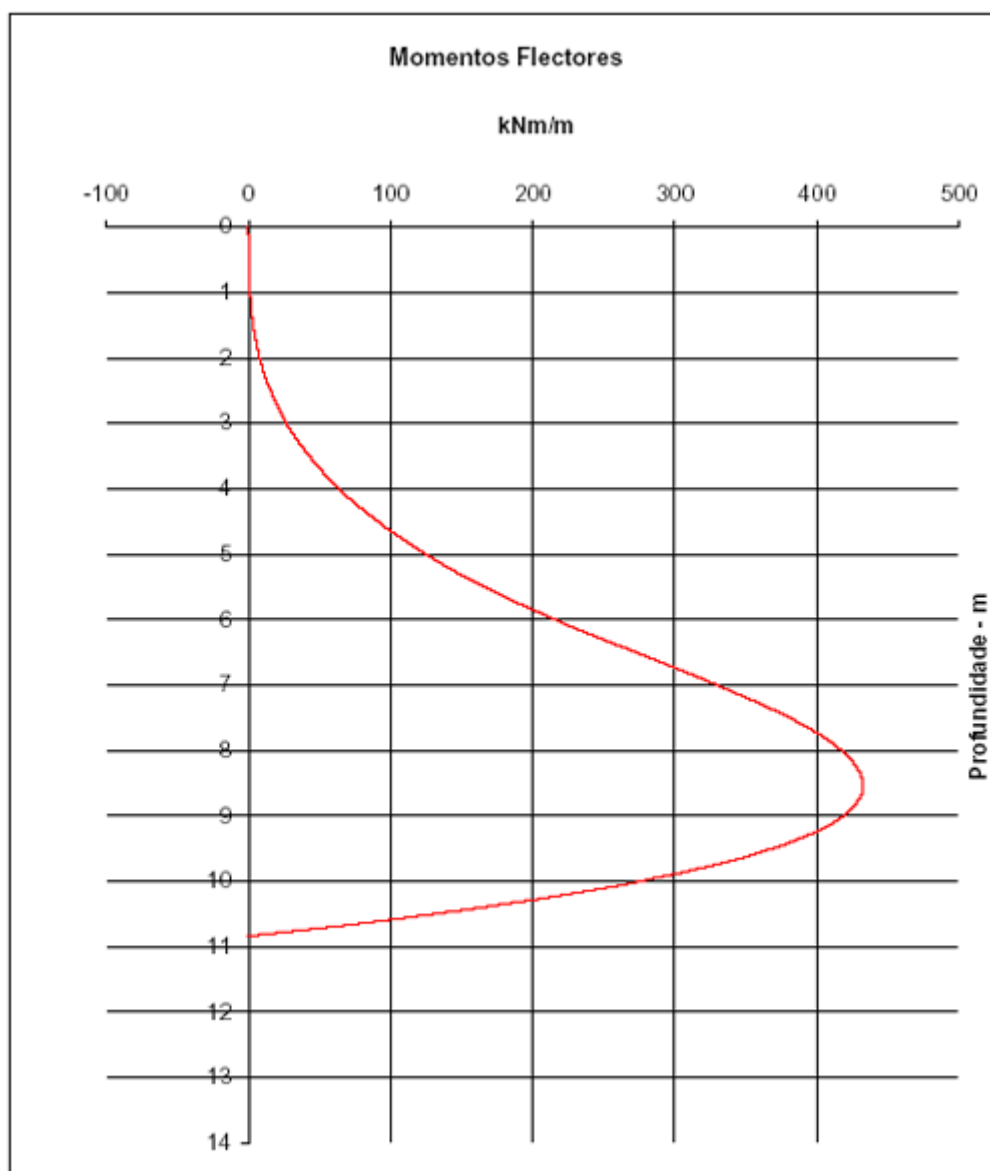


Fig. 3