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Anexo A

Inteligência Computacional

A1

Tabela Completa de Dados de Entrada e Saída

	Entradas					Saídas	
	r_c (mm)	L_c (m)	L_b (m)	A_s (mm ²)	Ps (%)	P_{cr} (N)	P_{cr}^* (N)
1	75,767	12	1,2	34,669	75	409367	0,337
2	30,462	30	0,6	34,669	75	6407,61	0,019
3	75,767	20	0,6	126,68	0	114594	0,094
4	30,462	20	1,2	16,18	30	23378,7	0,071
5	75,767	30	1,2	126,68	0	86188,7	0,071
6	30,462	20	0,6	16,18	45	10198,4	0,031
7	30,462	12	0,6	16,18	60	31950,3	0,097
8	30,462	12	1,2	16,18	0	47192,9	0,143
9	30,462	12	1,2	126,68	30	82013,6	0,249
10	75,767	12	0,6	16,18	45	450324	0,371
11	57,026	20	1,2	16,18	0	45339,7	0,063
12	30,462	12	0,9	126,68	75	66404,7	0,202
13	30,462	30	1,2	34,669	60	11169,1	0,034
14	57,026	30	0,6	126,68	30	33465,4	0,046
15	75,767	12	0,9	16,18	15	272688	0,224
16	57,026	12	0,9	34,669	30	176945	0,245
17	30,462	20	0,9	34,669	30	23565,9	0,072
18	30,462	20	0,6	126,68	75	24520,6	0,075
19	30,462	30	1,2	16,18	15	8487,97	0,026
20	75,767	30	1,2	126,68	15	119749	0,099
21	75,767	12	1,2	16,18	30	273524	0,225
22	57,026	20	0,6	126,68	60	74988,9	0,104
23	57,026	30	0,9	34,669	0	20709,8	0,029
24	30,462	12	0,9	16,18	45	48353,9	0,147
25	30,462	20	1,2	126,68	45	29839,7	0,091
26	57,026	30	0,6	16,18	75	8125,36	0,011
27	75,767	20	0,6	34,669	30	87052,7	0,072
28	57,026	20	1,2	16,18	45	51896,4	0,072
29	75,767	12	0,9	34,669	60	174972	0,144
30	57,026	12	1,2	34,669	60	208707	0,289
31	57,026	12	1,2	126,68	0	327552	0,454

32	75,767	12	0,9	16,18	0	273855	0,225
33	75,767	30	0,9	16,18	60	26600,9	0,022
34	57,026	30	0,6	16,18	45	12203,7	0,017
35	75,767	30	0,9	34,669	30	50460,3	0,070
36	57,026	20	0,9	126,68	45	135901	0,188
37	75,767	30	0,9	126,68	45	88797,3	0,073
38	57,026	30	0,9	34,669	45	26212	0,036
39	75,767	20	1,2	16,18	15	115076	0,095
40	30,462	30	0,6	16,18	0	3169,21	0,010
41	30,462	20	0,9	126,68	0	25270,7	0,077
42	57,026	30	0,9	126,68	60	55455,1	0,077
43	30,462	12	1,2	16,18	75	46929,7	0,143
44	30,462	20	1,2	34,669	15	25221,6	0,077
45	57,026	20	0,6	16,18	15	36204	0,050
46	57,026	12	1,2	16,18	15	168592	0,234
47	30,462	20	0,9	126,68	60	28641,1	0,087
48	57,026	12	0,6	16,18	45	74322,4	0,103
49	30,462	30	0,9	16,18	75	6729,08	0,020
50	75,767	20	0,9	126,68	30	213126	0,175
51	75,767	30	1,2	16,18	75	26396,3	0,022
52	57,026	20	0,9	16,18	30	43038,1	0,060
53	57,026	20	1,2	34,669	75	71493,7	0,099
54	57,026	20	0,9	16,18	60	32844,5	0,045
55	30,462	12	1,2	34,669	45	65615,2	0,199
56	30,462	30	0,9	126,68	15	11031	0,034
57	75,767	20	0,6	34,669	60	55340	0,046
58	75,767	20	0,9	16,18	75	40647,5	0,033
59	30,462	12	0,9	16,18	30	51490,5	0,157
60	30,462	12	0,6	126,68	15	59762,3	0,182
61	30,462	30	1,2	126,68	45	12654,8	0,038
62	30,462	30	0,6	16,18	30	4339,73	0,013
63	75,767	12	0,6	126,68	60	203200	0,167
64	75,767	20	0,9	34,669	45	95865,9	0,079
65	57,026	12	0,9	16,18	75	69246,4	0,096
66	75,767	20	1,2	126,68	60	267818	0,220
67	75,767	30	0,6	34,669	15	44294	0,036
68	57,026	30	1,2	126,68	75	70802,2	0,098
69	75,767	20	1,2	34,669	0	122003	0,100
70	75,767	12	1,2	126,68	45	659223	0,543
71	57,026	30	0,9	34,669	15	27304,4	0,038
72	57,026	30	1,2	34,669	30	38930,9	0,054
73	57,026	30	1,2	16,18	60	21381,4	0,030
74	75,767	12	0,6	126,68	75	340351	0,280

75	30,462	30	0,6	126,68	60	10038,2	0,031
76	30,462	12	0,9	34,669	0	50701	0,154
77	57,026	12	0,6	34,669	0	106170	0,147
78	30,462	20	0,9	16,18	15	15971,3	0,049

Anexo B

Resultados Experimentais

B.1

Primeira Coluna

B.1.1

Modo x

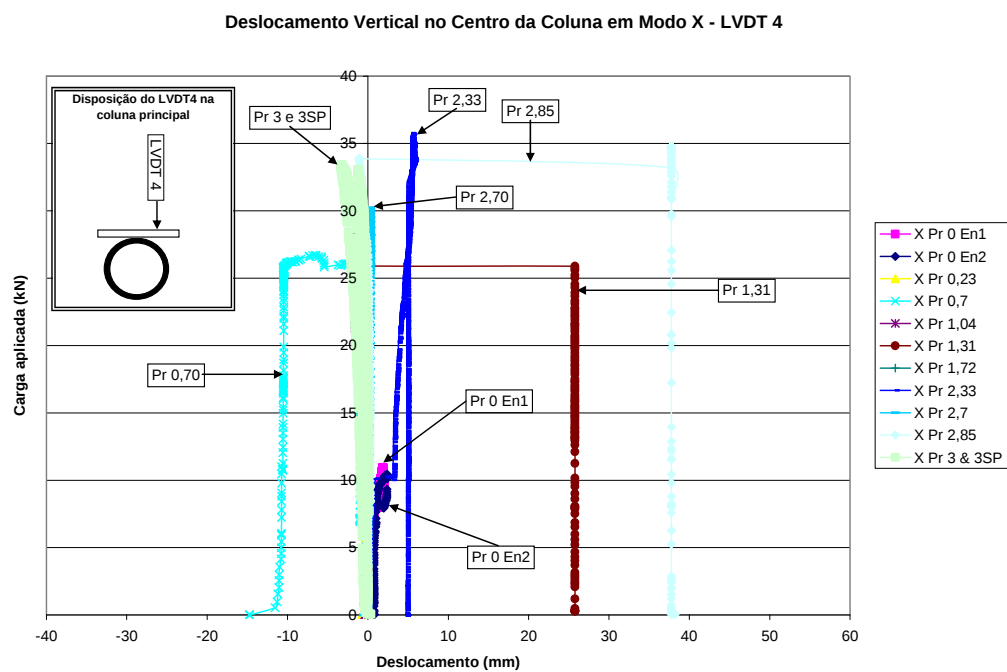


Figura B.1 – Gráfico do deslocamento vertical para o LVDT 4

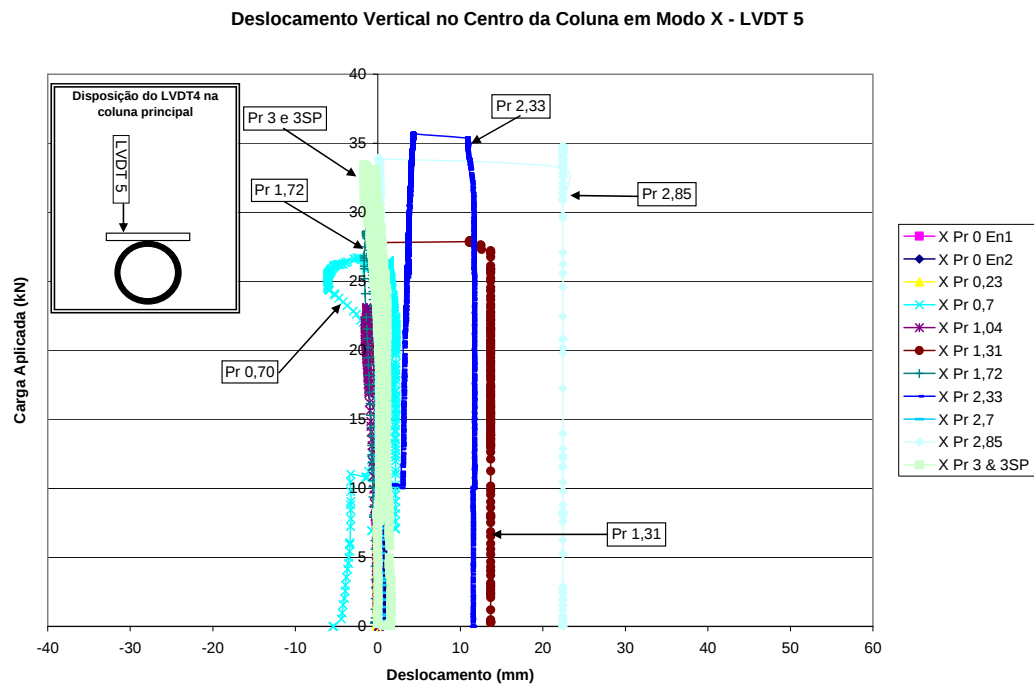


Figura B.2 – Gráfico do deslocamento vertical para o LVDT 5

B.1.2

Modo +

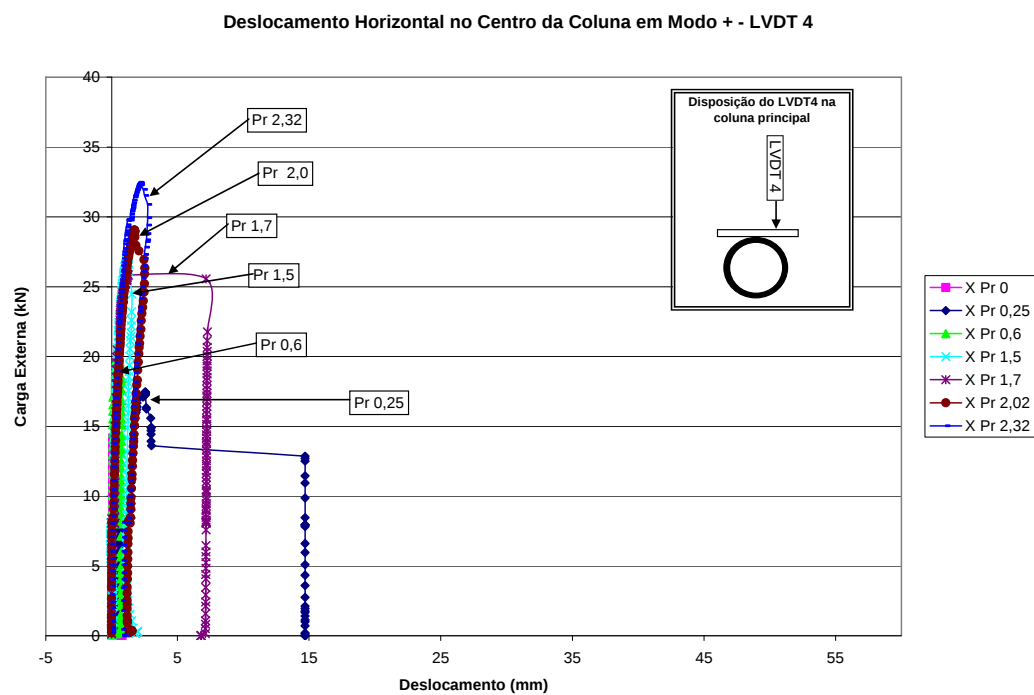


Figura B.3 – Gráfico do deslocamento vertical para o LVDT 4 em Modo +

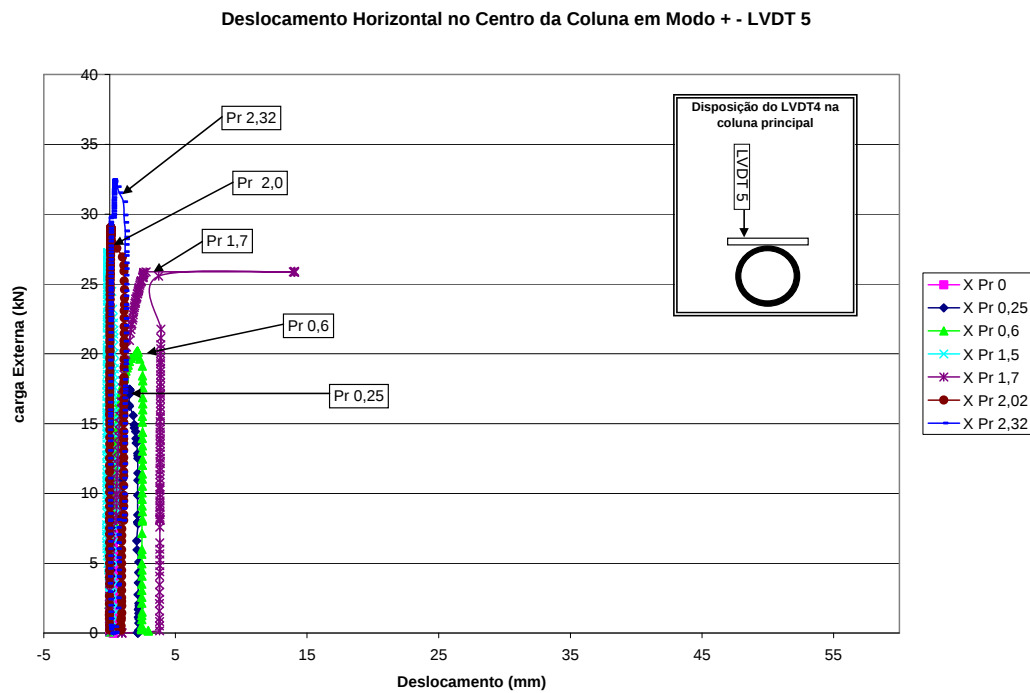


Figura B.4 – Gráfico do deslocamento vertical para o LVDT 5 em Modo +

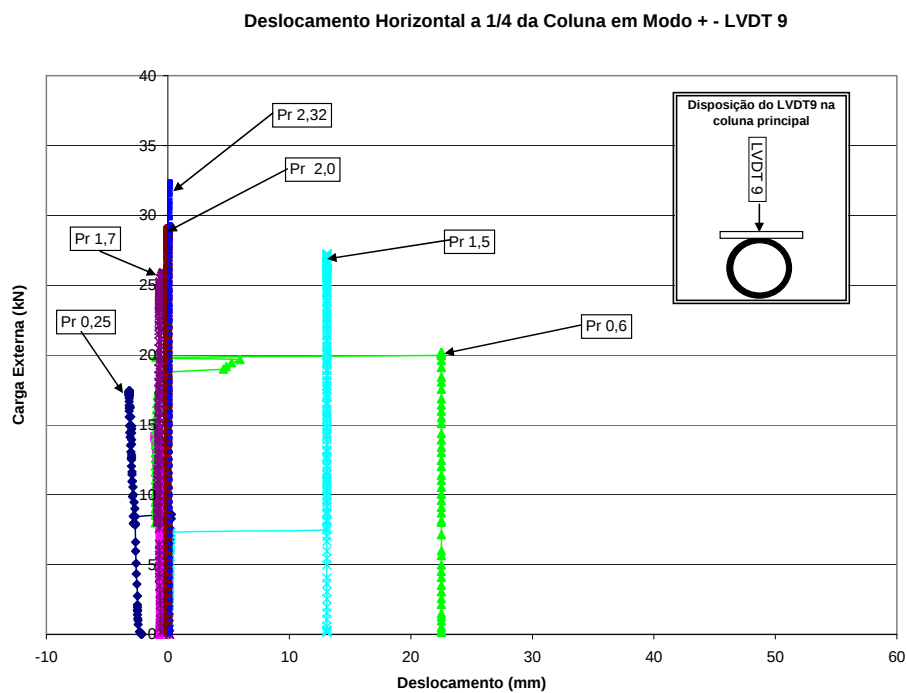


Figura B.5 – Gráfico do deslocamento vertical para o LVDT 9

Os deslocamentos em plano horizontal que aparecem foram devido a retirado dos apoios que mantiam a coluna na horizontal antes da aplicação da carga externa.

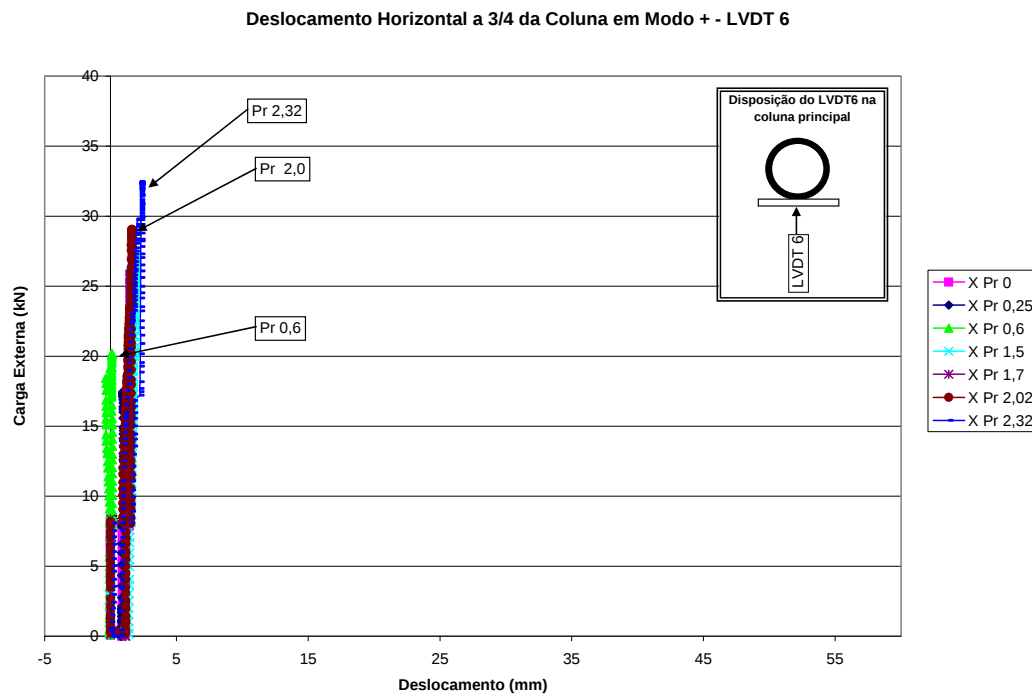


Figura B.6 – Gráfico do deslocamento vertical para o LVDT 6

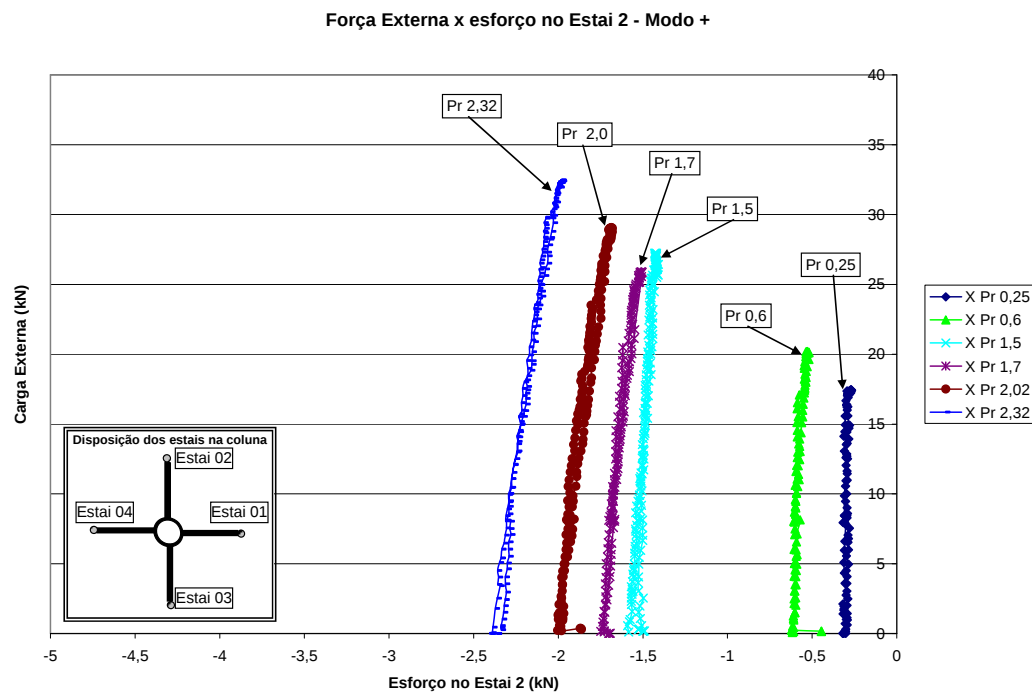


Figura B.7 – Comportamento do estai 2 na aplicação da carga externa na estrutura em “modo +”.

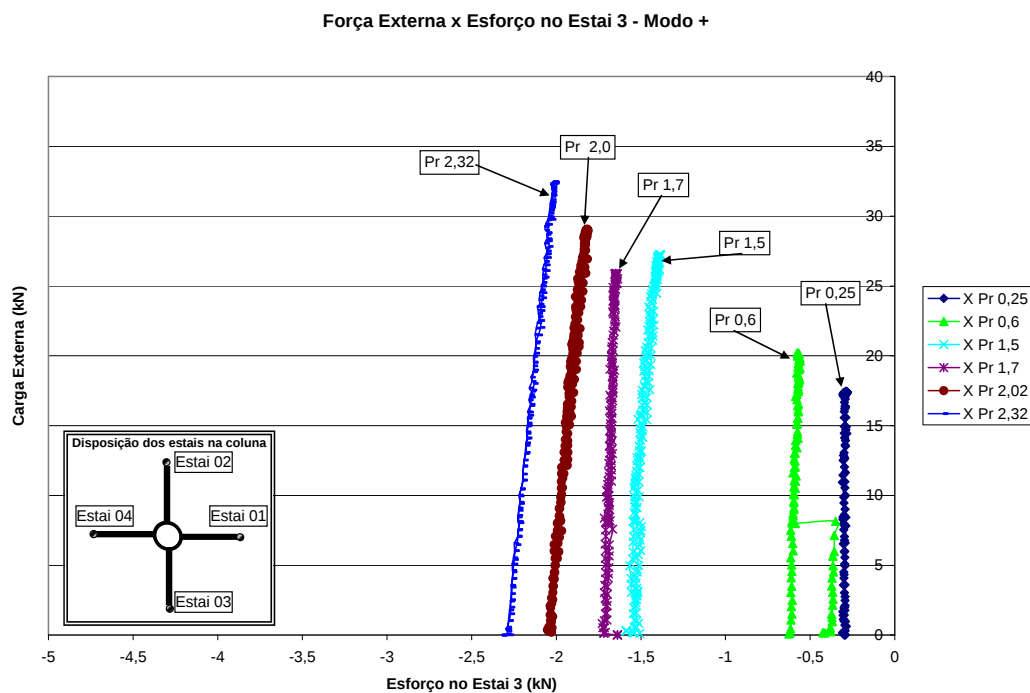


Figura B.8 – Comportamento do estai 3 na aplicação da carga externa na estrutura em “modo +”.

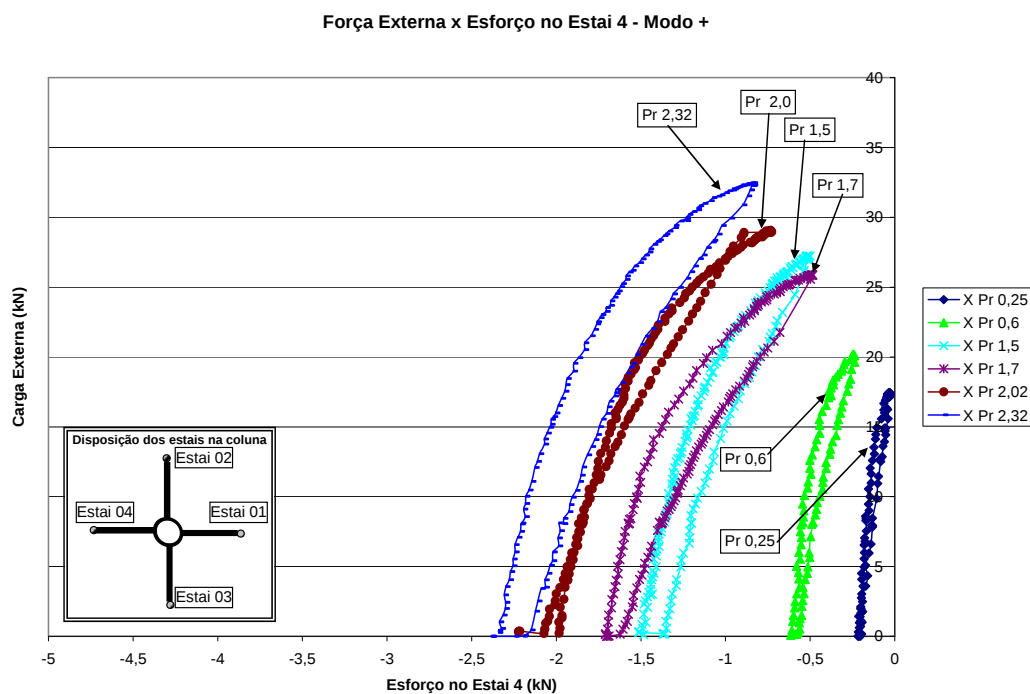


Figura B.9 – Comportamento do estai 4 na aplicação da carga externa na estrutura em “modo +”.

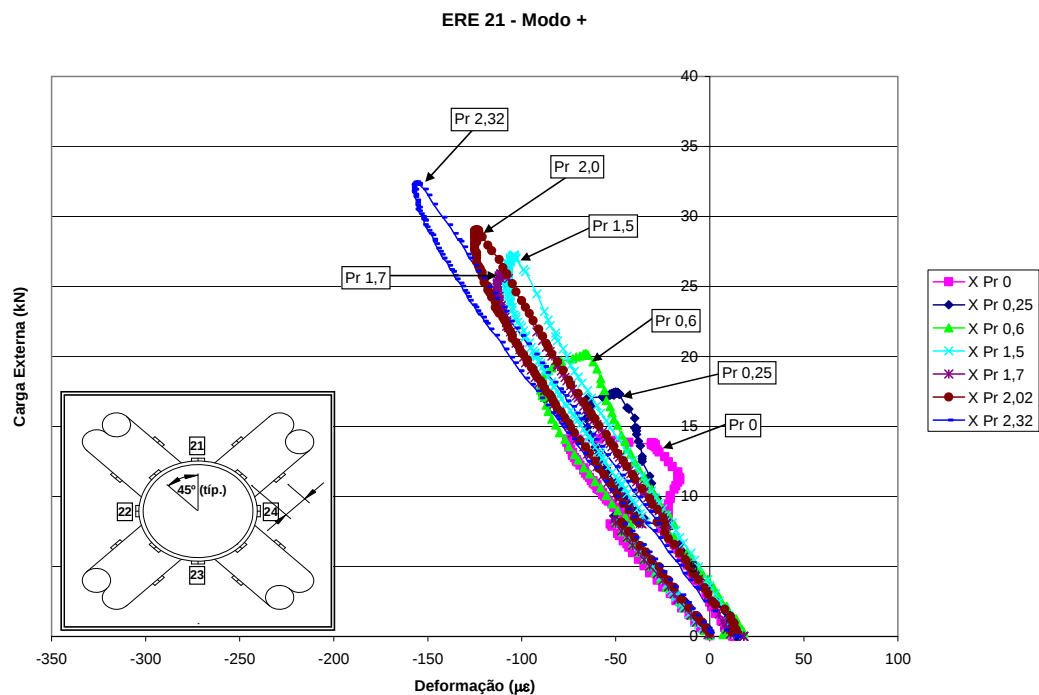


Figura B.10 – Gráfico referente ao extensômetro 21 em “modo +”.

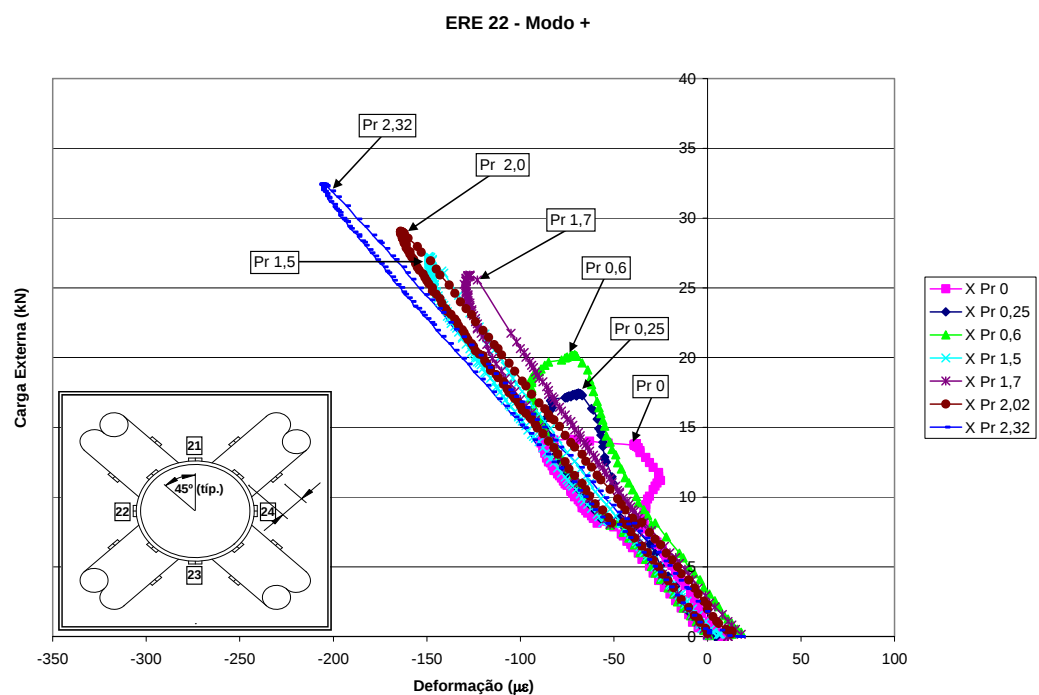


Figura B.11 – Gráfico referente ao extensômetro 22 em “modo +”.

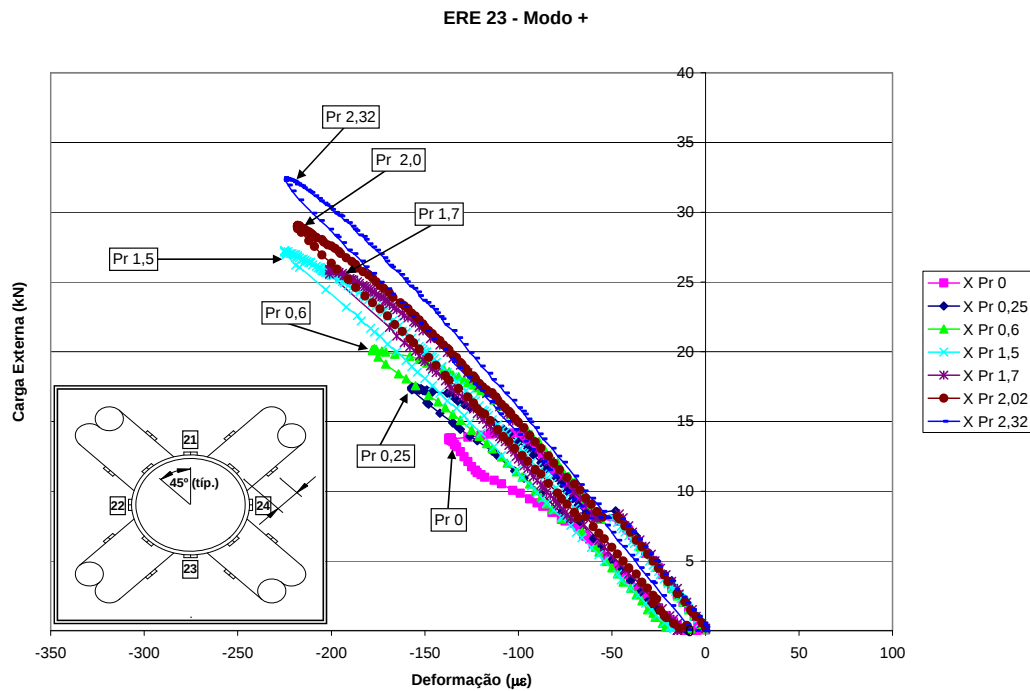


Figura B.12 – Gráfico referente ao extensômetro 23 em “modo +”.

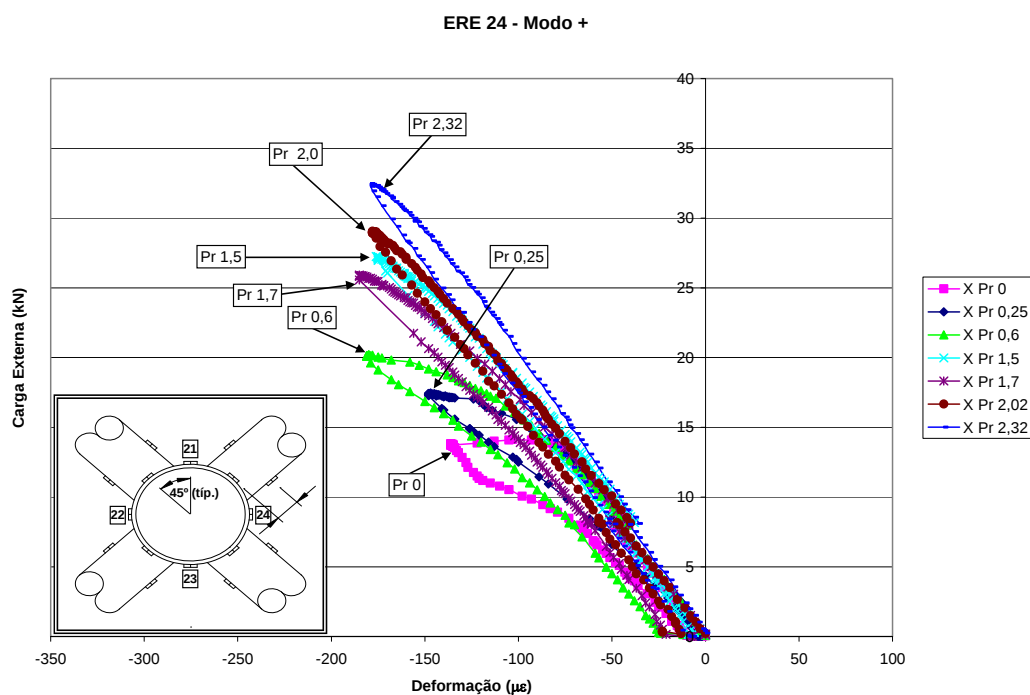


Figura B.13 – Gráfico referente ao extensômetro 24 em “modo +”.

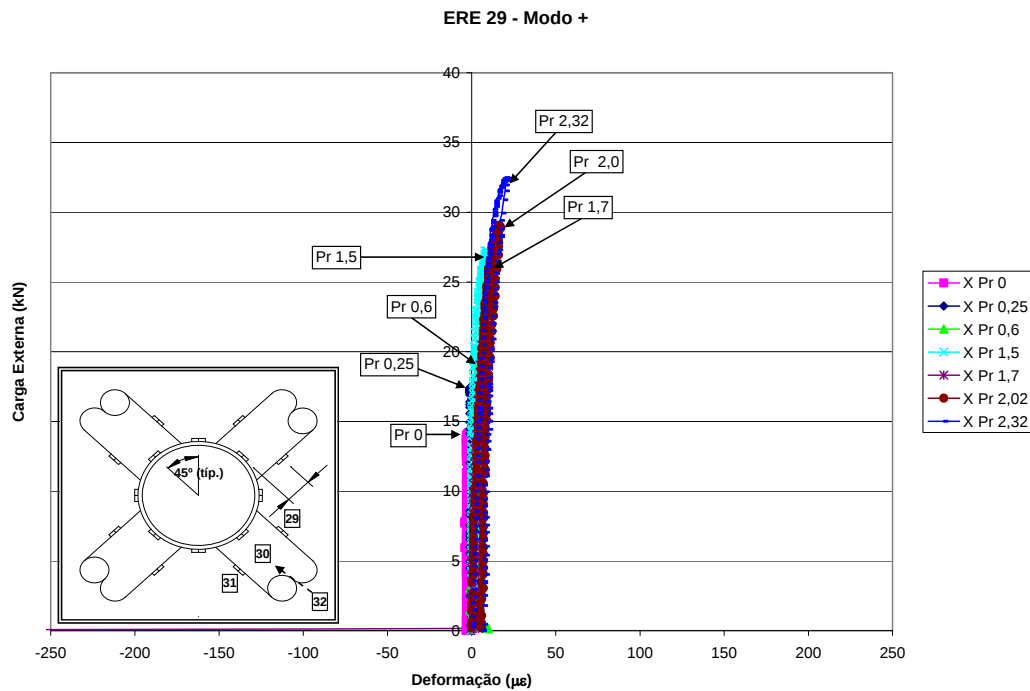


Figura B.14 – Gráfico referente ao extensômetro 29 em “modo +”.

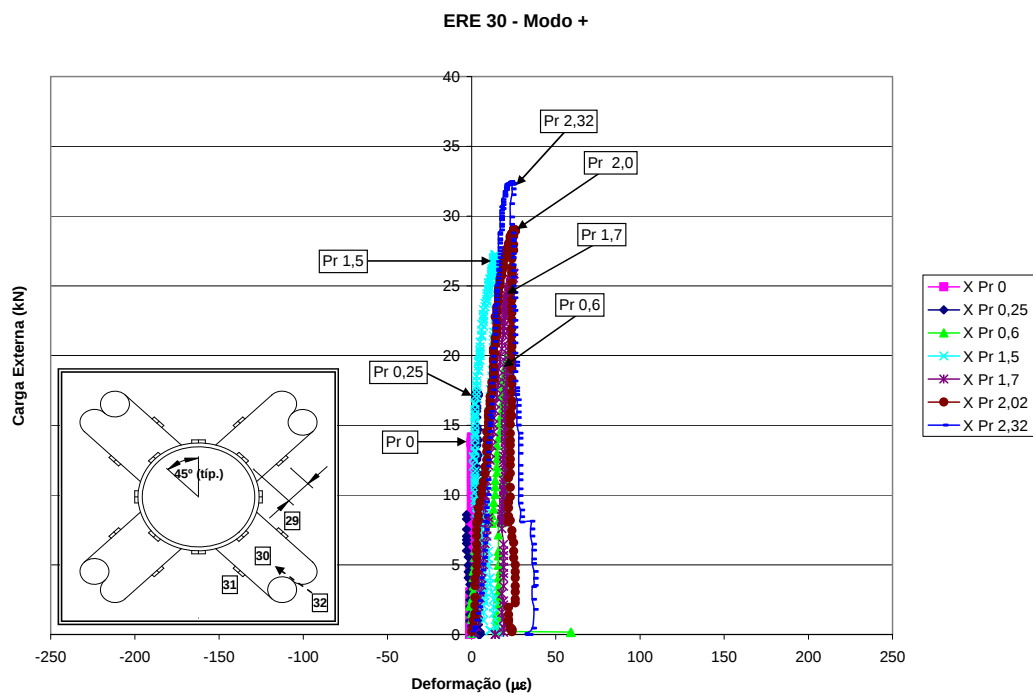


Figura B.15 – Gráfico referente ao extensômetro 30 em “modo +”.

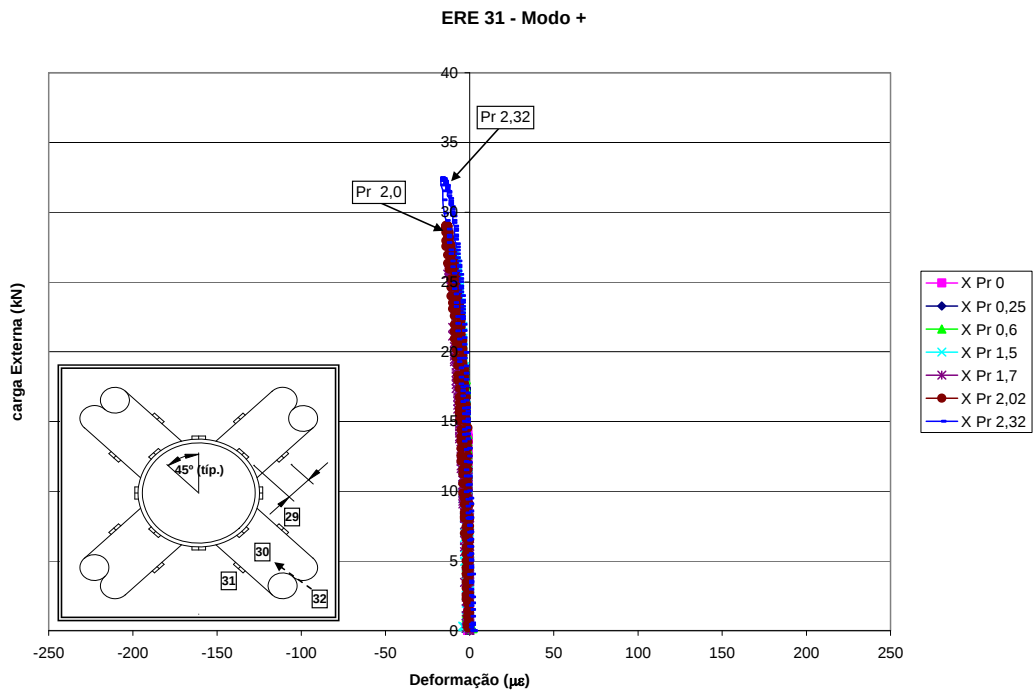


Figura B.16 – Gráfico referente ao extensômetro 31 em “modo +”.

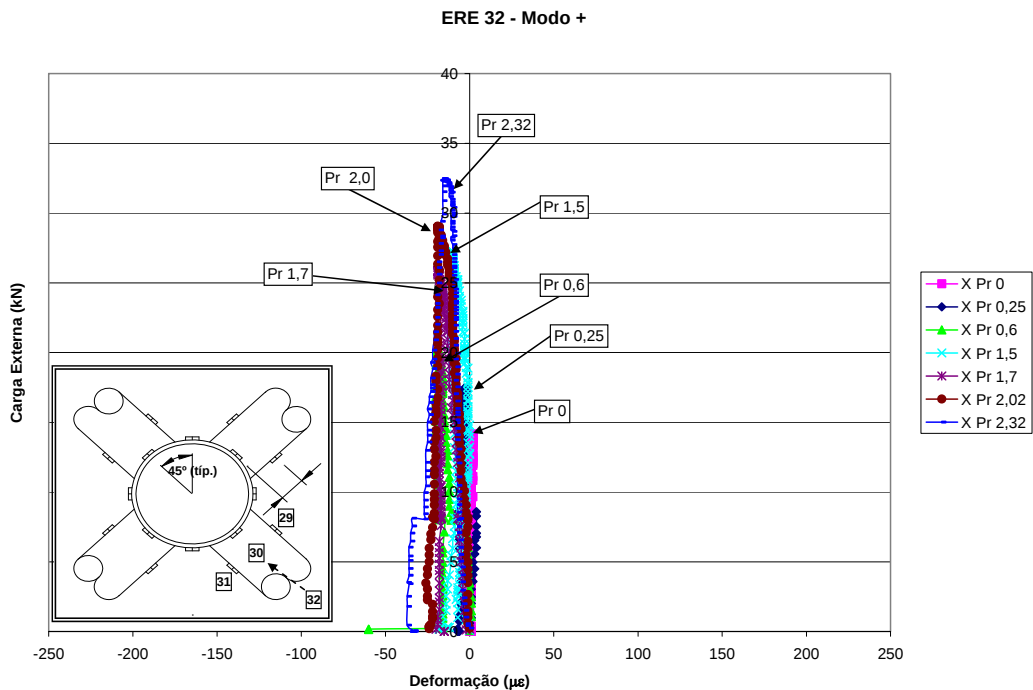


Figura B.17 – Gráfico referente ao extensômetro 32 em “modo +”.

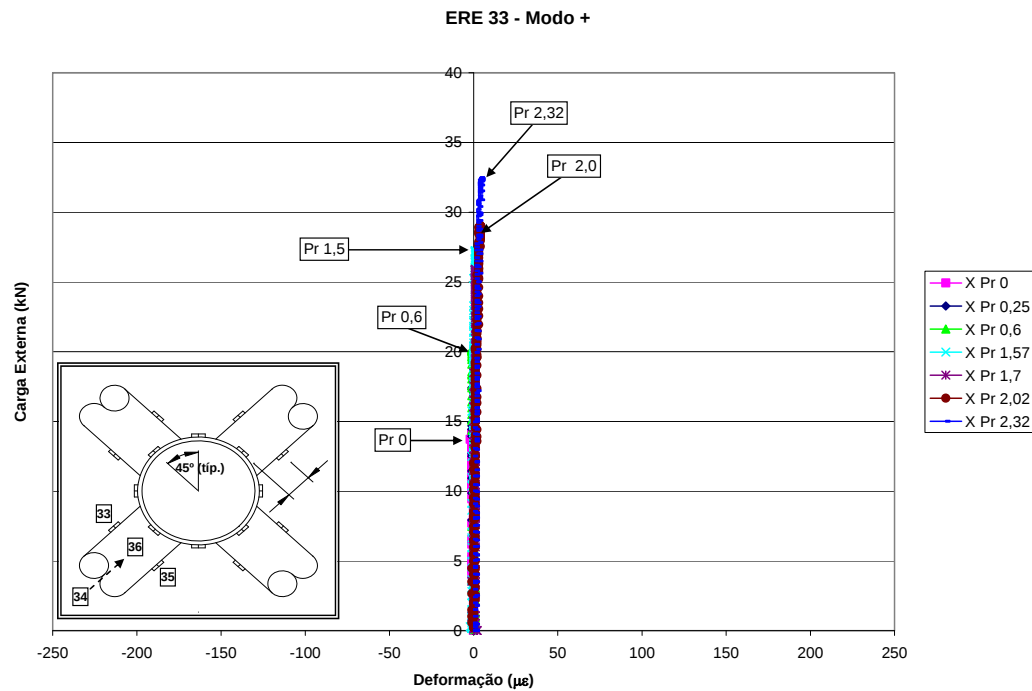


Figura B.18 – Gráfico referente ao extensômetro 33 em “modo +”.

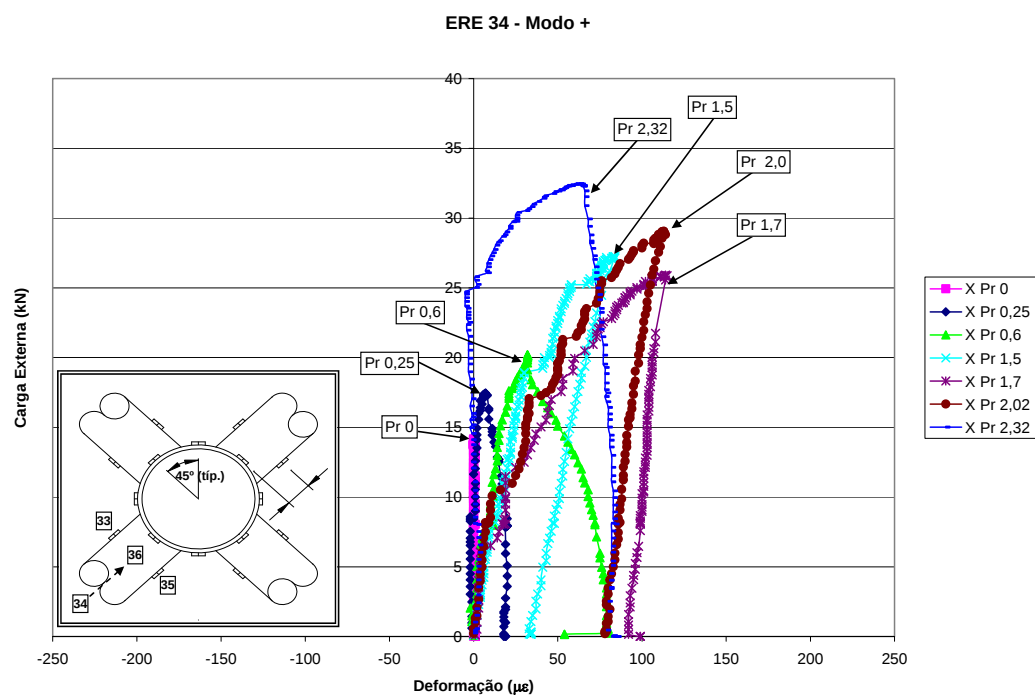


Figura B.19 – Gráfico referente ao extensômetro 34 em “modo +”.

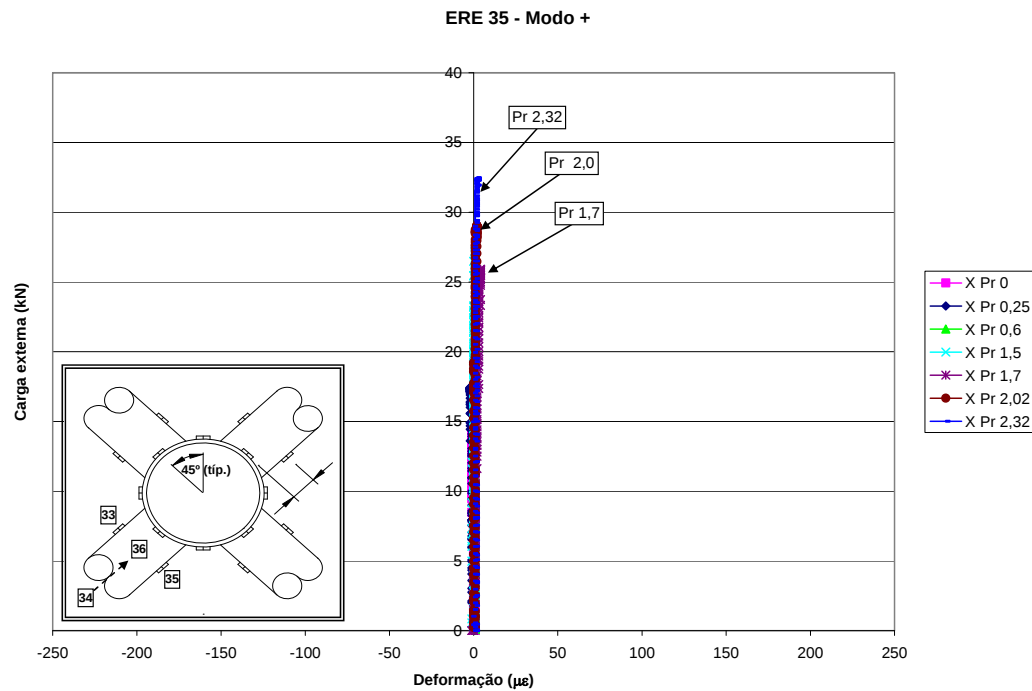


Figura B.20 – Gráfico referente ao extensômetro 35 em “modo +”.

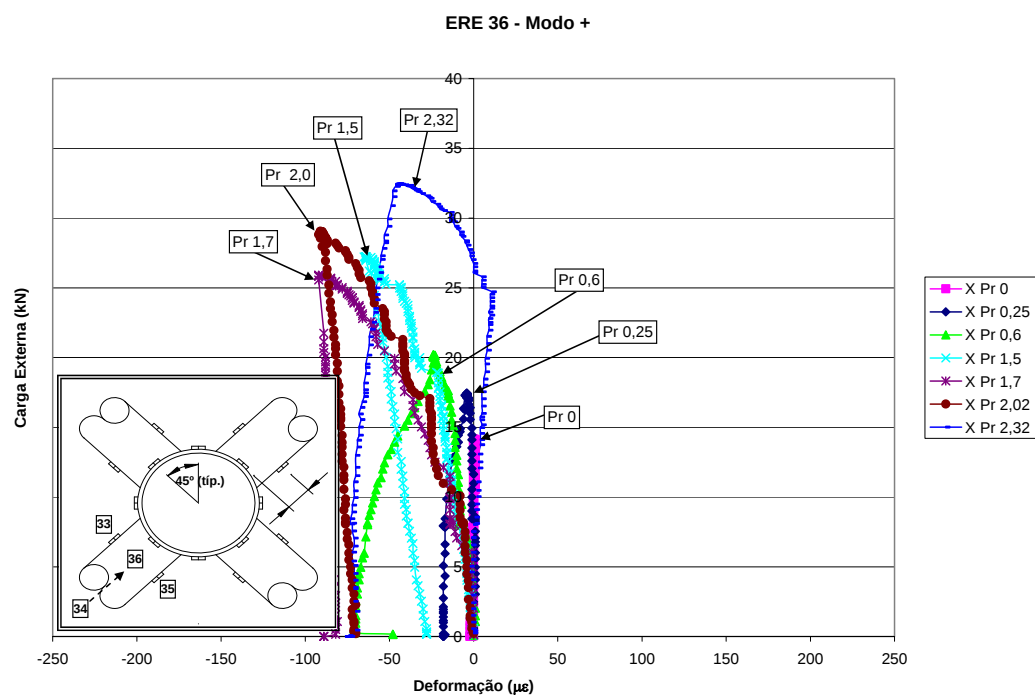


Figura B.21 – Gráfico referente ao extensômetro 36 em “modo +”.

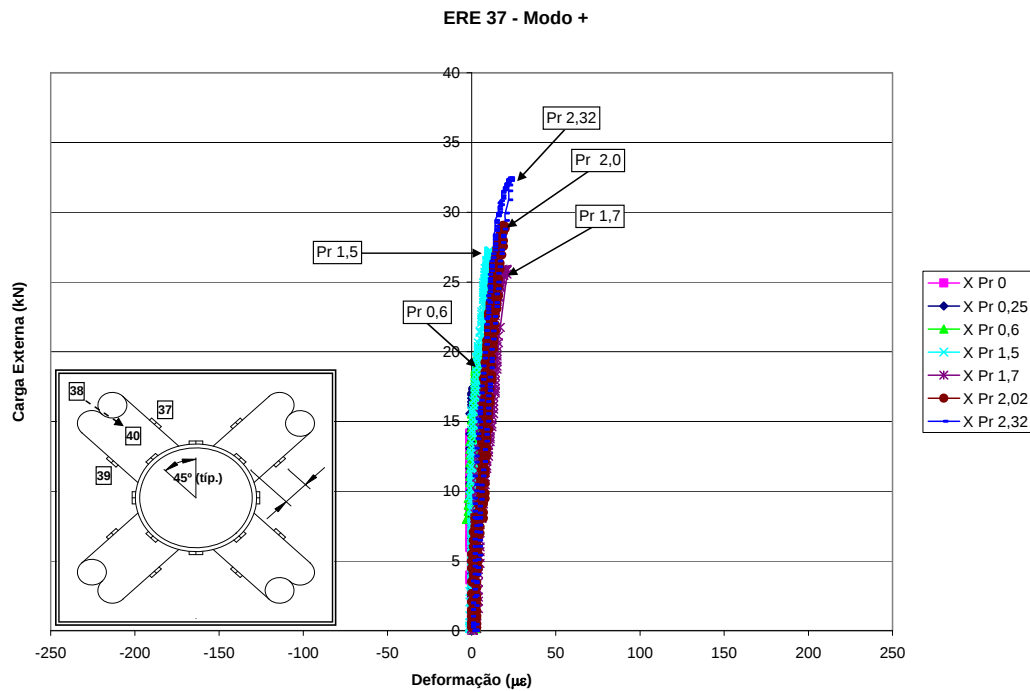


Figura B.22 – Gráfico referente ao extensômetro 37 em “modo +”.

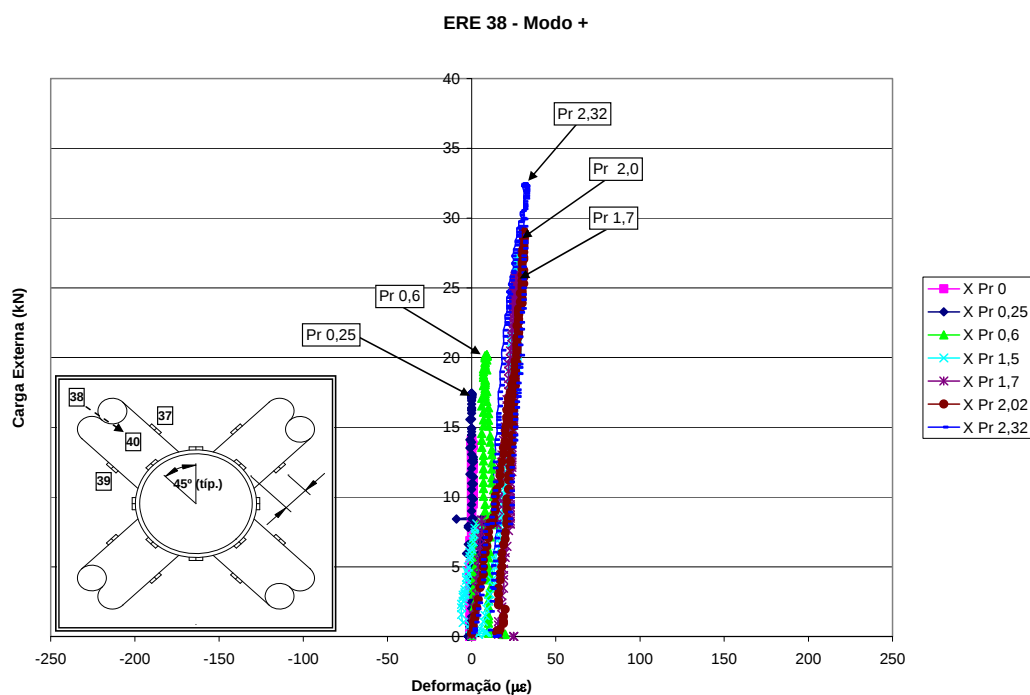


Figura B.23 – Gráfico referente ao extensômetro 38 em “modo +”.

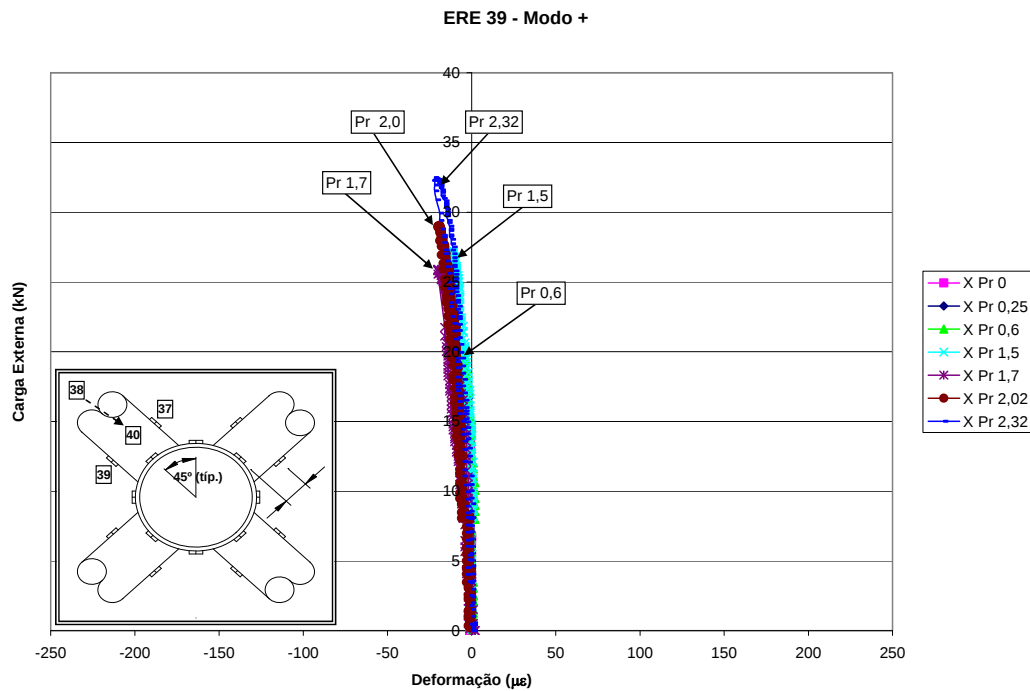


Figura B.24 – Gráfico referente ao extensômetro 39 em “modo +”.

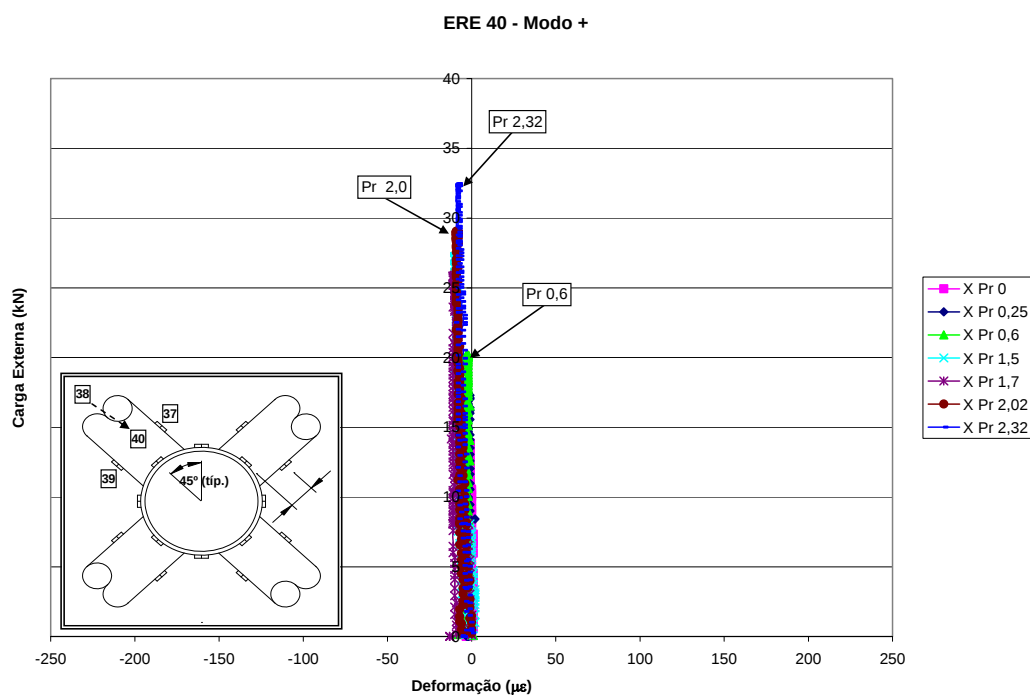


Figura B.25 – Gráfico referente ao extensômetro 40 em “modo +”.

B.2

Segunda Coluna

B.2.1

Modo x

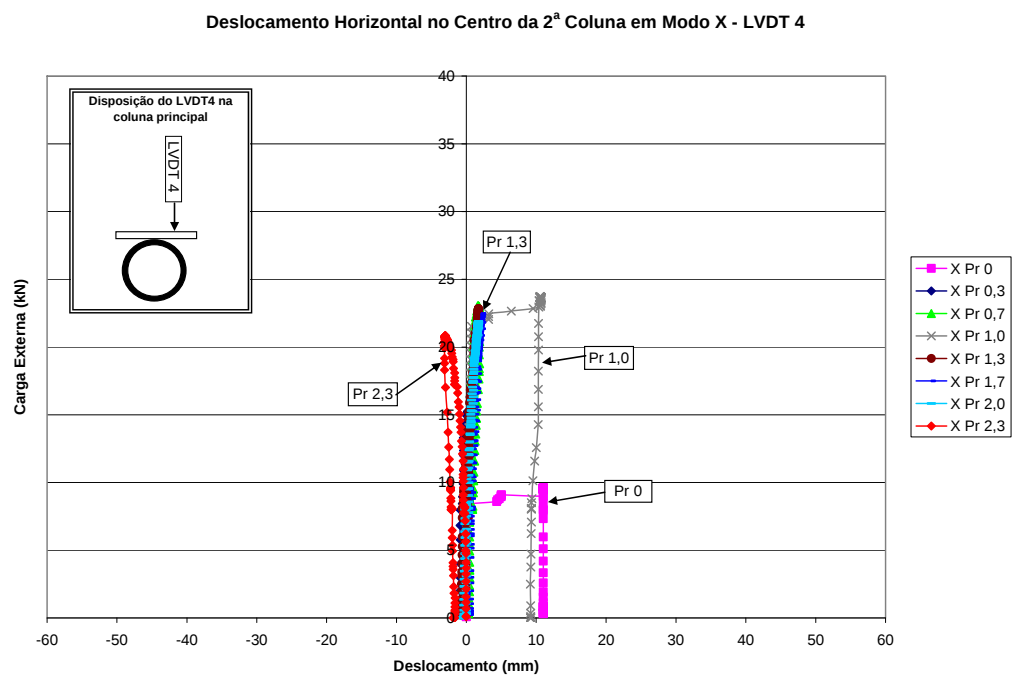


Figura B.26 – Gráfico do deslocamento vertical para o LVDT 4

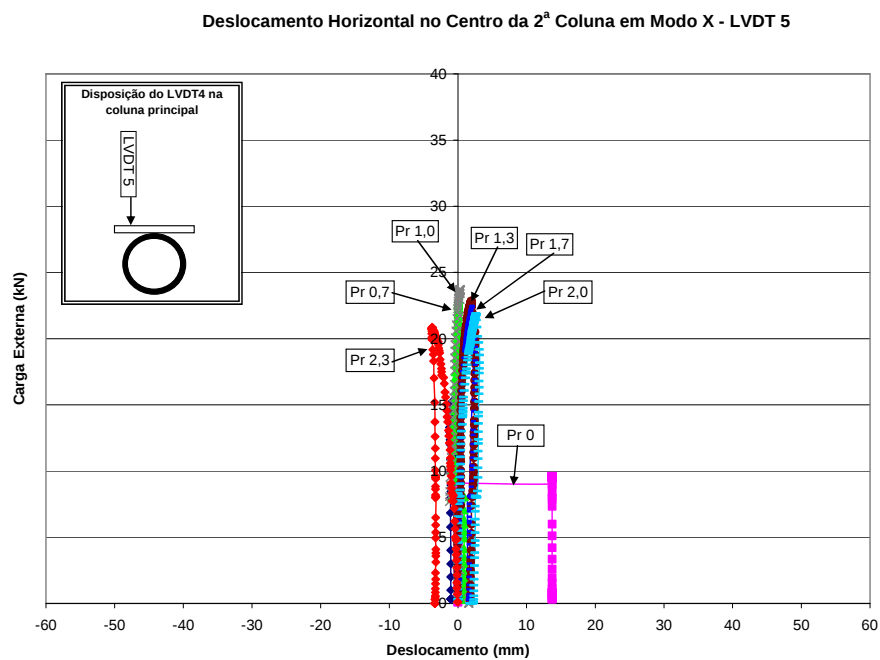


Figura B.27 – Gráfico do deslocamento vertical para o LVDT 5

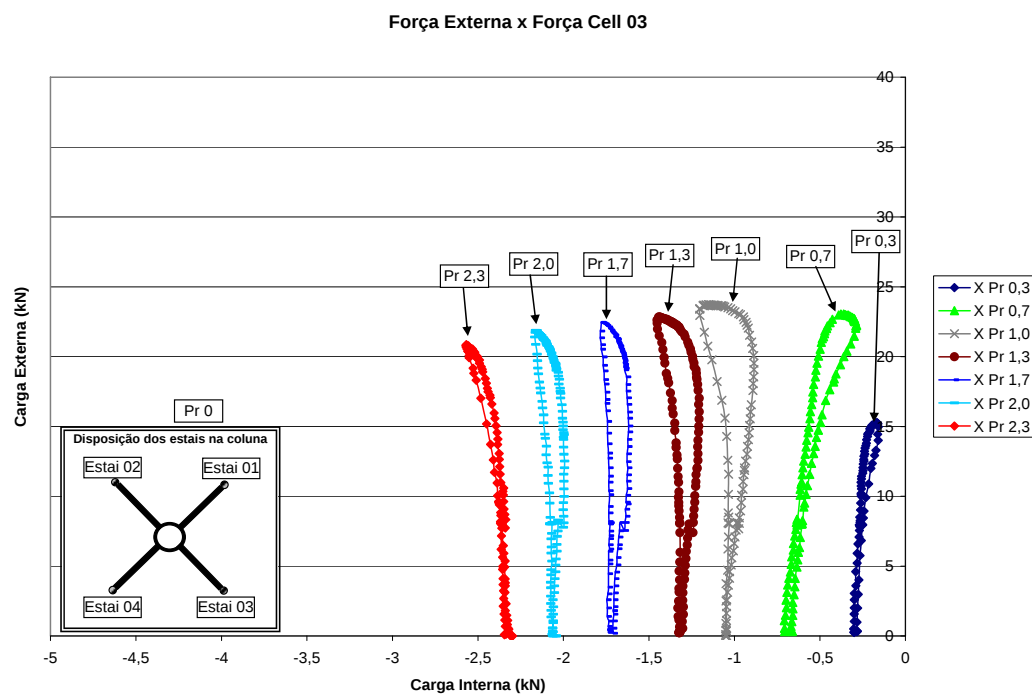


Figura B.28 – Comportamento do estai 3 na aplicação da carga externa na estrutura

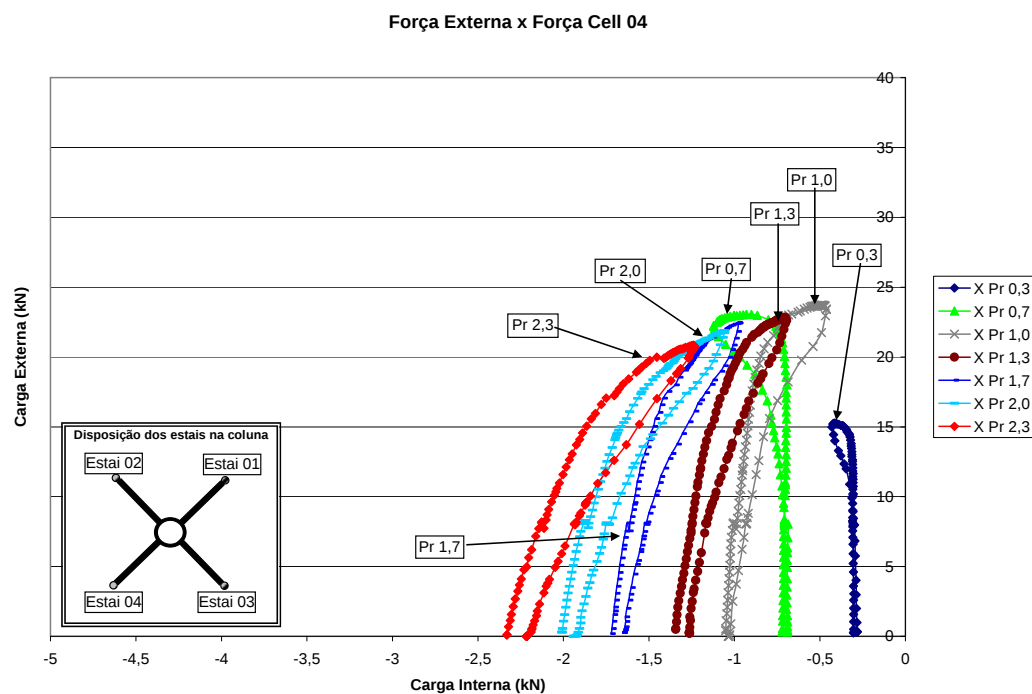


Figura B.29 – Comportamento do estai 4 na aplicação da carga externa na estrutura

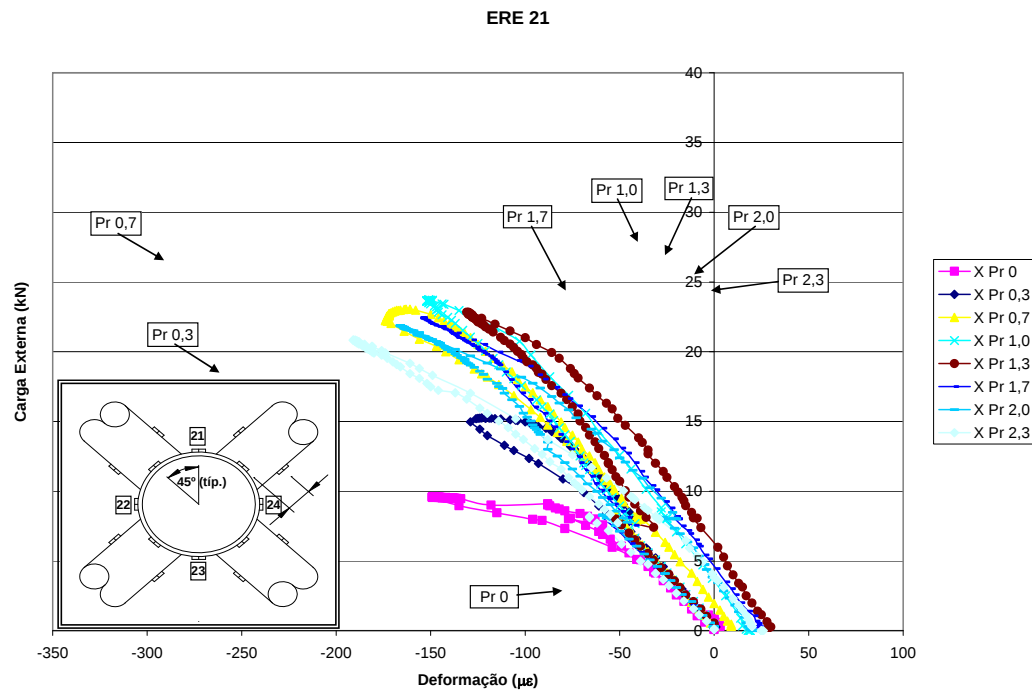


Figura B.30 – Gráfico referente ao extensômetro 21.

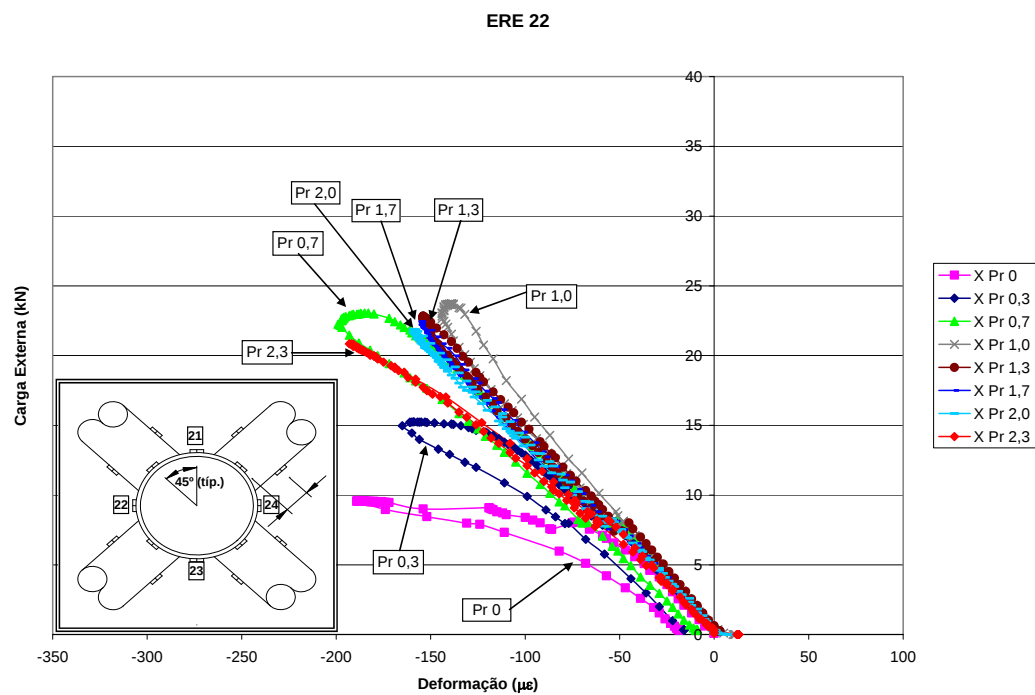


Figura B.31 – Gráfico referente ao extensômetro 22.

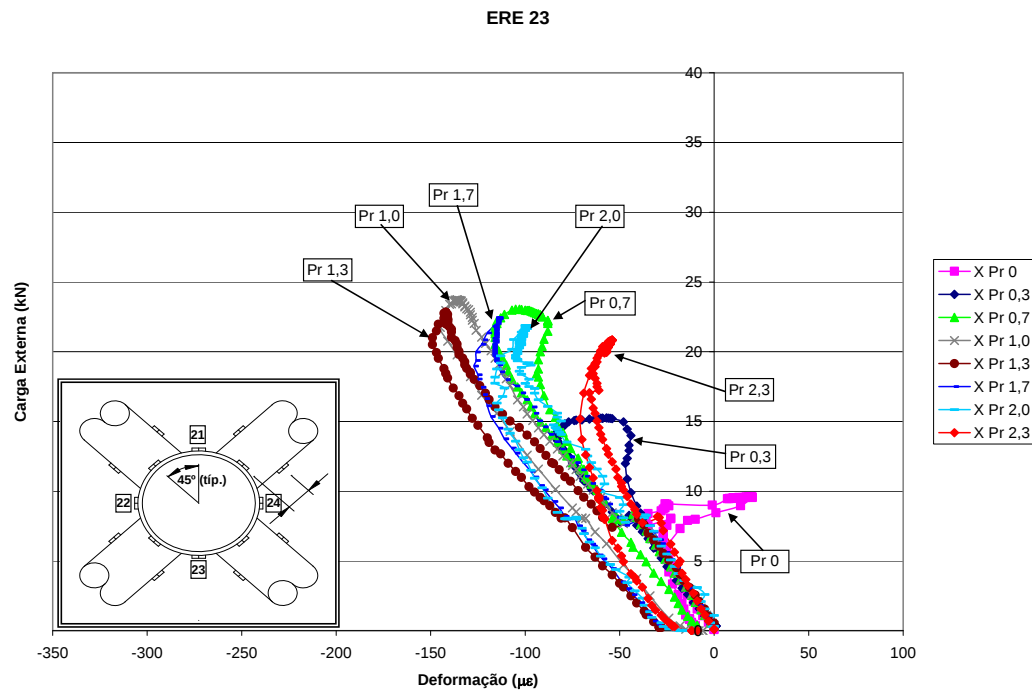


Figura B.32 – Gráfico referente ao extensômetro 23.

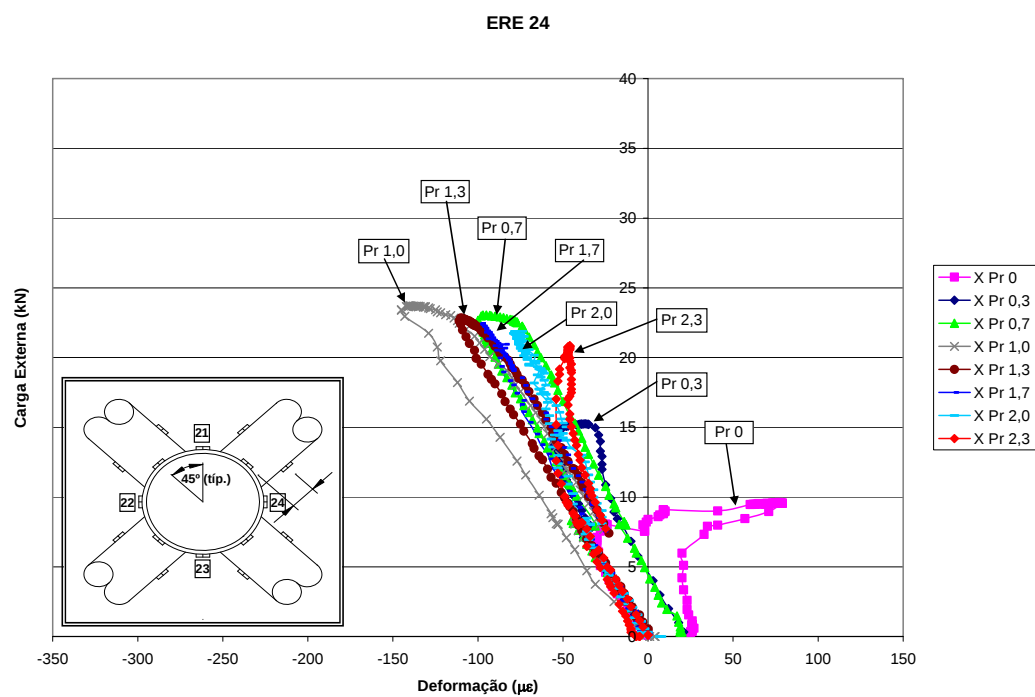


Figura B.33 – Gráfico referente ao extensômetro 24.

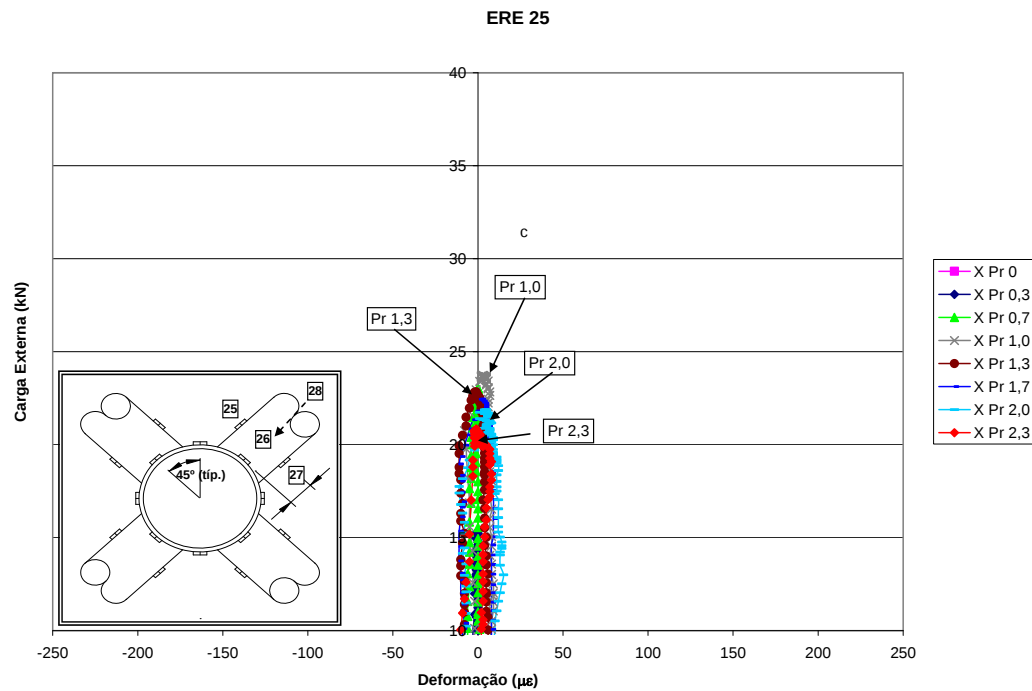


Figura B.34 – Gráfico referente ao extensômetro 25.

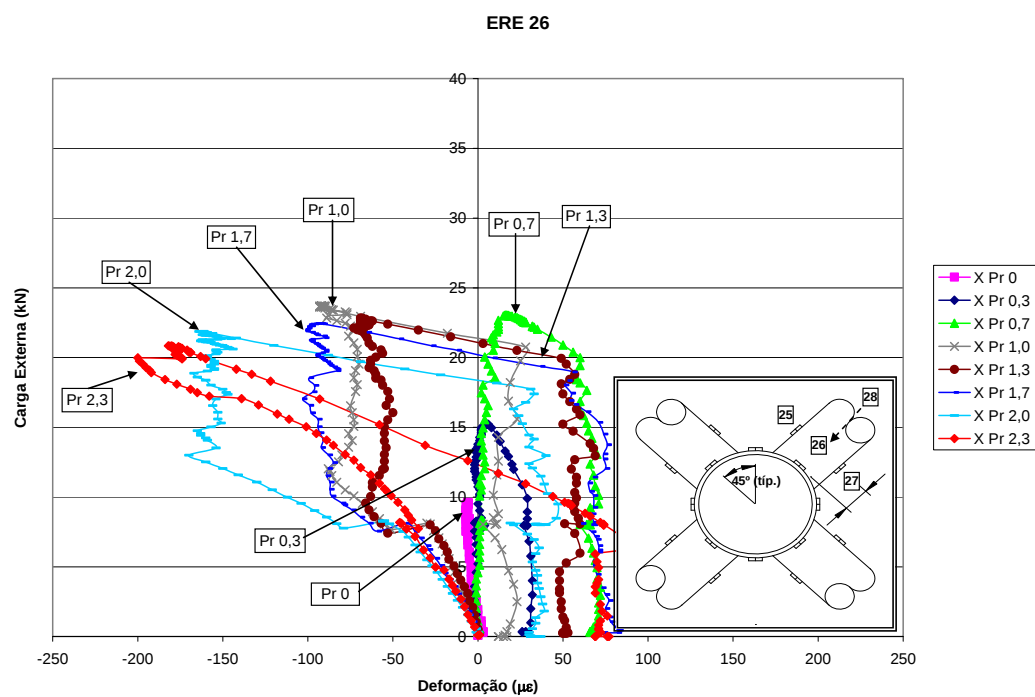


Figura B.35 – Gráfico referente ao extensômetro 26.

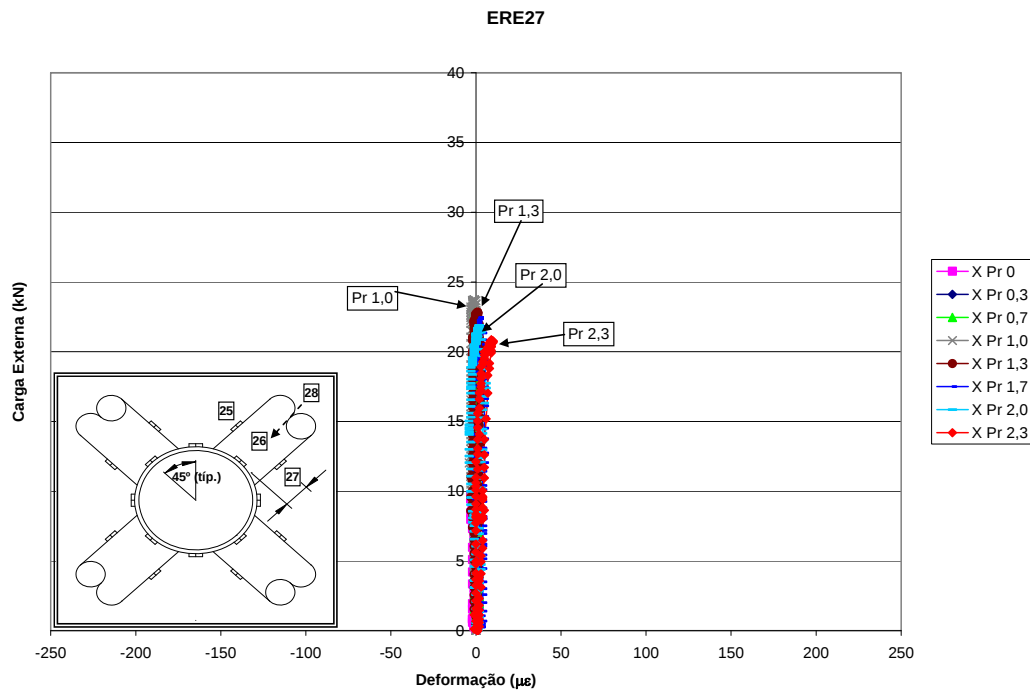


Figura B.36 – Gráfico referente ao extensômetro 27.

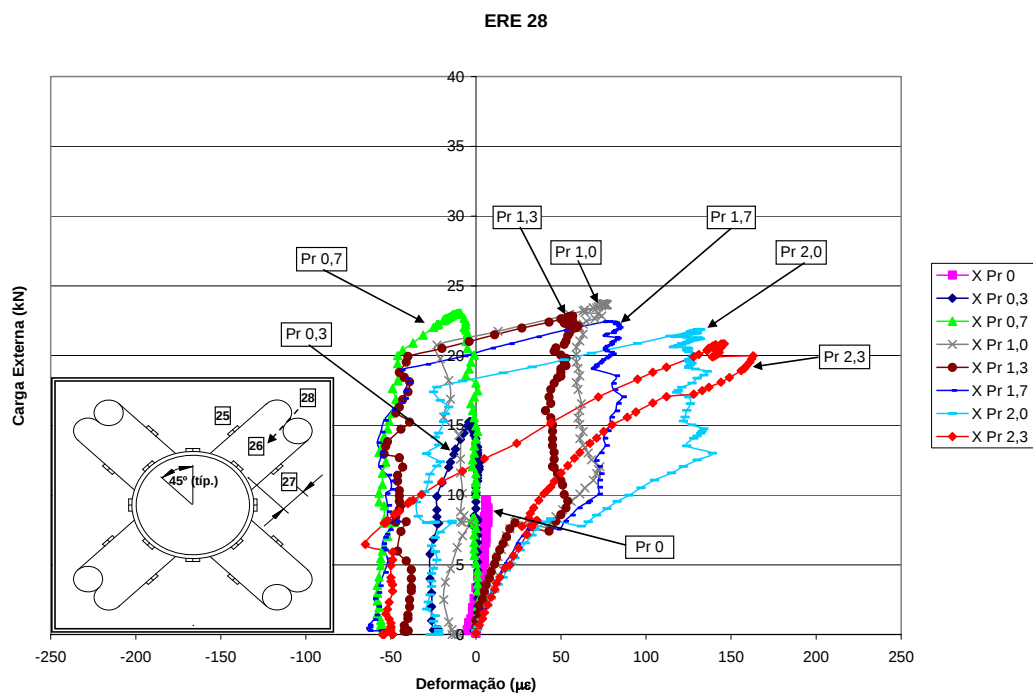


Figura B.37 – Gráfico referente ao extensômetro 28.

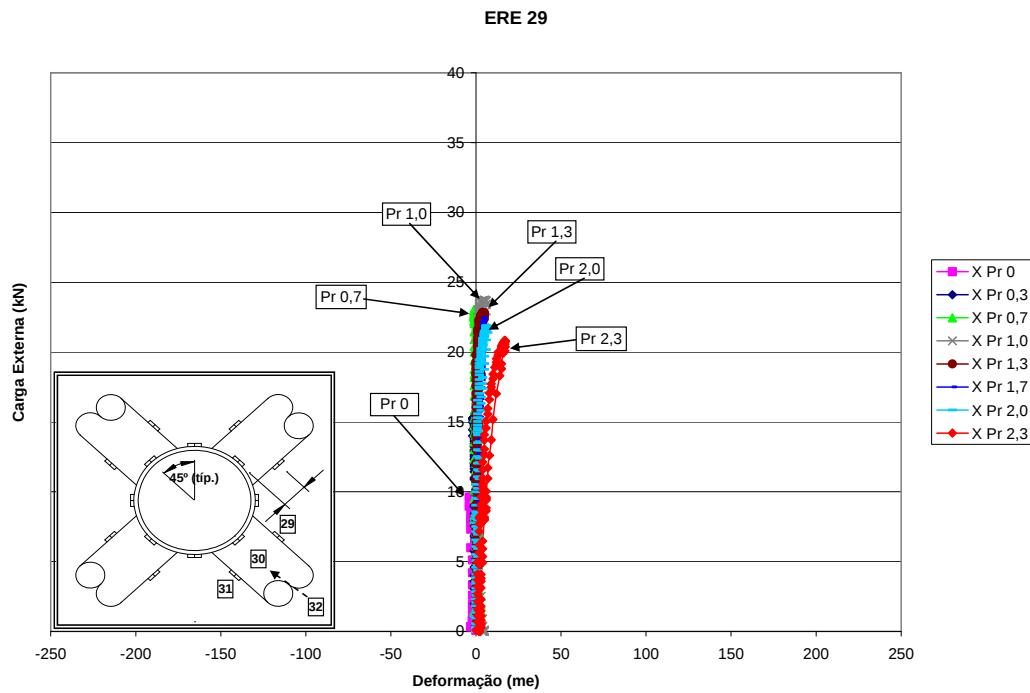


Figura B.38 – Gráfico referente ao extensômetro 29.

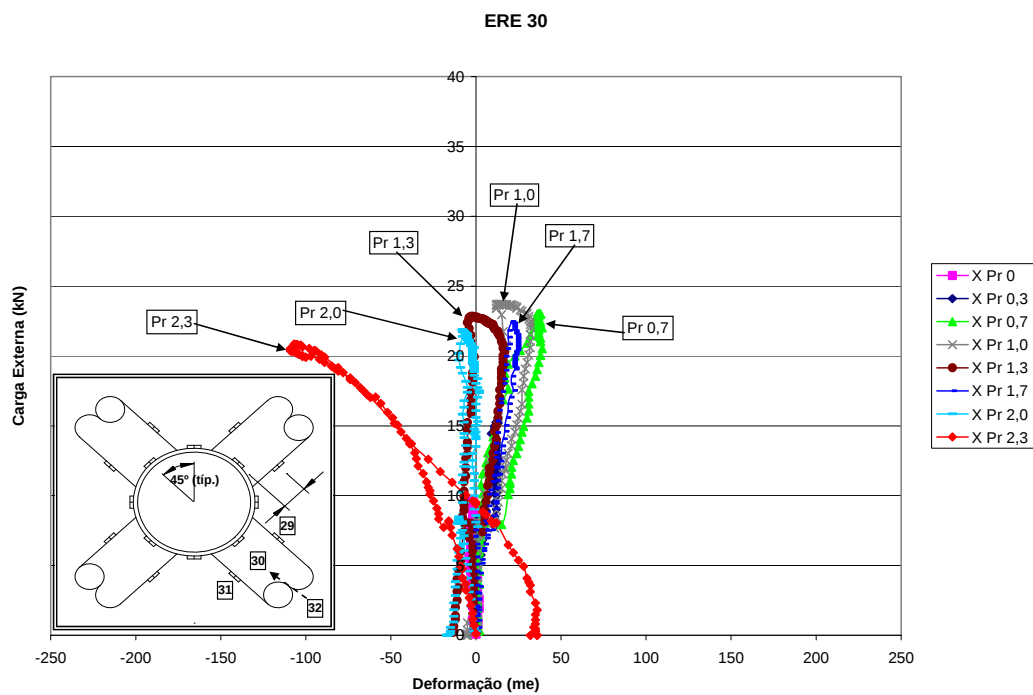


Figura B.39 – Gráfico referente ao extensômetro 30.

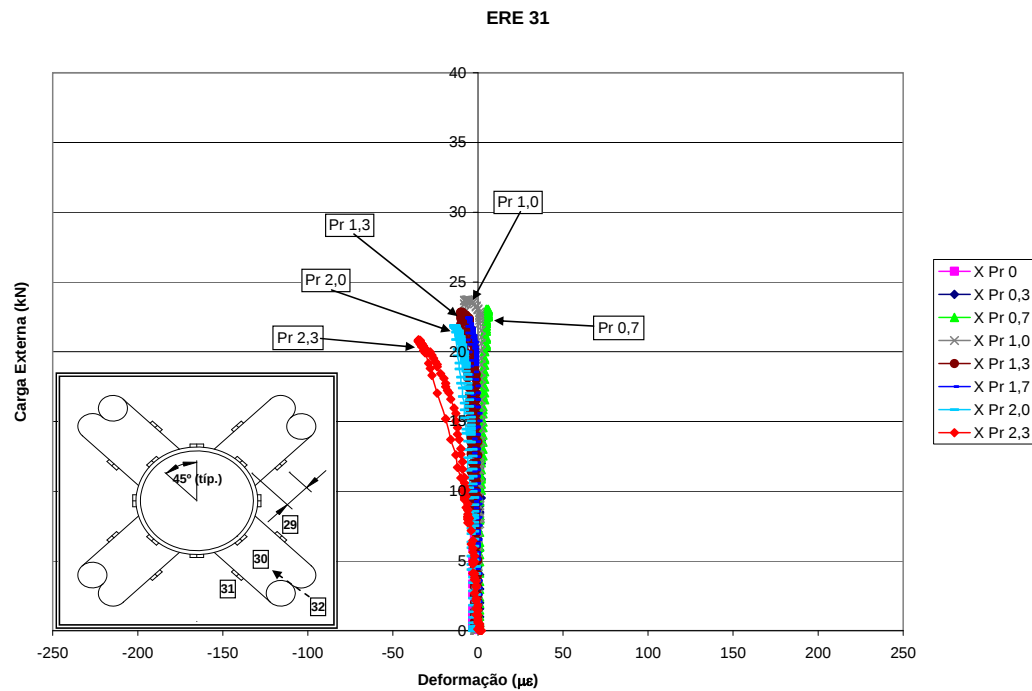


Figura B.40 – Gráfico referente ao extensômetro 31.

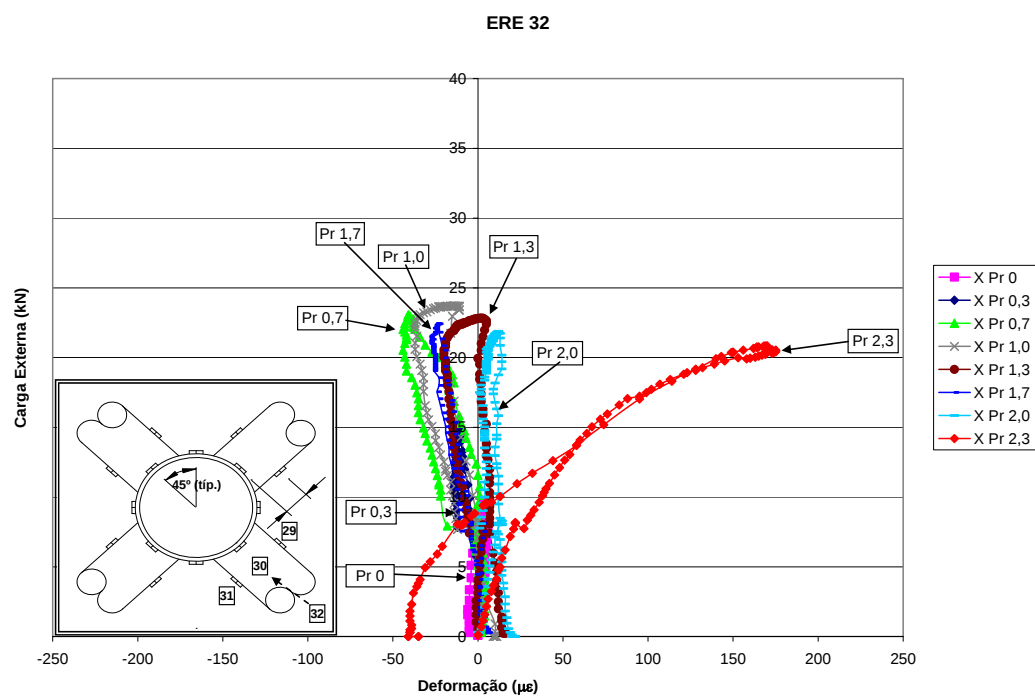


Figura B.41 – Gráfico referente ao extensômetro 32.

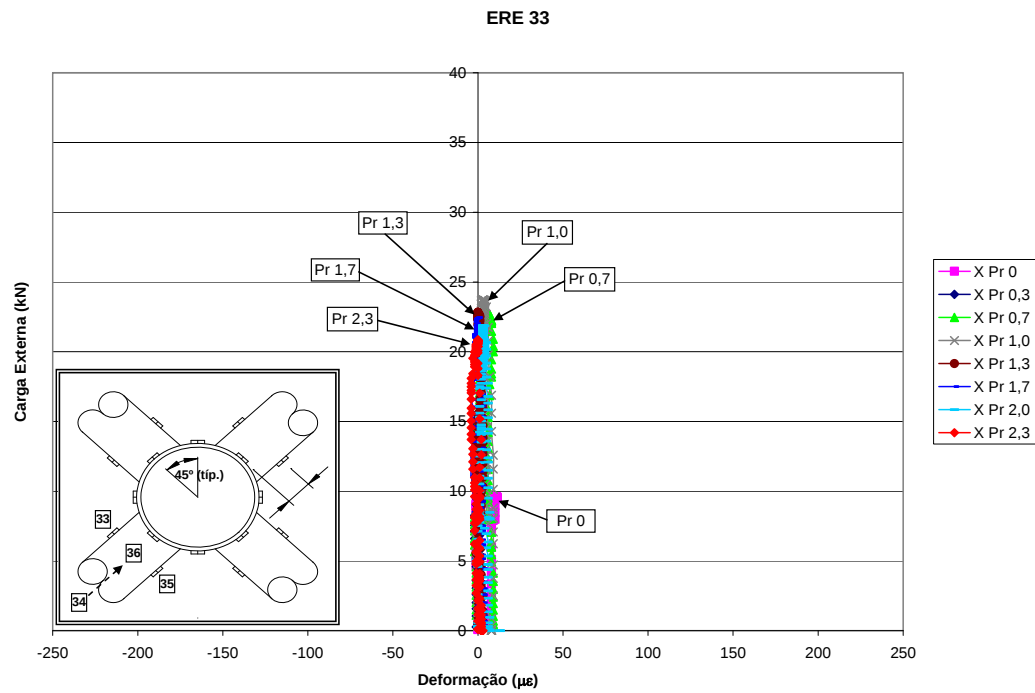


Figura B.42 – Gráfico referente ao extensômetro 33.

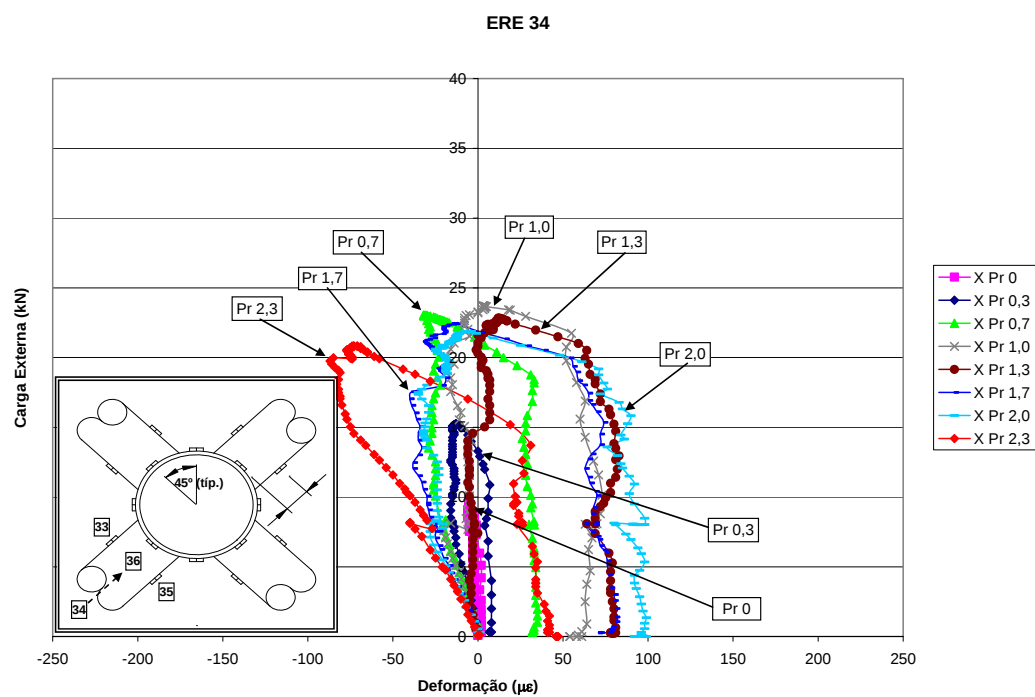


Figura B.43 – Gráfico referente ao extensômetro 34.

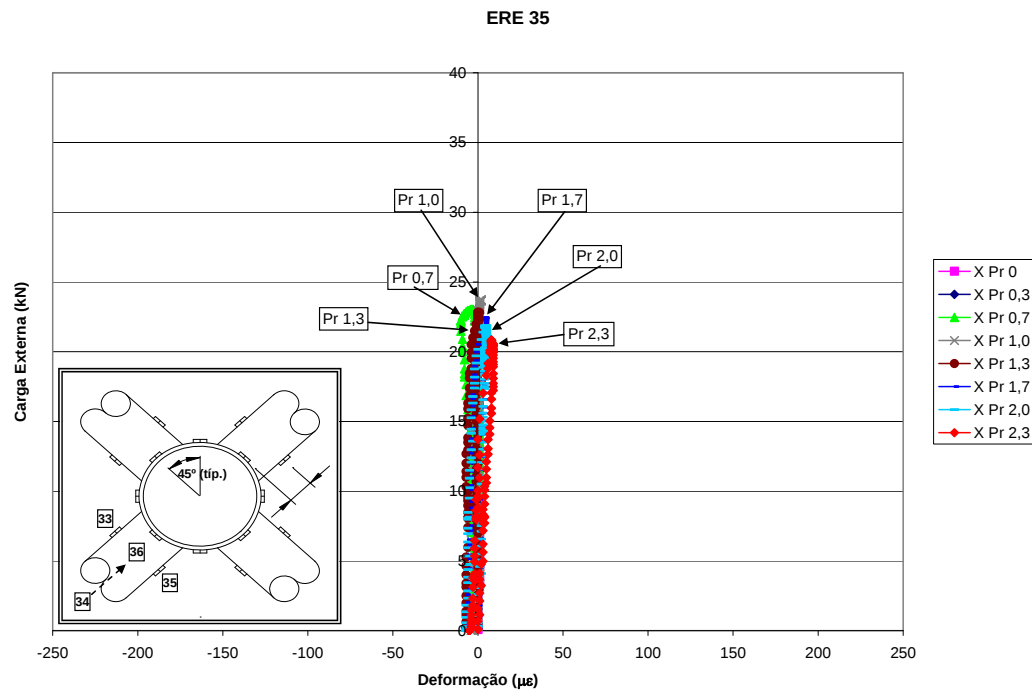


Figura B.44 – Gráfico referente ao extensômetro 35.

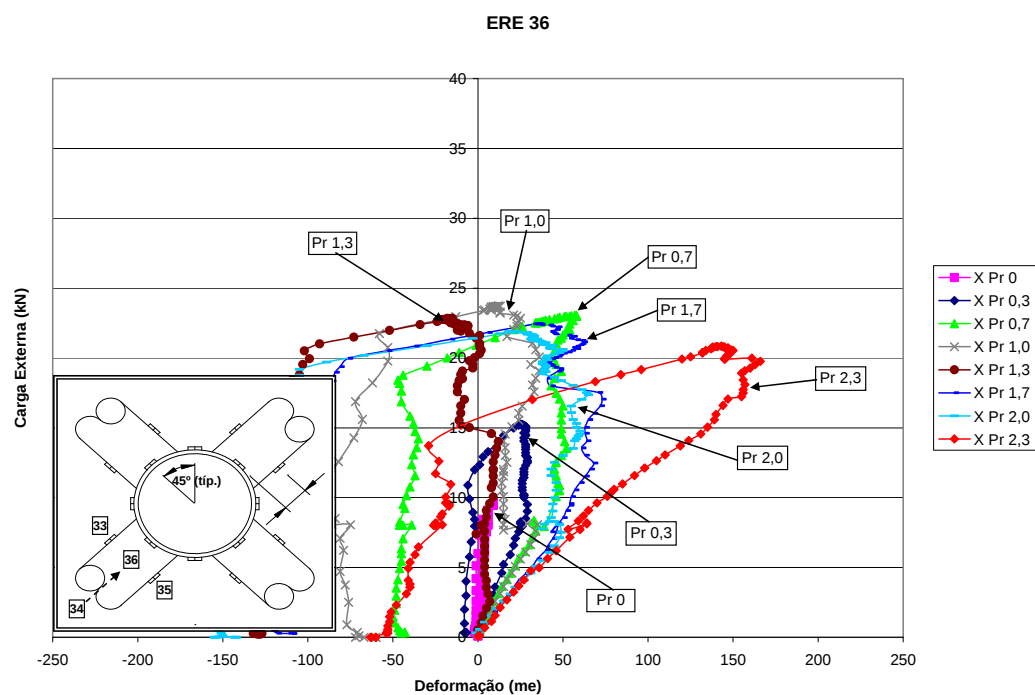


Figura B.45 – Gráfico referente ao extensômetro 36.

B.2.2

Modo +

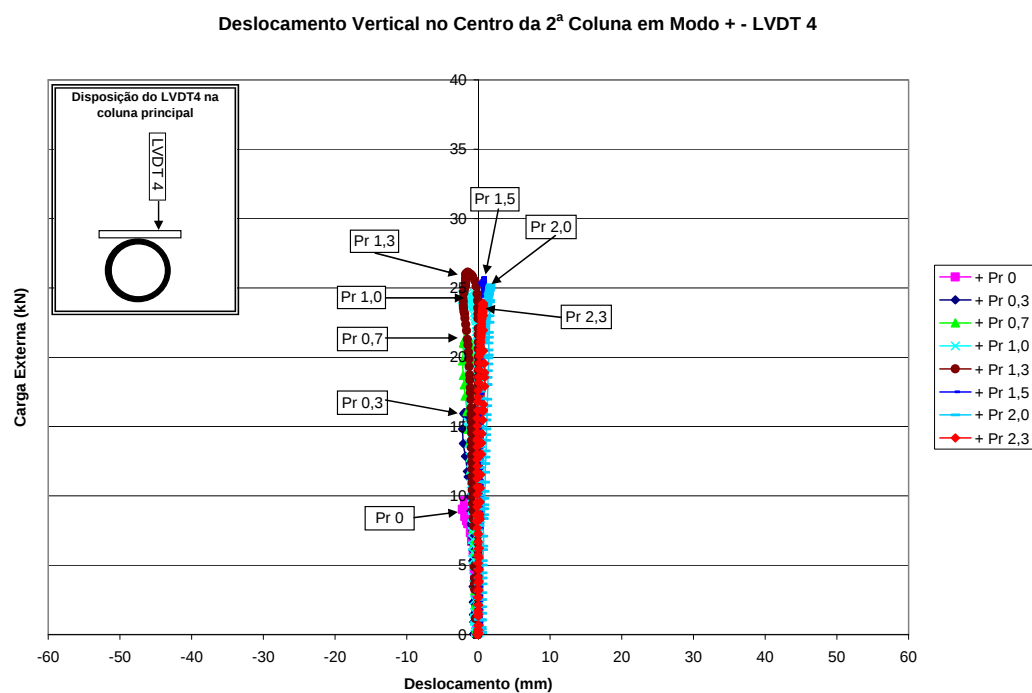


Figura B.46 – Gráfico do deslocamento vertical para o LVDT 4

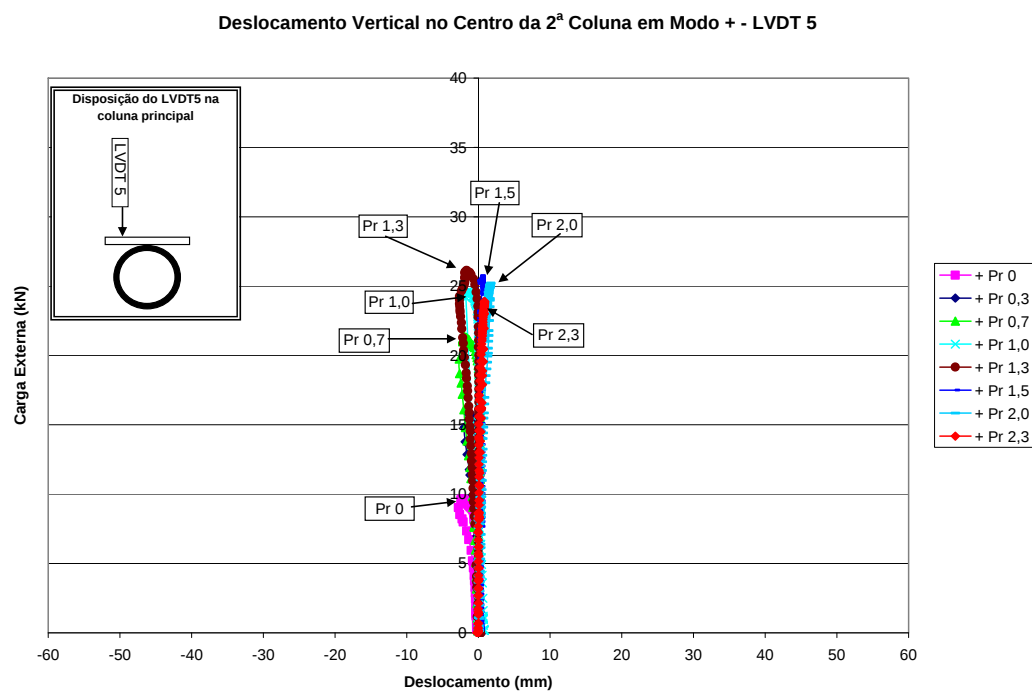


Figura B.47 – Gráfico do deslocamento vertical para o LVDT 5

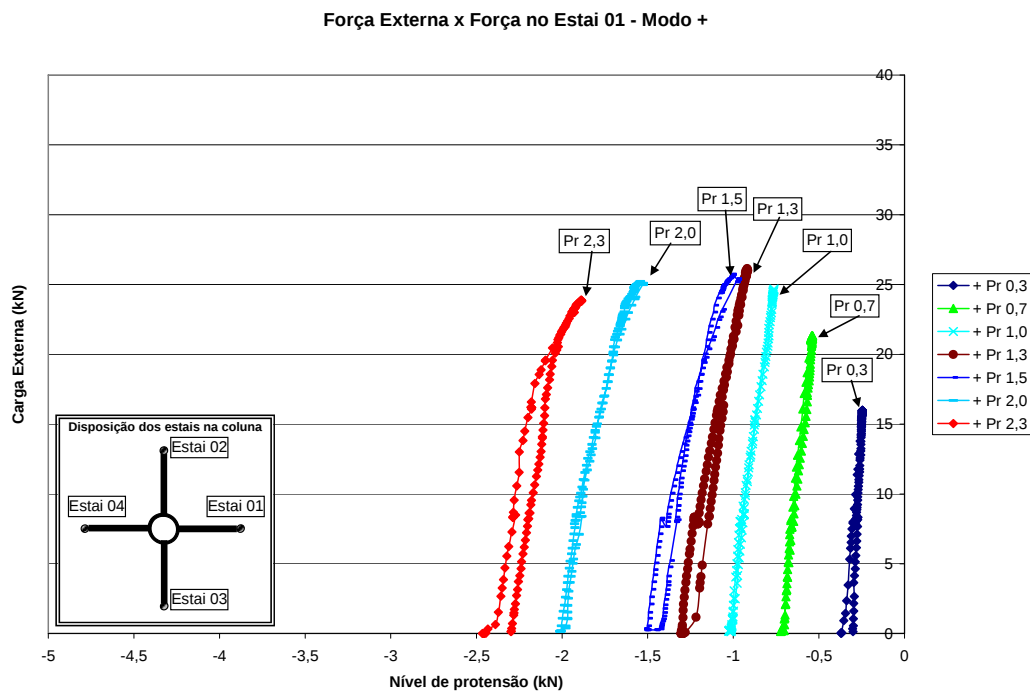


Figura B.48 – Comportamento do estai 1 na aplicação da carga externa na estrutura

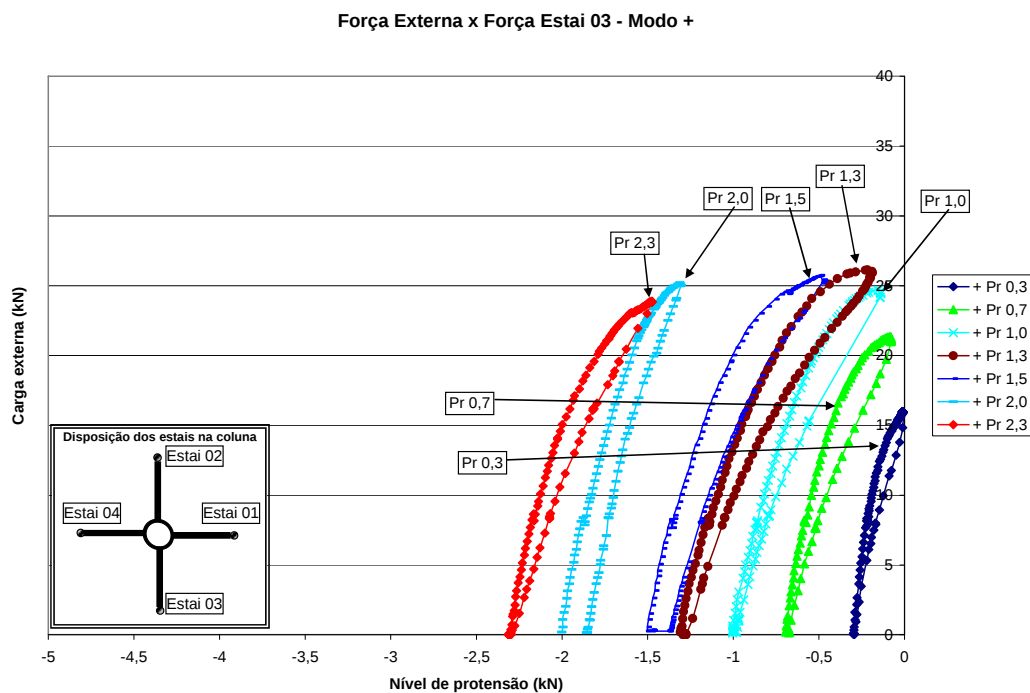


Figura B.49 – Comportamento do estai 3 na aplicação da carga externa na estrutura

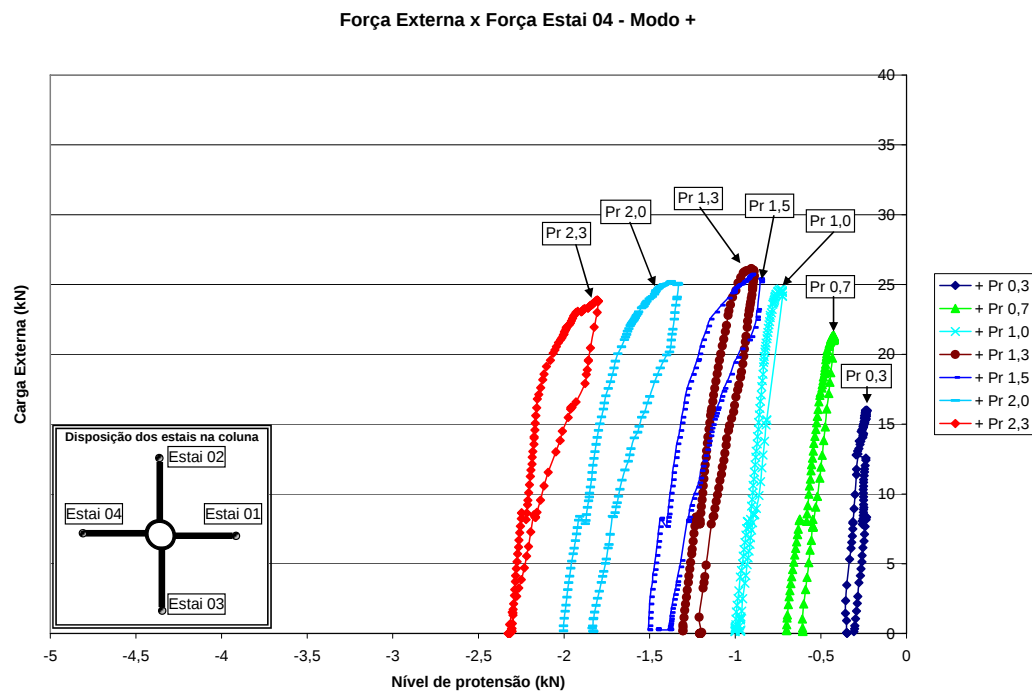


Figura B.50 – Comportamento do estai 4 na aplicação da carga externa na estrutura

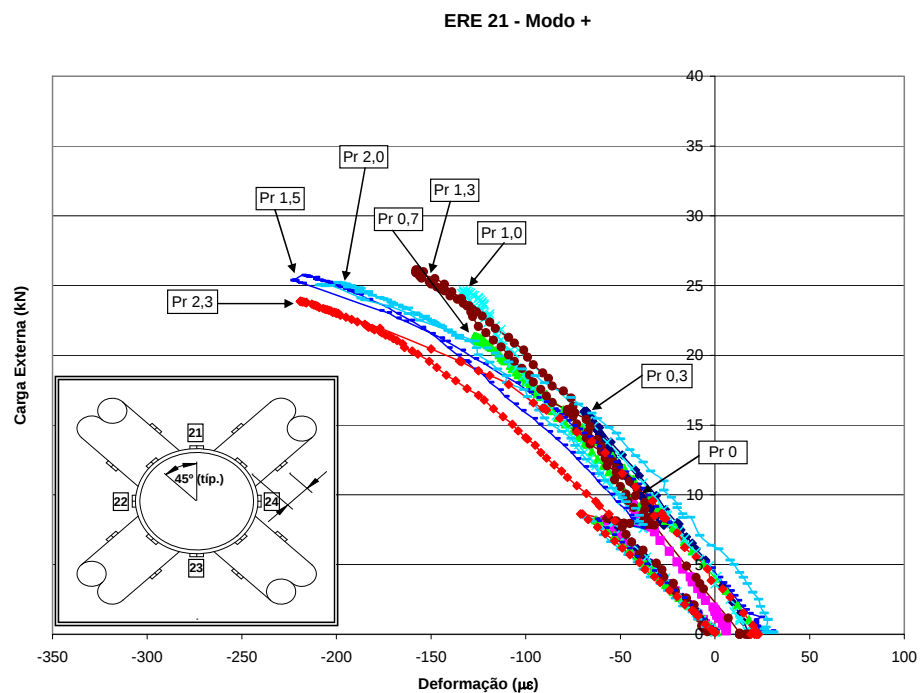


Figura B.51 – Gráfico referente ao extensômetro 21.

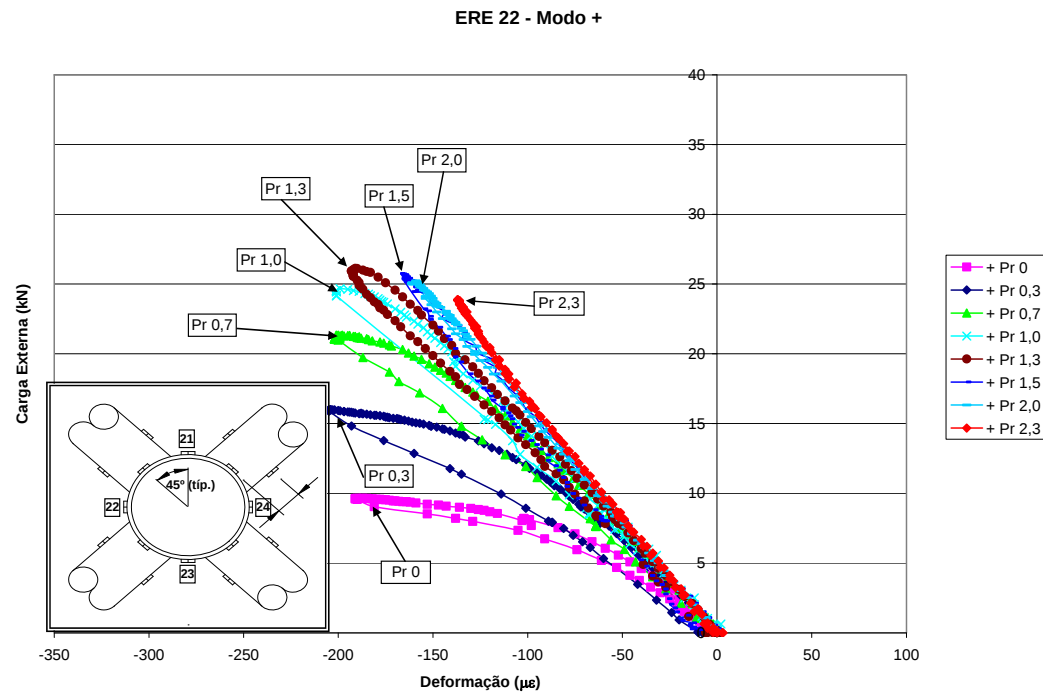


Figura B.52 – Gráfico referente ao extensômetro 22.

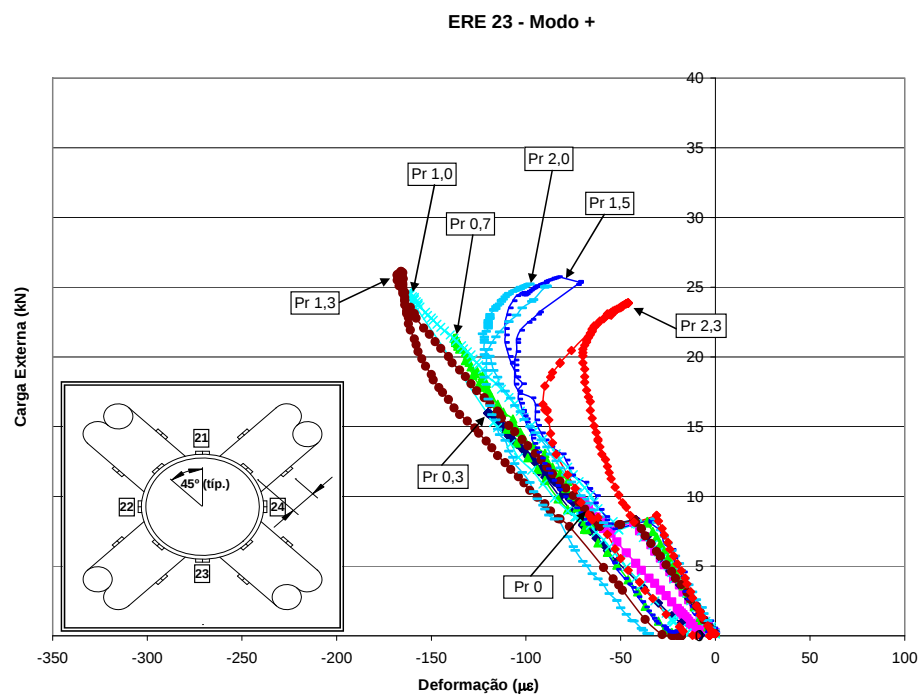


Figura B.53 – Gráfico referente ao extensômetro 23.

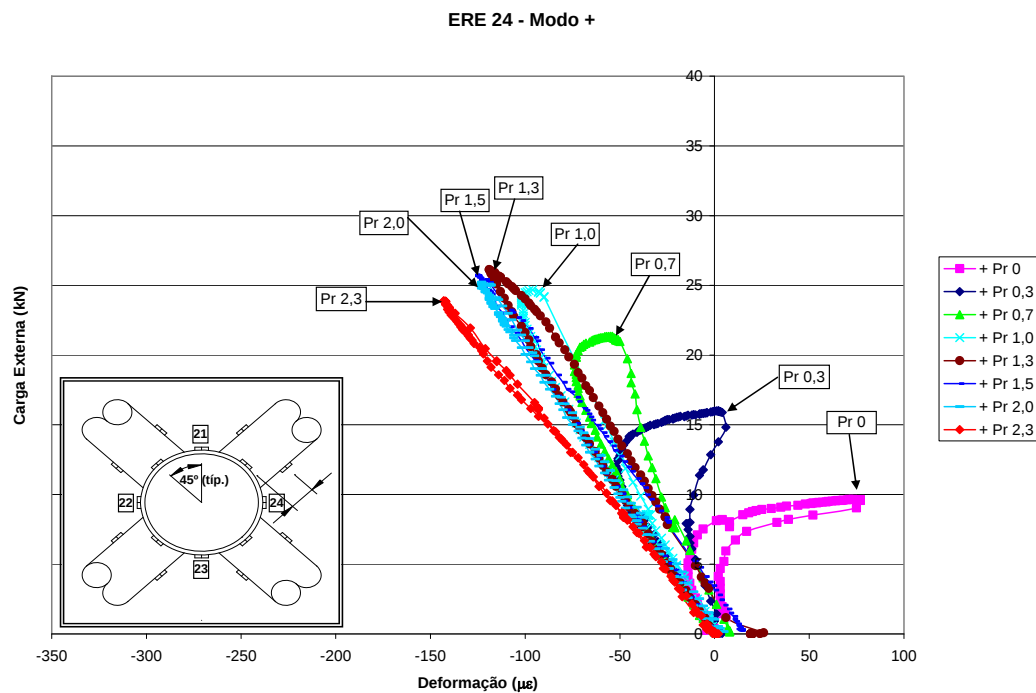


Figura B.54 – Gráfico referente ao extensômetro 24.

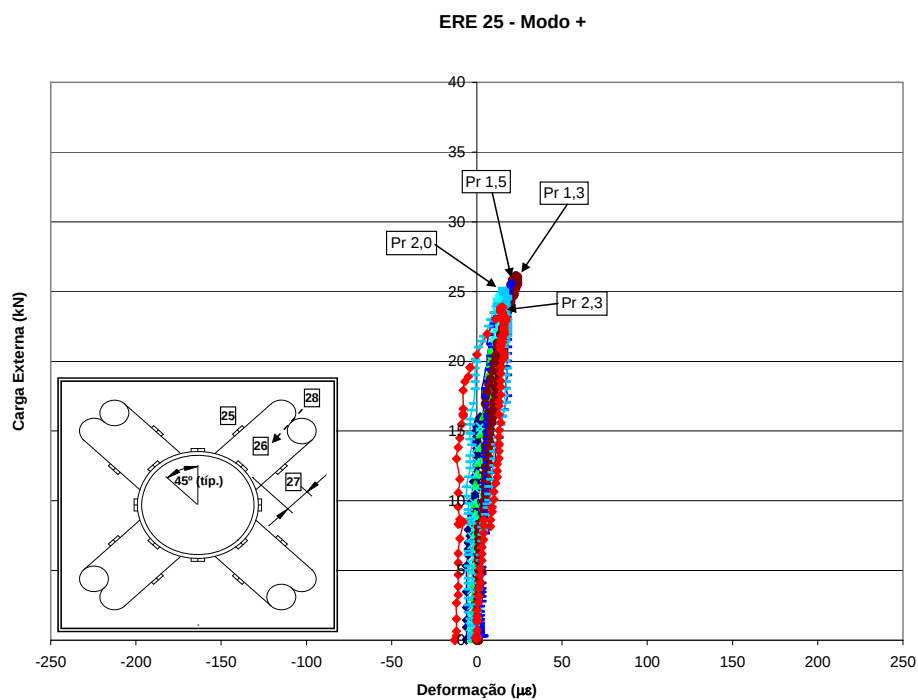


Figura B.55 – Gráfico referente ao extensômetro 25.

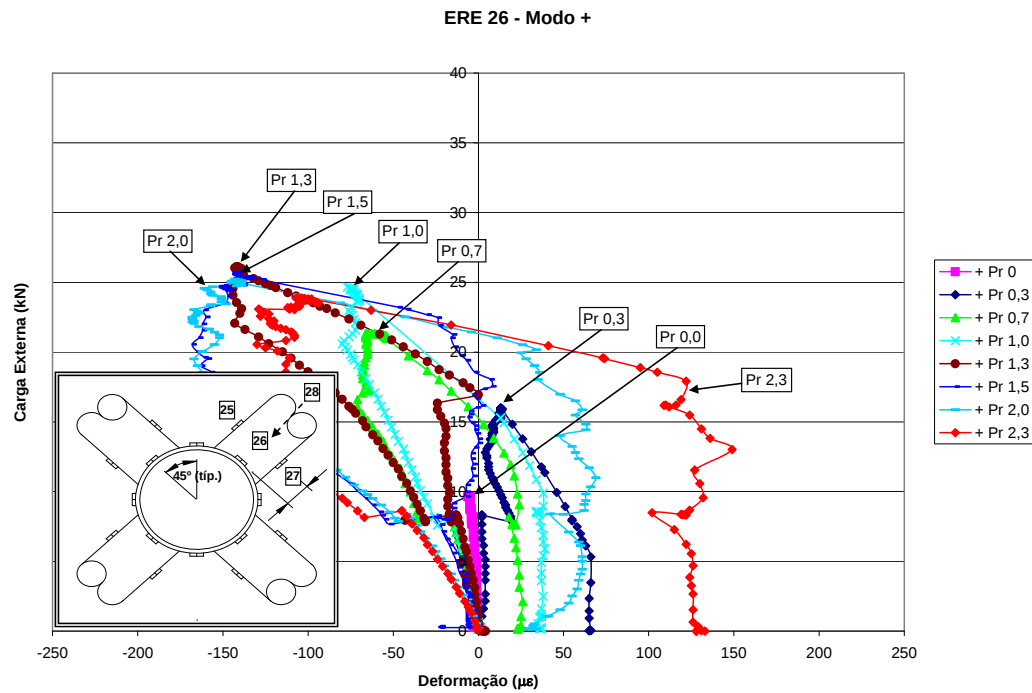


Figura B.56 – Gráfico referente ao extensômetro 26.

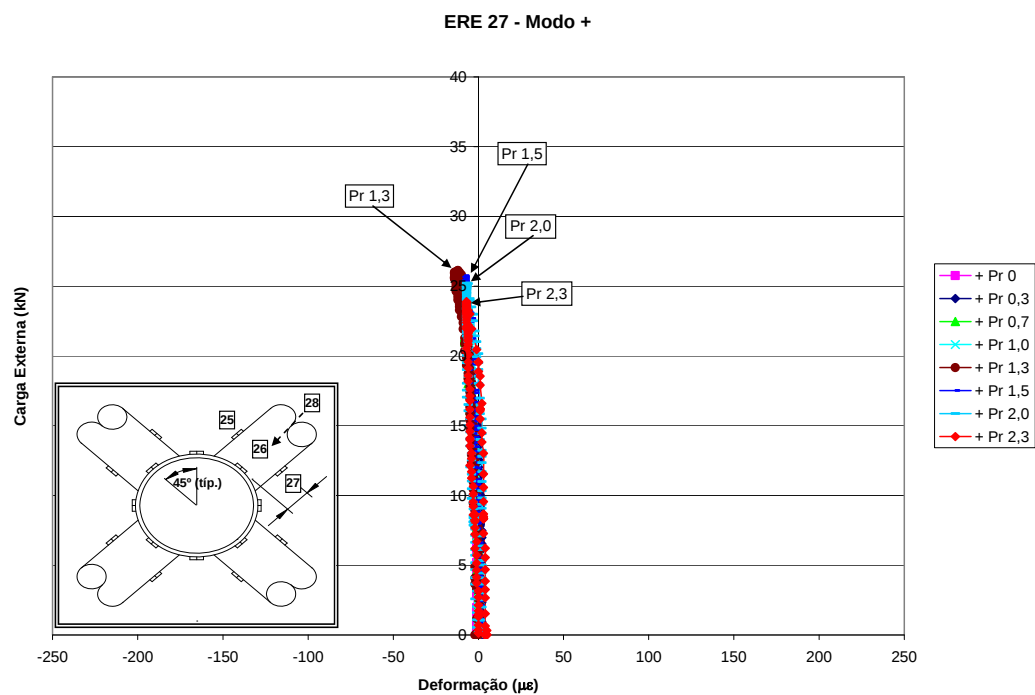


Figura B.57 – Gráfico referente ao extensômetro 27.

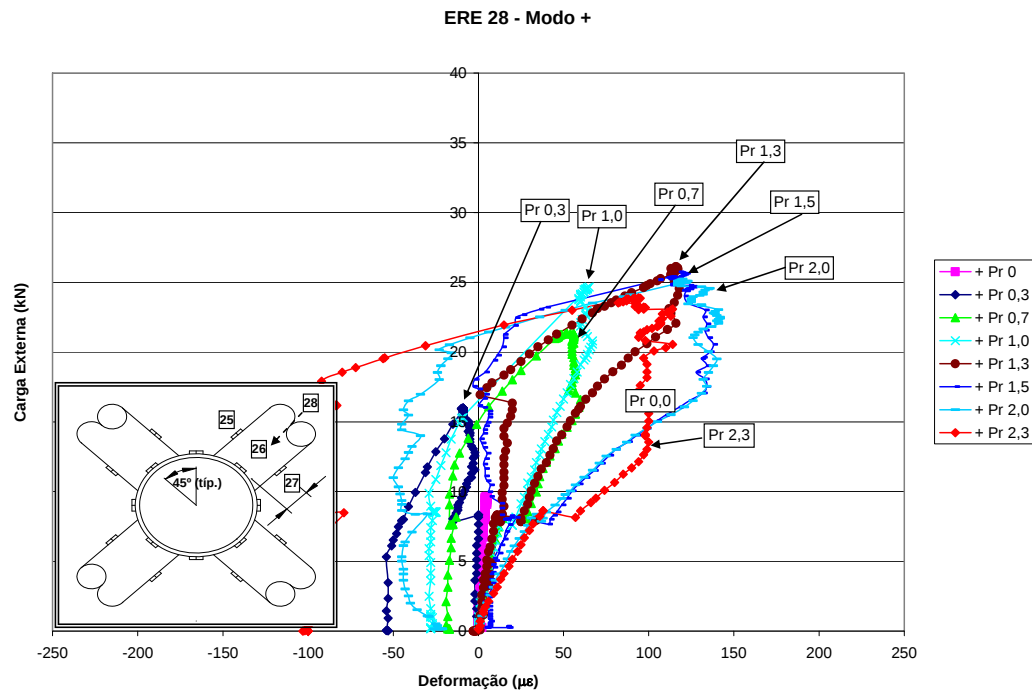


Figura B.58 – Gráfico referente ao extensômetro 28.

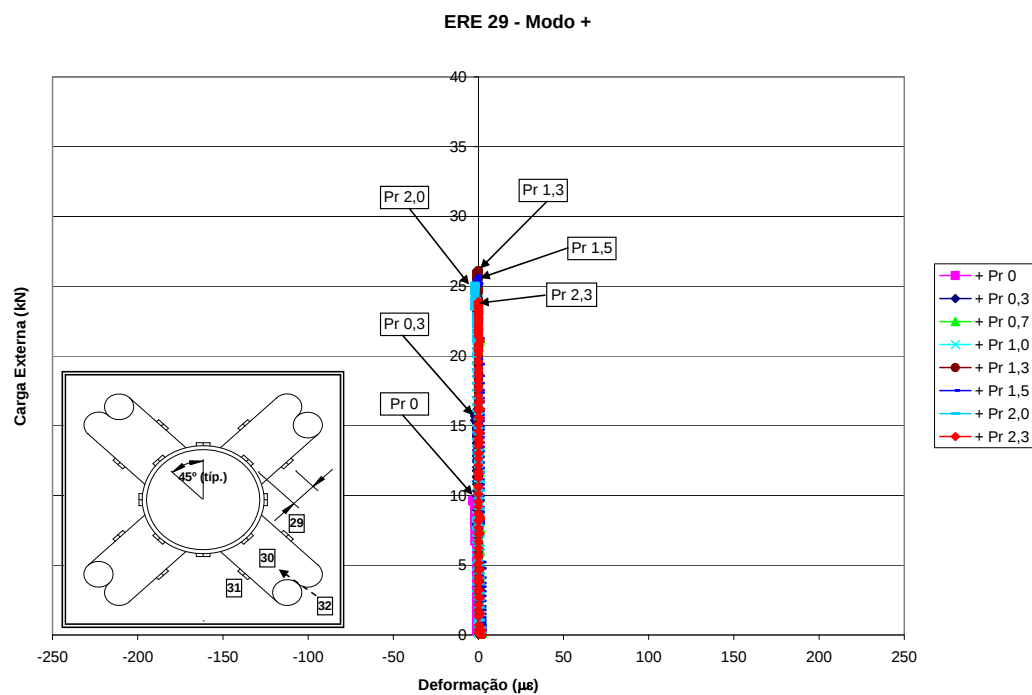


Figura B.59 – Gráfico referente ao extensômetro 29.

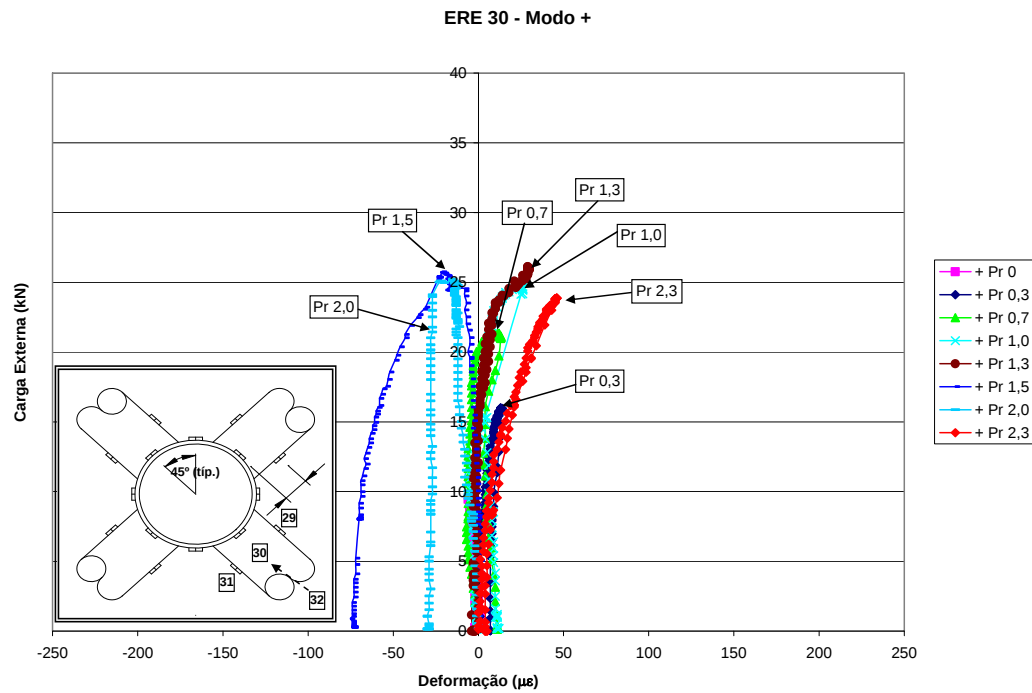


Figura B.60 – Gráfico referente ao extensômetro 30.

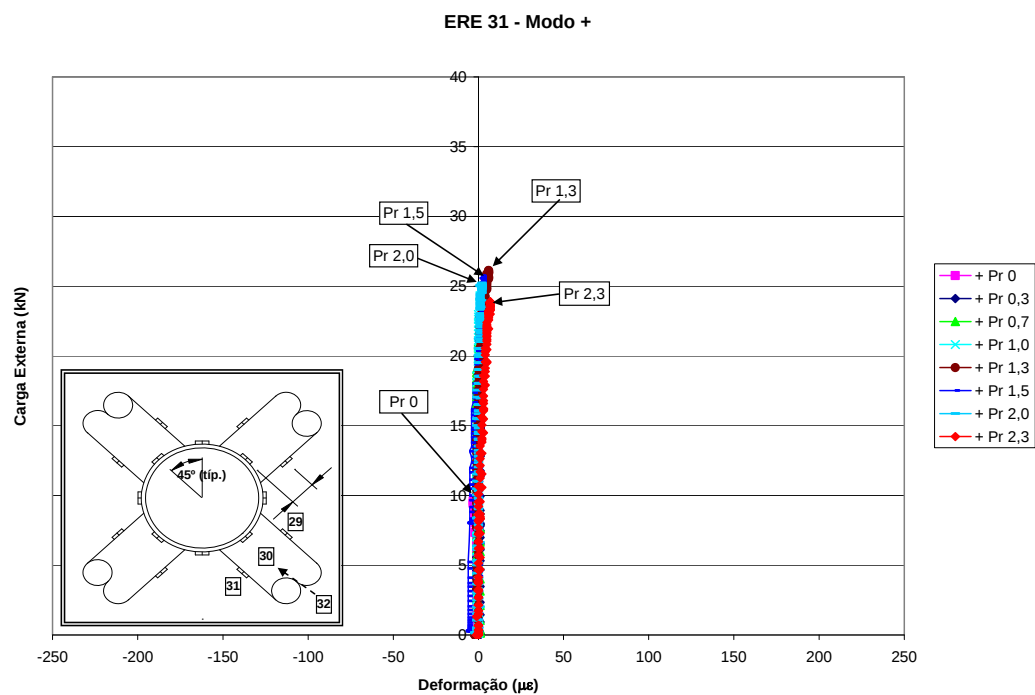


Figura B.61 – Gráfico referente ao extensômetro 31.

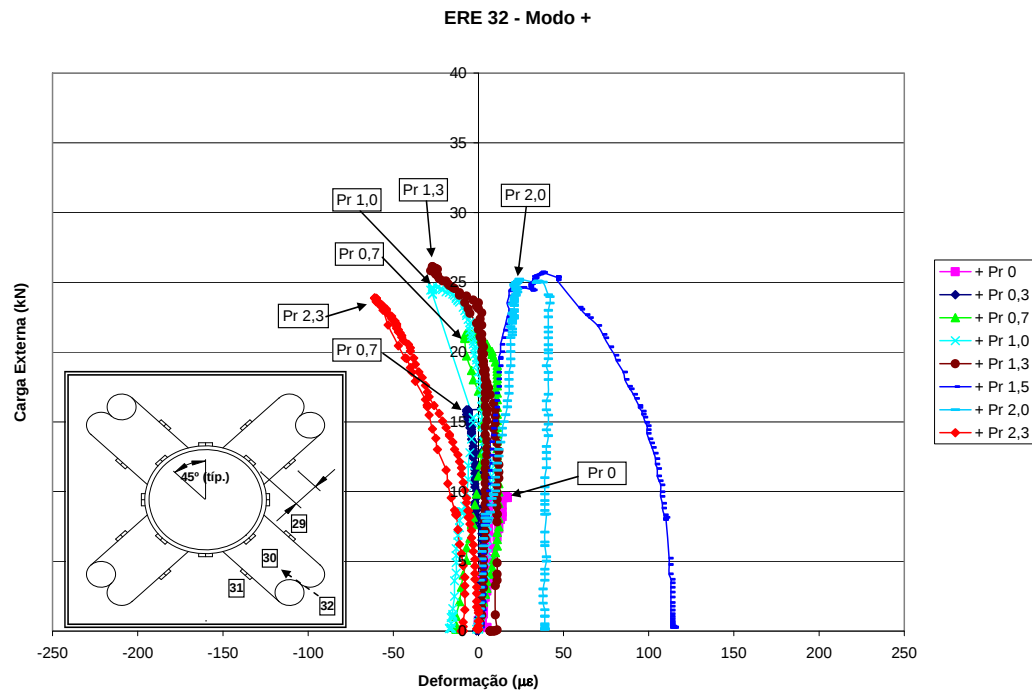


Figura B.62 – Gráfico referente ao extensômetro 32.

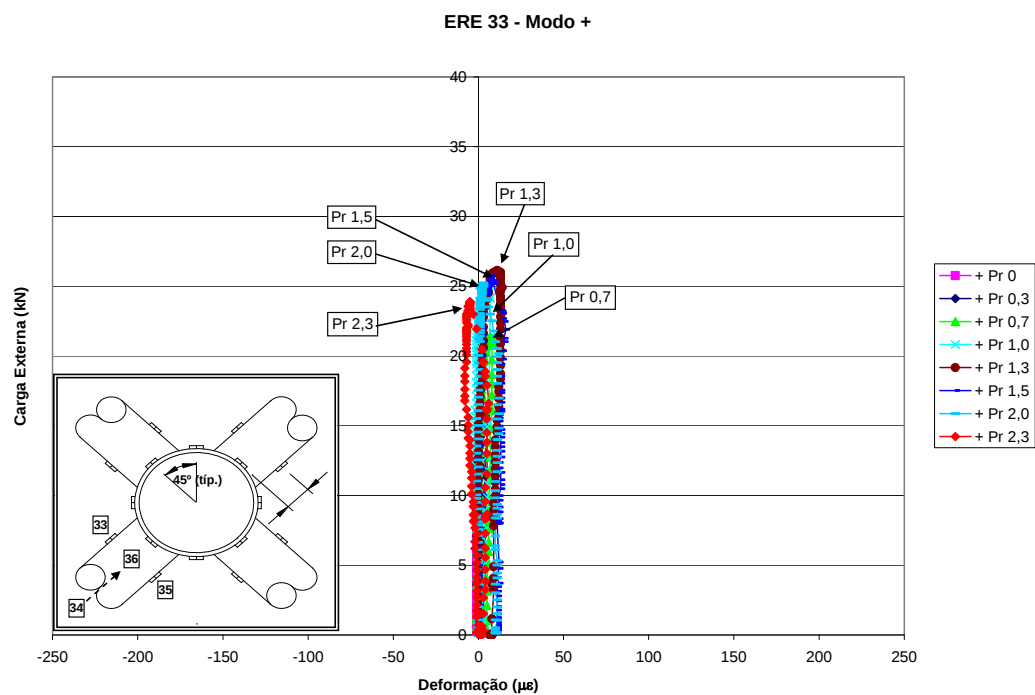


Figura B.63 – Gráfico referente ao extensômetro 33.

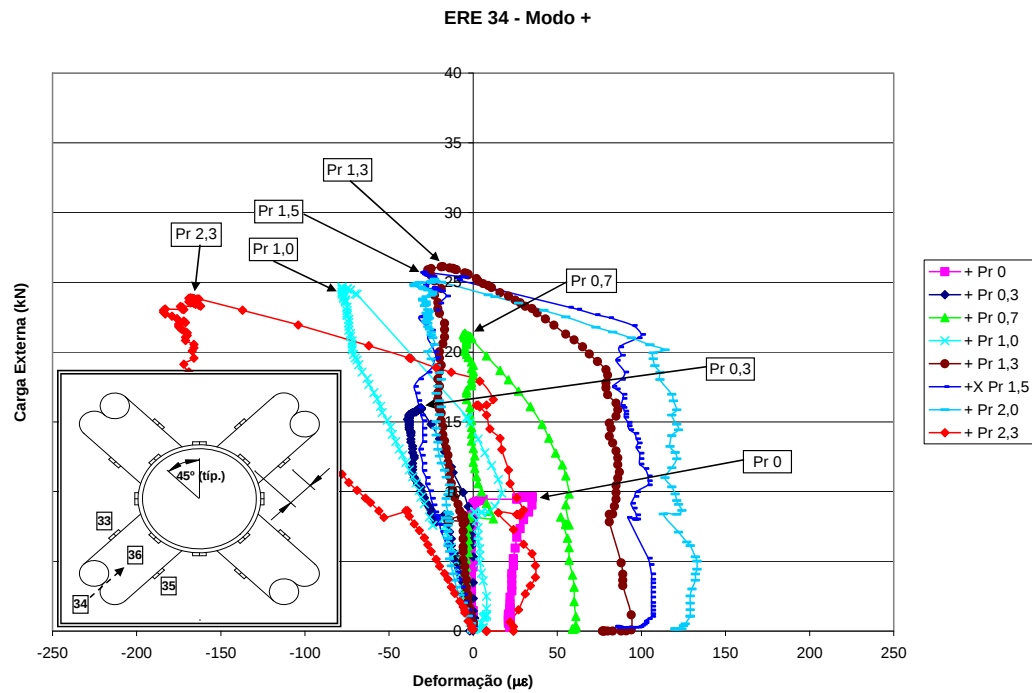


Figura B.64 – Gráfico referente ao extensômetro 34.

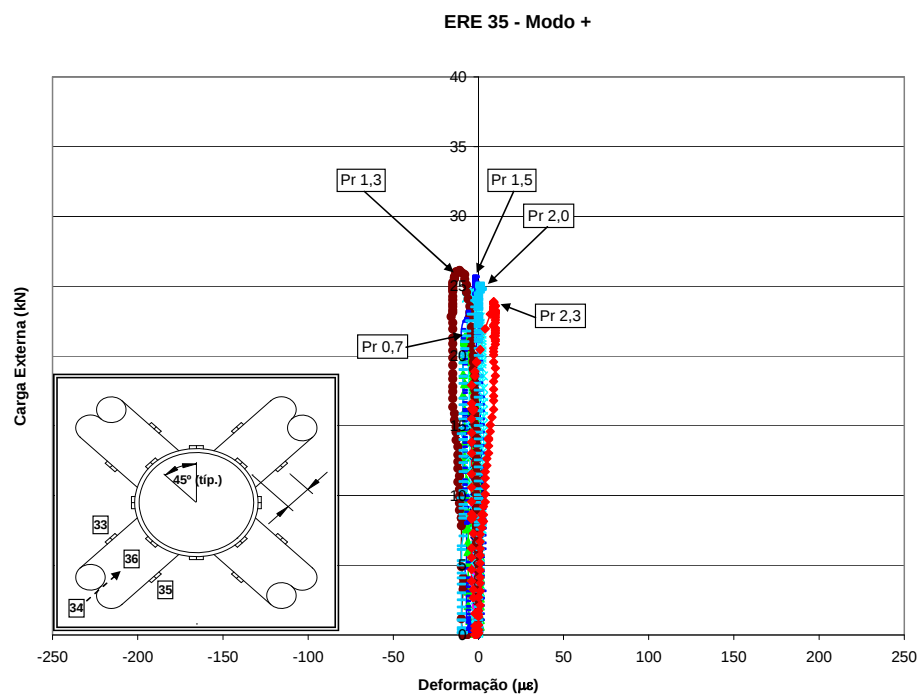


Figura B.65 – Gráfico referente ao extensômetro 35.

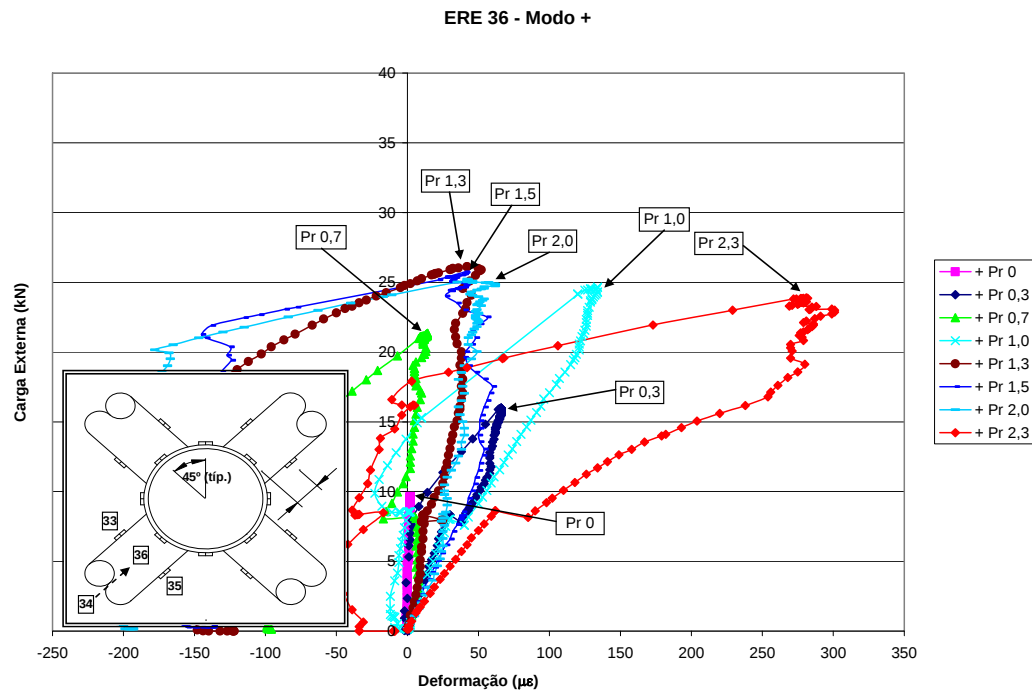


Figura B.66 – Gráfico referente ao extensômetro 36.

B.3

Terceira Coluna

B.3.1

Modo x

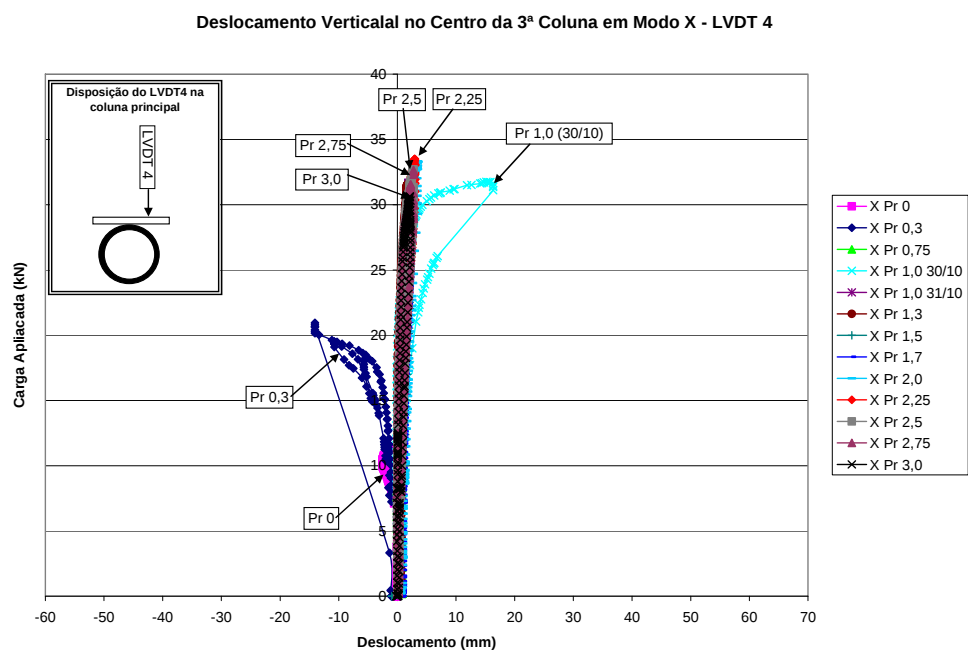


Figura B.67 – Gráfico do deslocamento vertical para o LVDT 4

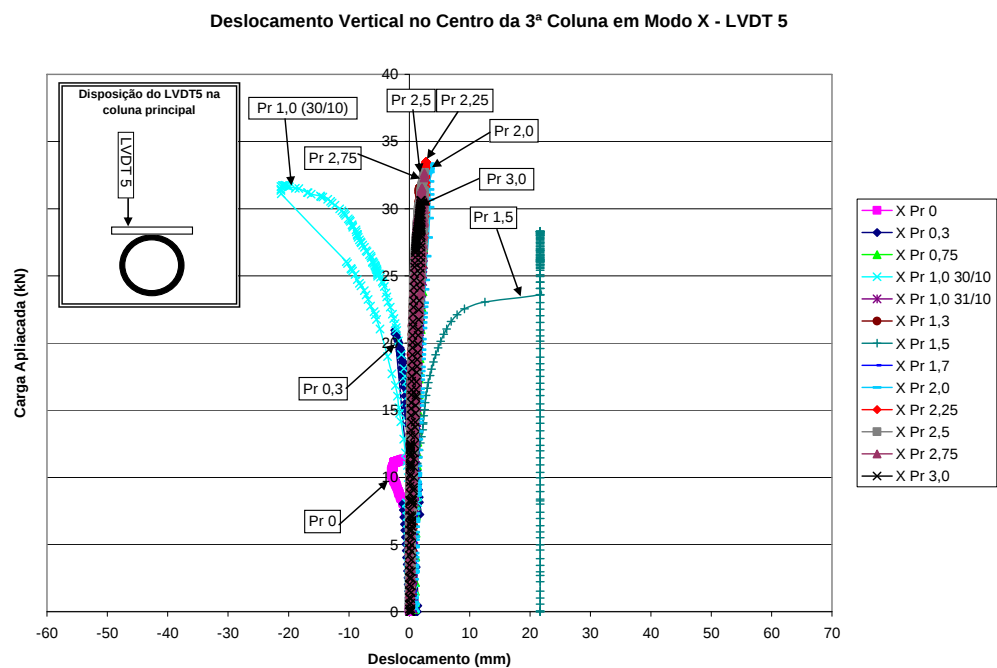


Figura B.68 – Gráfico do deslocamento vertical para o LVDT 5

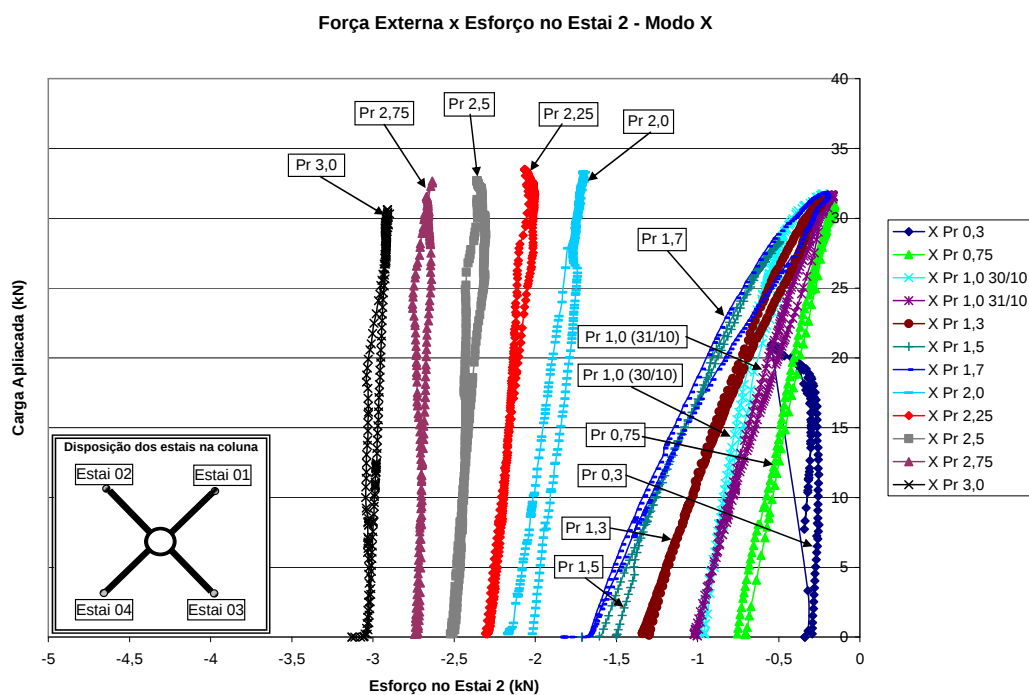


Figura B.69 – Comportamento do estai 2 na aplicação da carga externa na estrutura

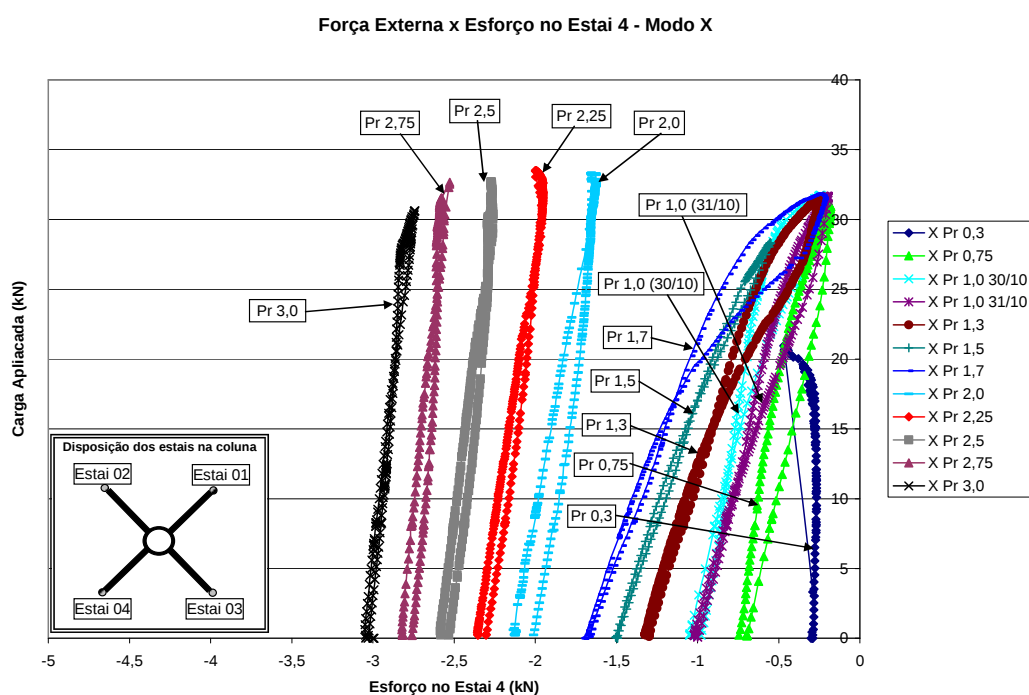


Figura B.70 – Comportamento do estai 4 na aplicação da carga externa na estrutura

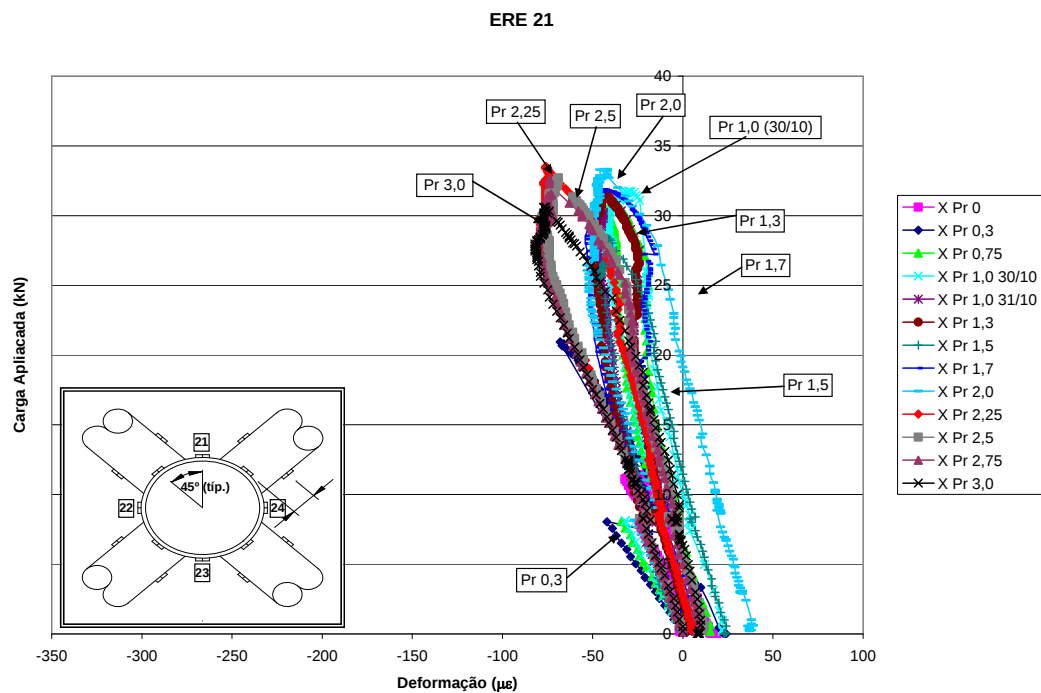


Figura B.71 – Gráfico referente ao extensômetro 21.

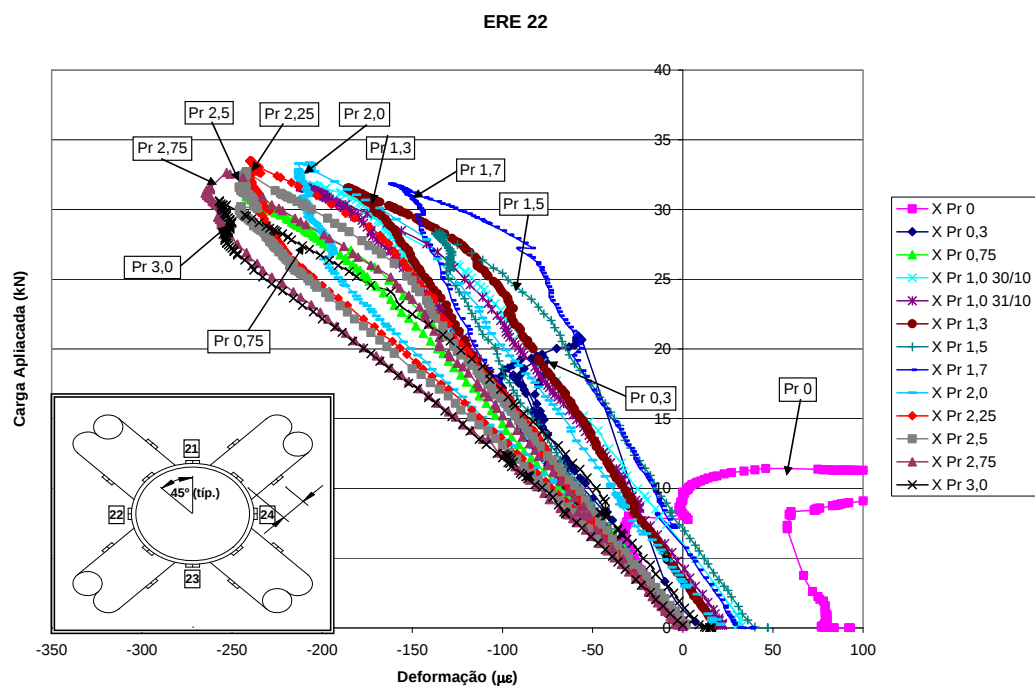


Figura B.72 – Gráfico referente ao extensômetro 22.

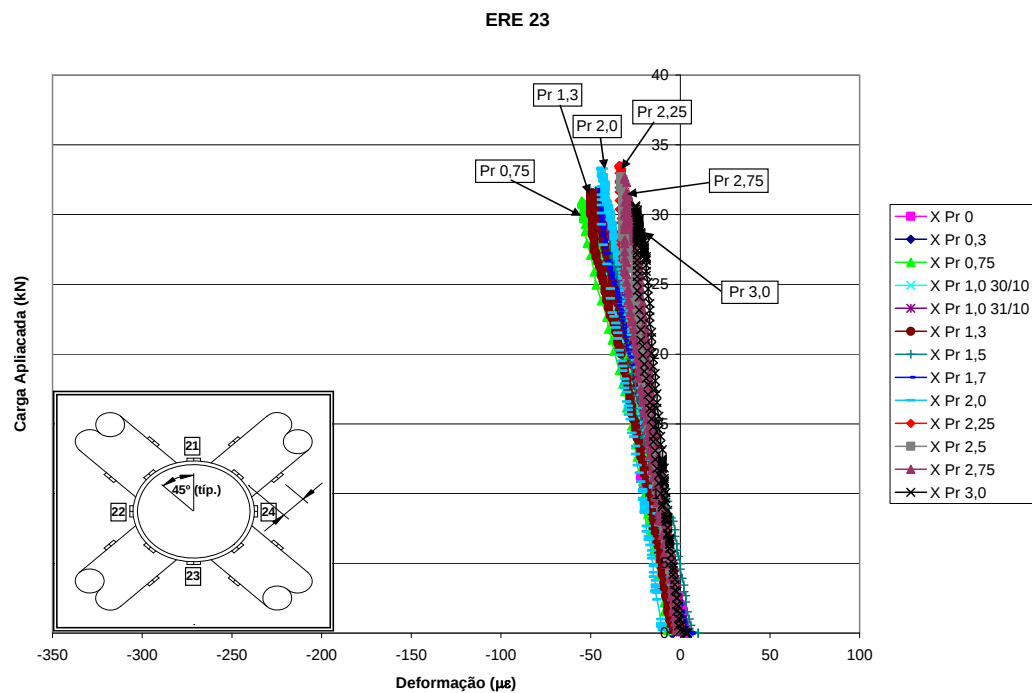


Figura B.73 – Gráfico referente ao extensômetro 23.

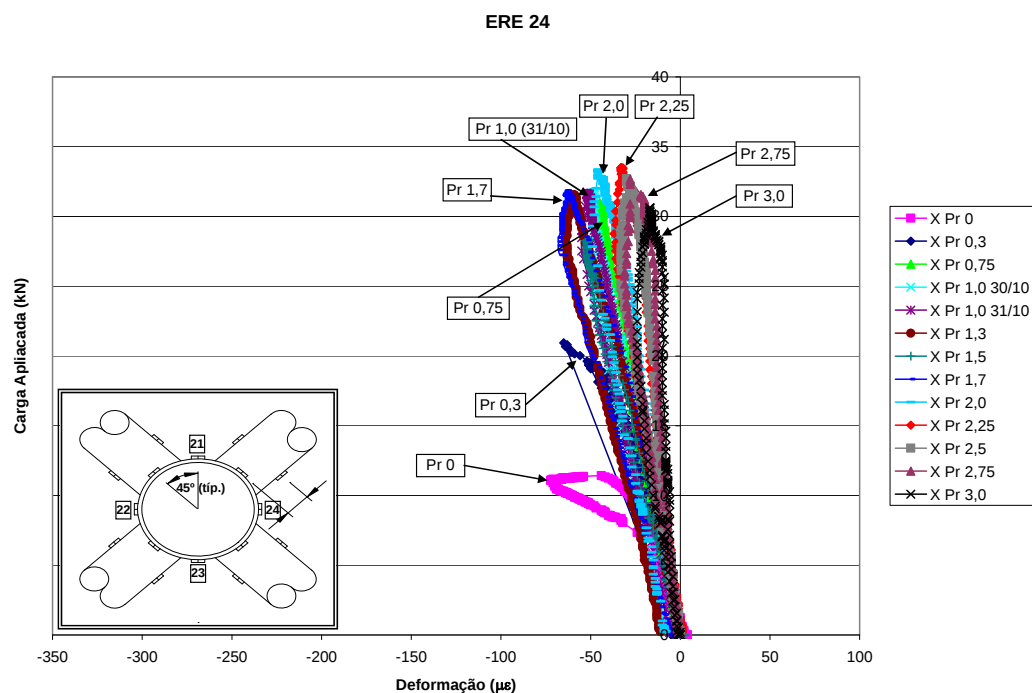


Figura B.74 – Gráfico referente ao extensômetro 24.

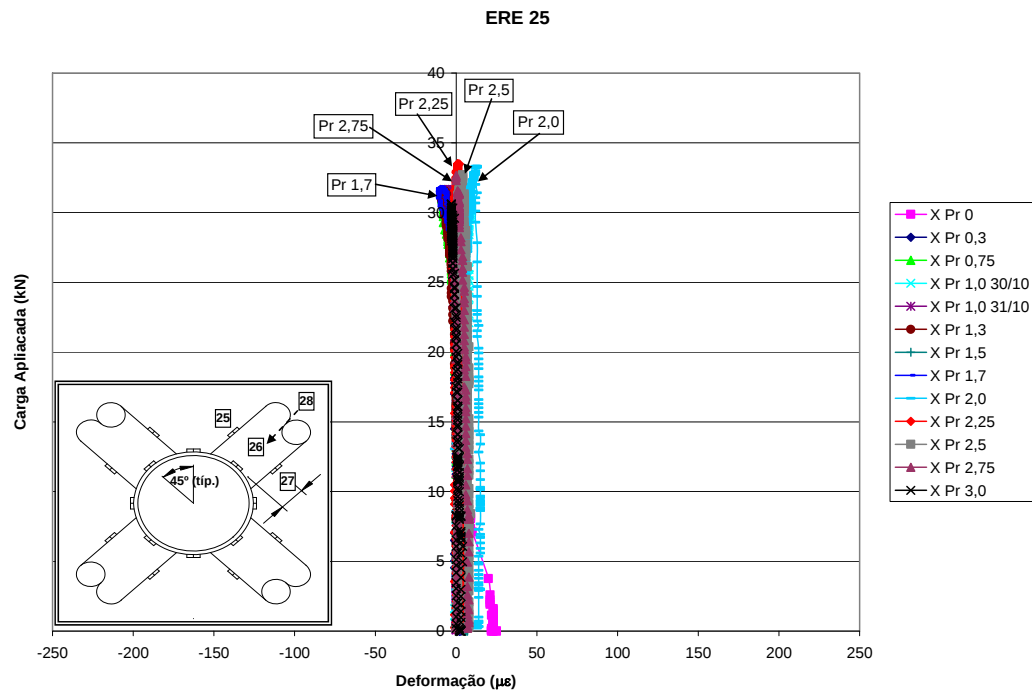


Figura B.75 – Gráfico referente ao extensômetro 25.

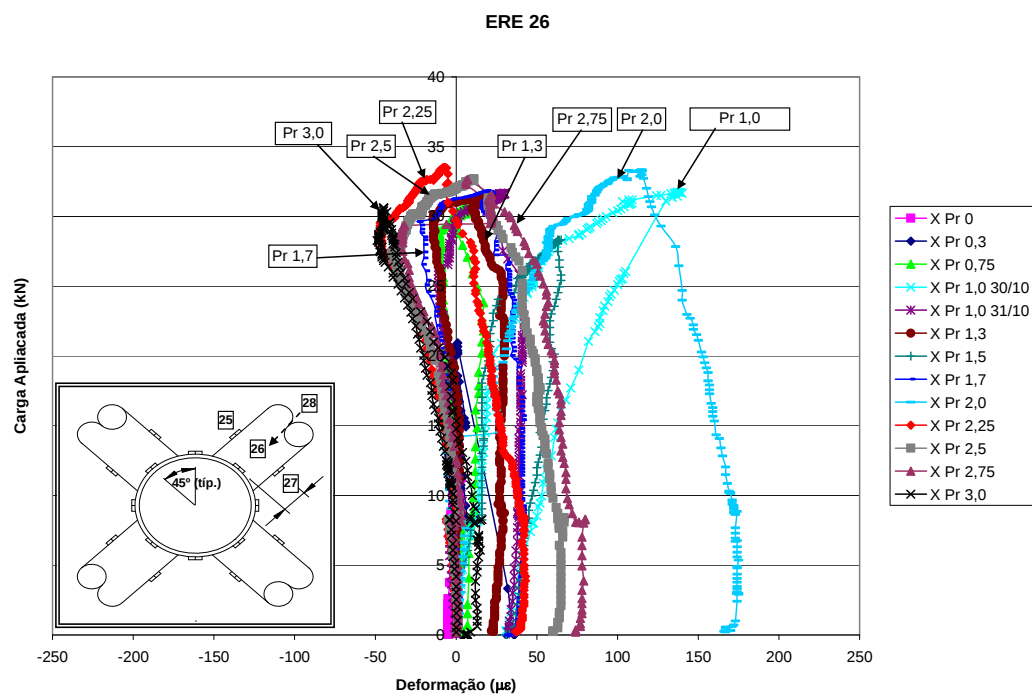


Figura B.76 – Gráfico referente ao extensômetro 26.

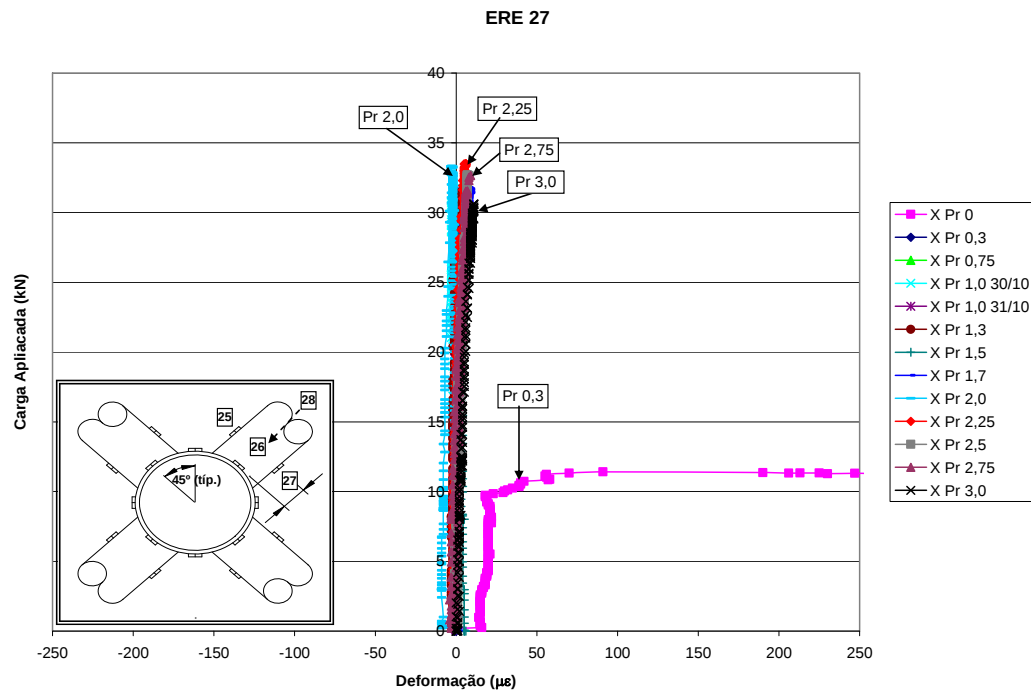


Figura B.77 – Gráfico referente ao extensômetro 27.

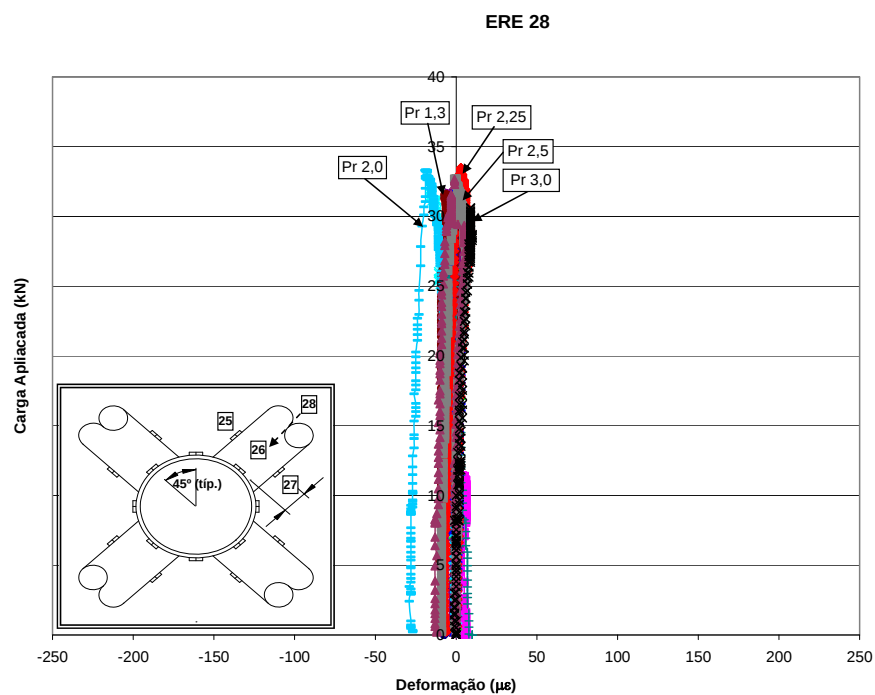


Figura B.78 – Gráfico referente ao extensômetro 28.

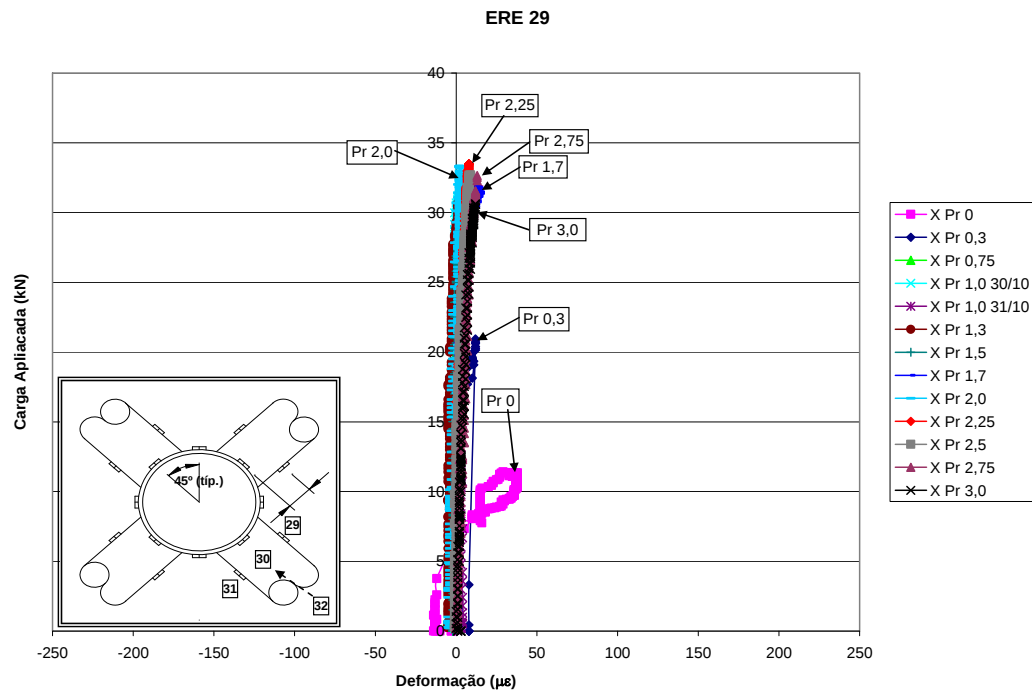


Figura B.79 – Gráfico referente ao extensômetro 29.

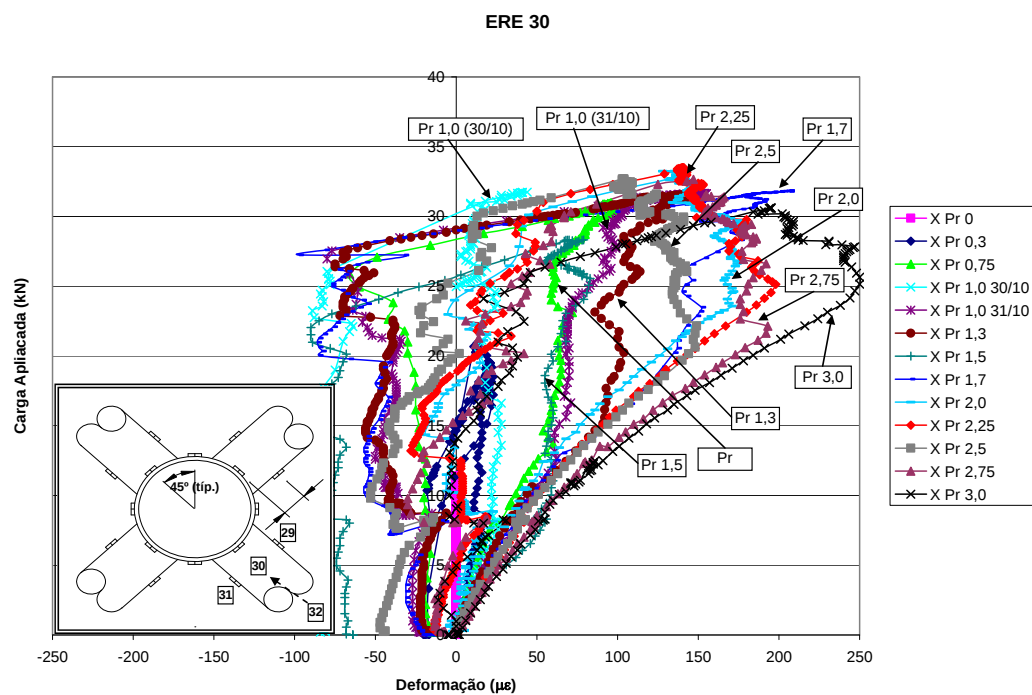


Figura B.80 – Gráfico referente ao extensômetro 30.

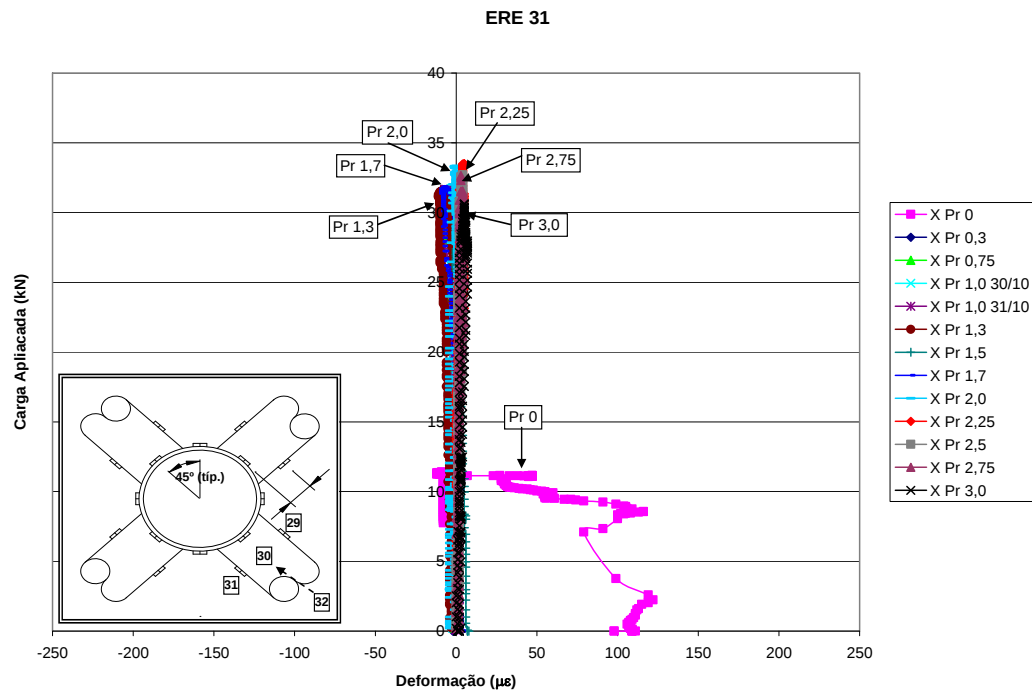


Figura B.81 – Gráfico referente ao extensômetro 31.

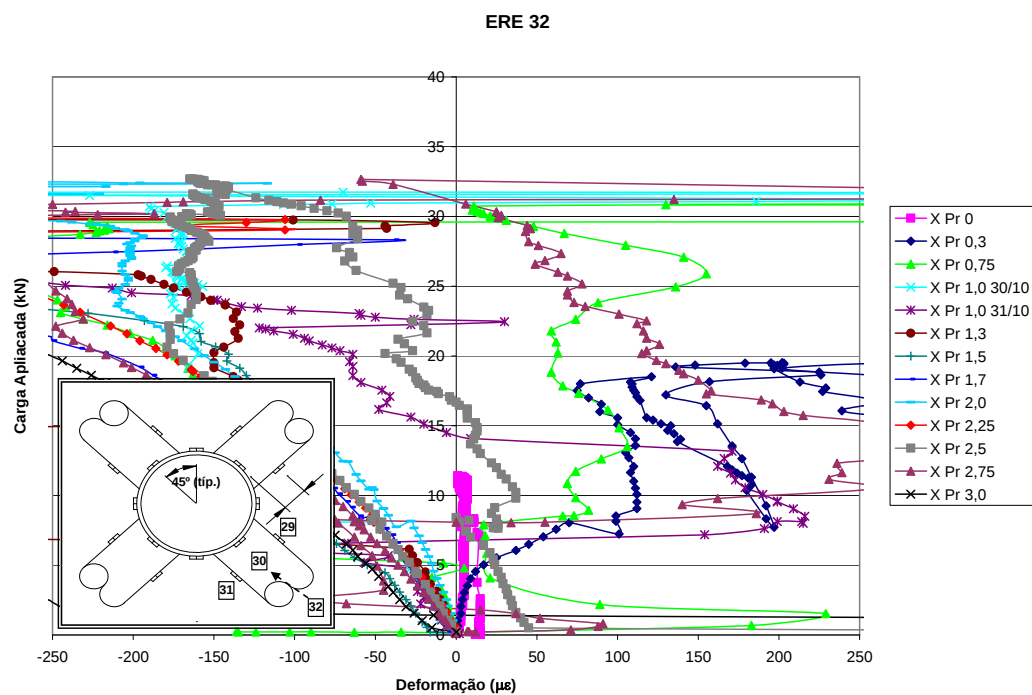


Figura B.82 – Gráfico referente ao extensômetro 32.

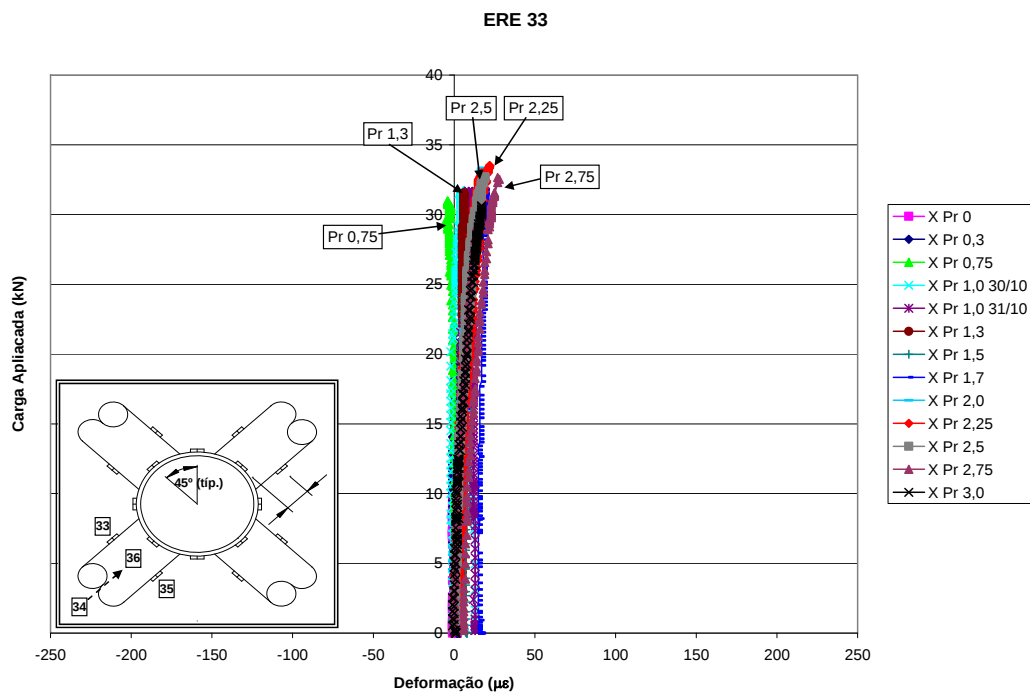


Figura B.83 – Gráfico referente ao extensômetro 33.

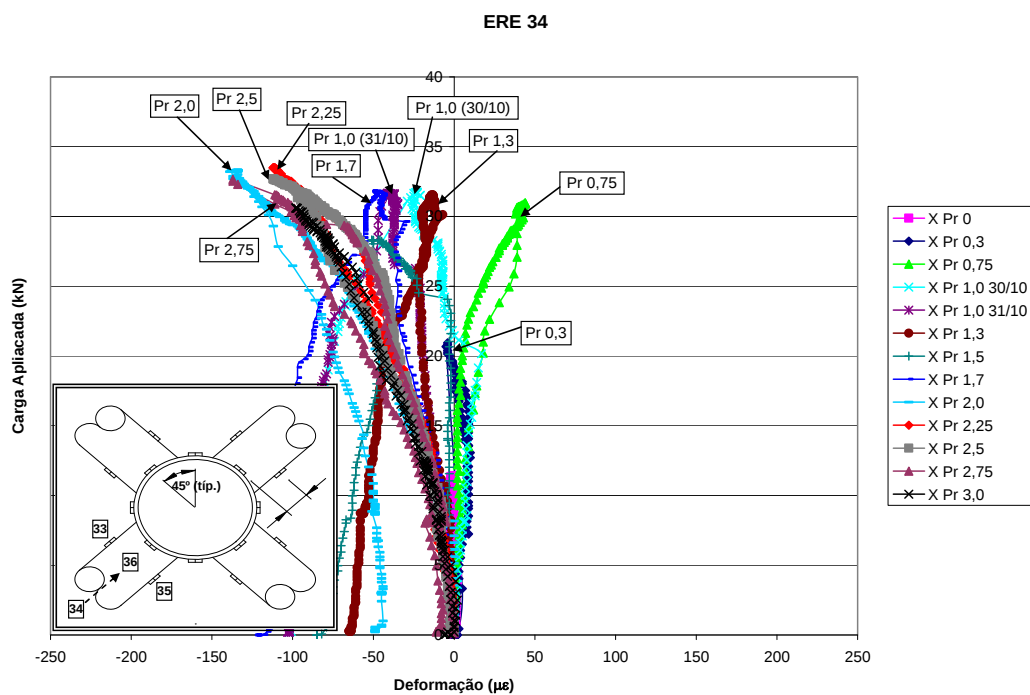


Figura B.84 – Gráfico referente ao extensômetro 34.

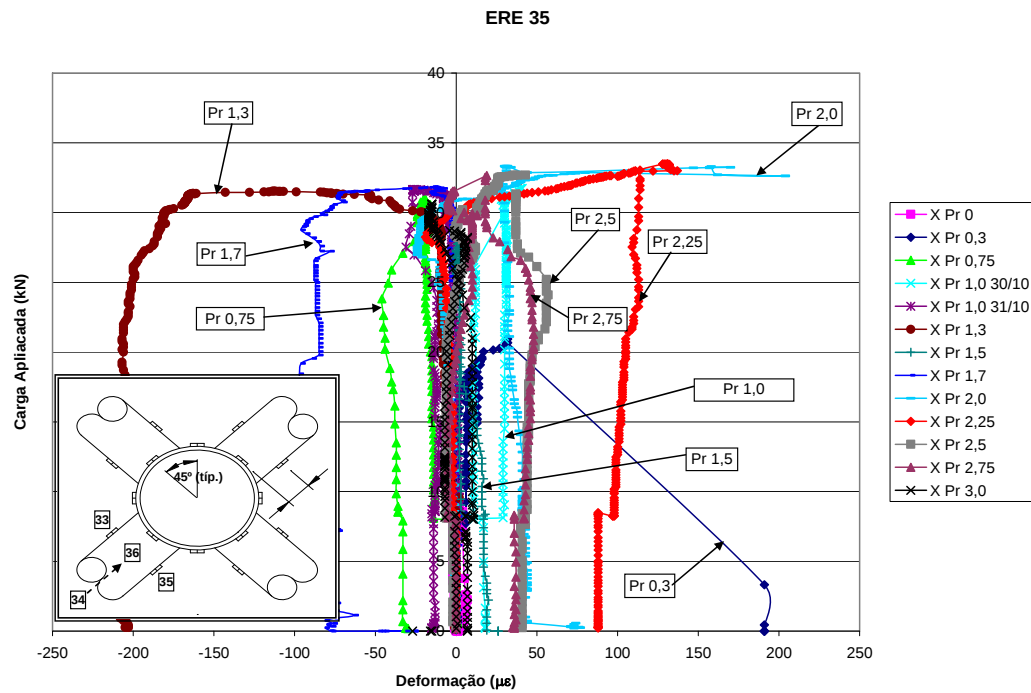


Figura B.85 – Gráfico referente ao extensômetro 35.

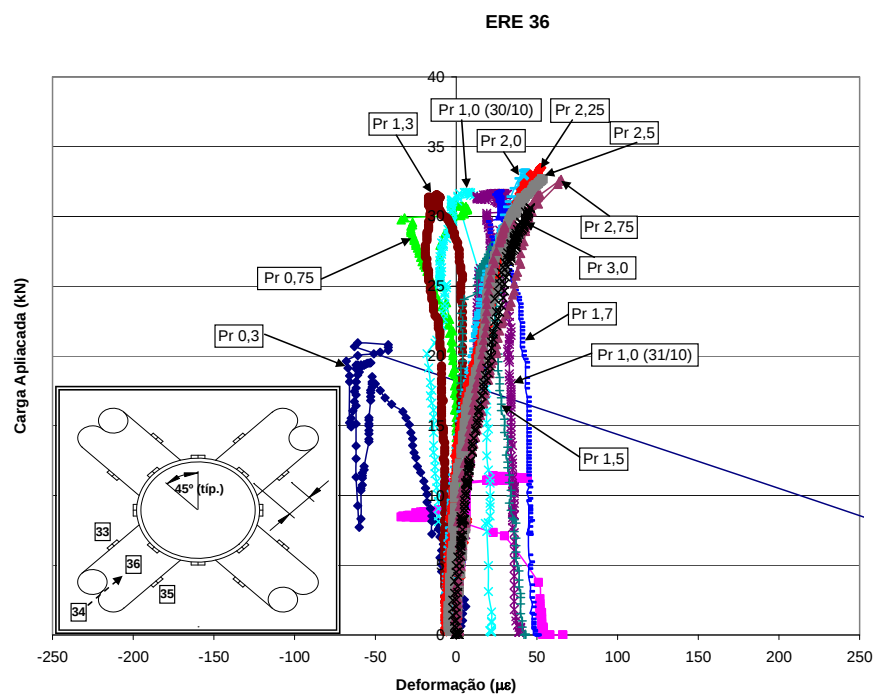


Figura B.86 – Gráfico referente ao extensômetro 36.

B.3.2

Modo +

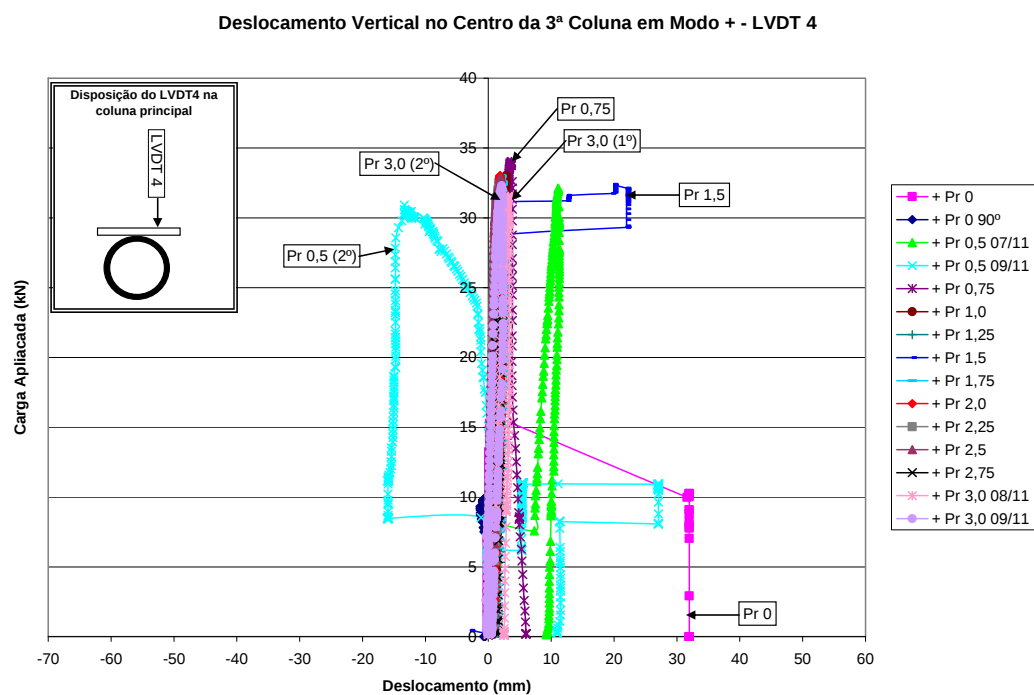


Figura B.87 – Gráfico do deslocamento vertical para o LVDT 4

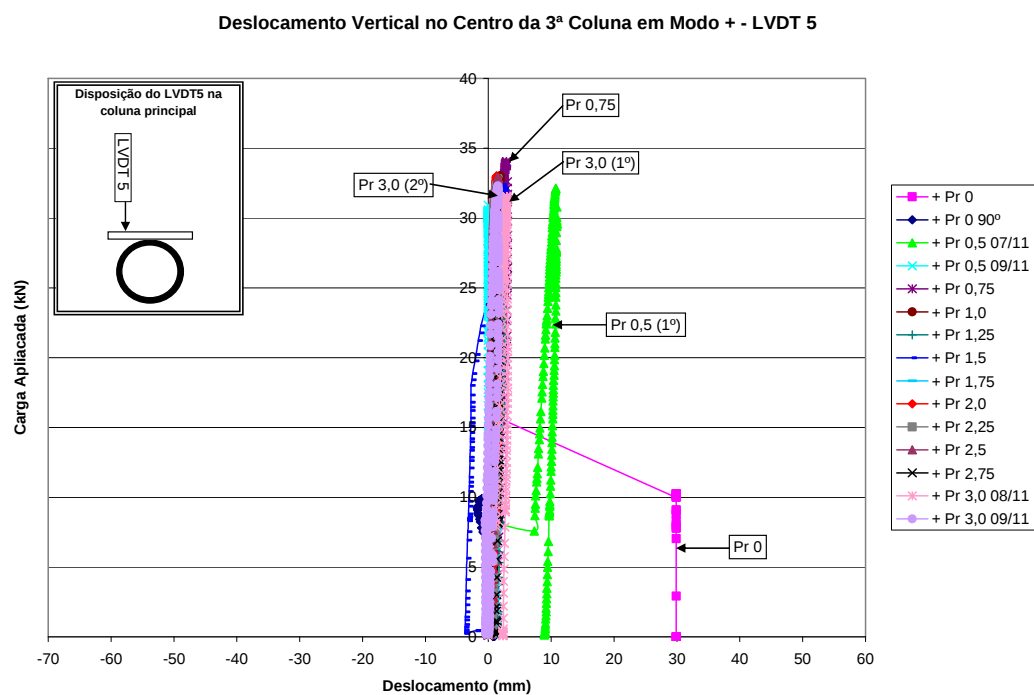


Figura B.88 – Gráfico do deslocamento vertical para o LVDT 5

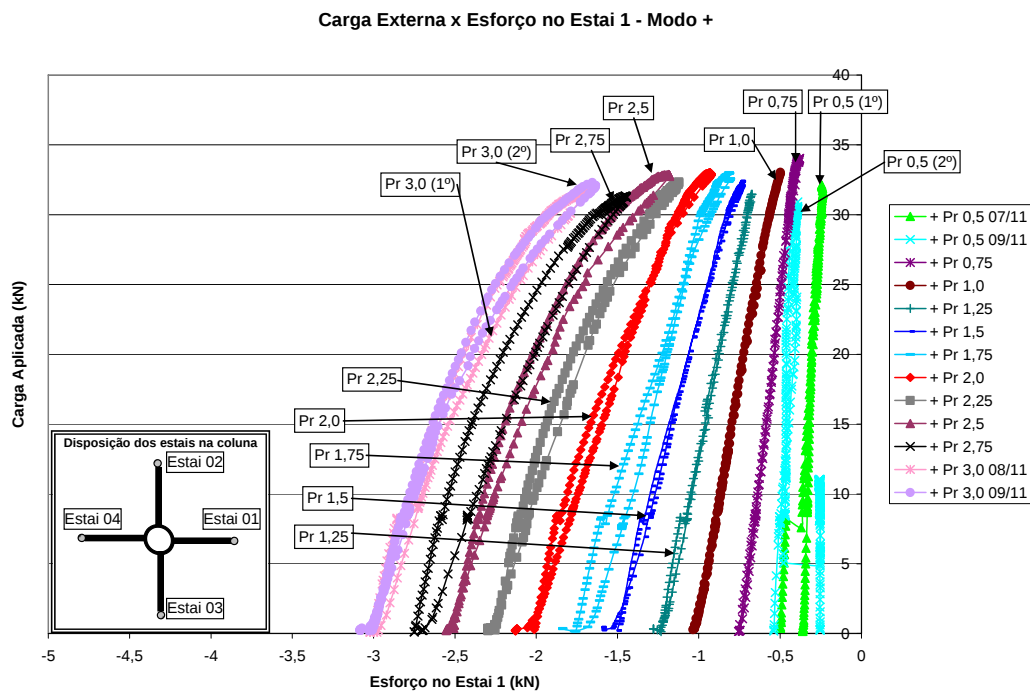


Figura B.89 – Comportamento do estai 1 na aplicação da carga externa na estrutura

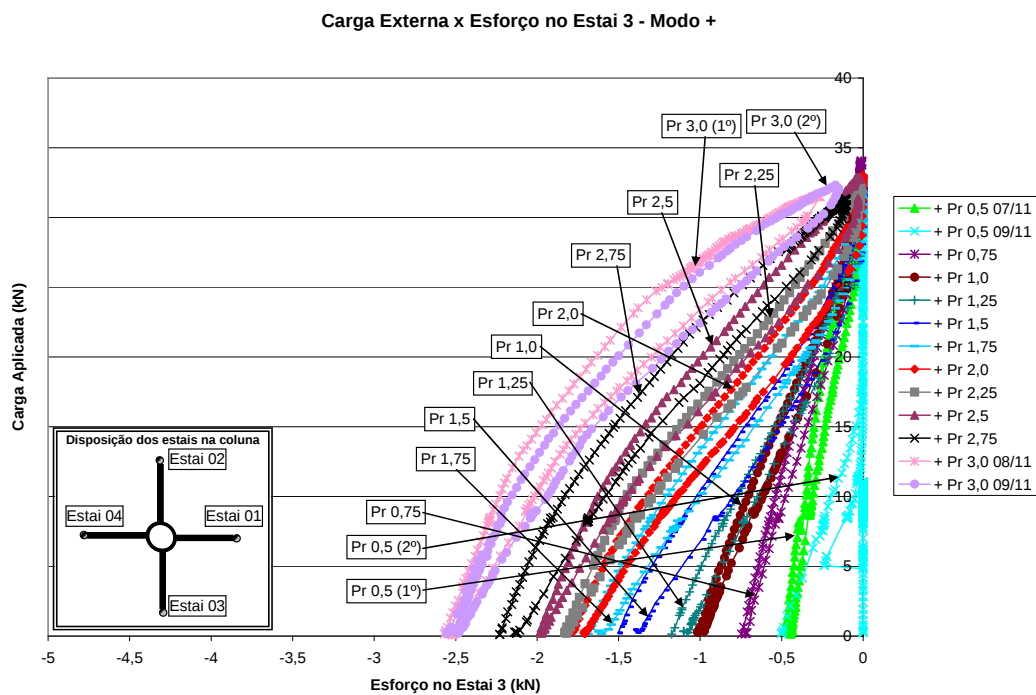


Figura B.90 – Comportamento do estai 3 na aplicação da carga externa na estrutura

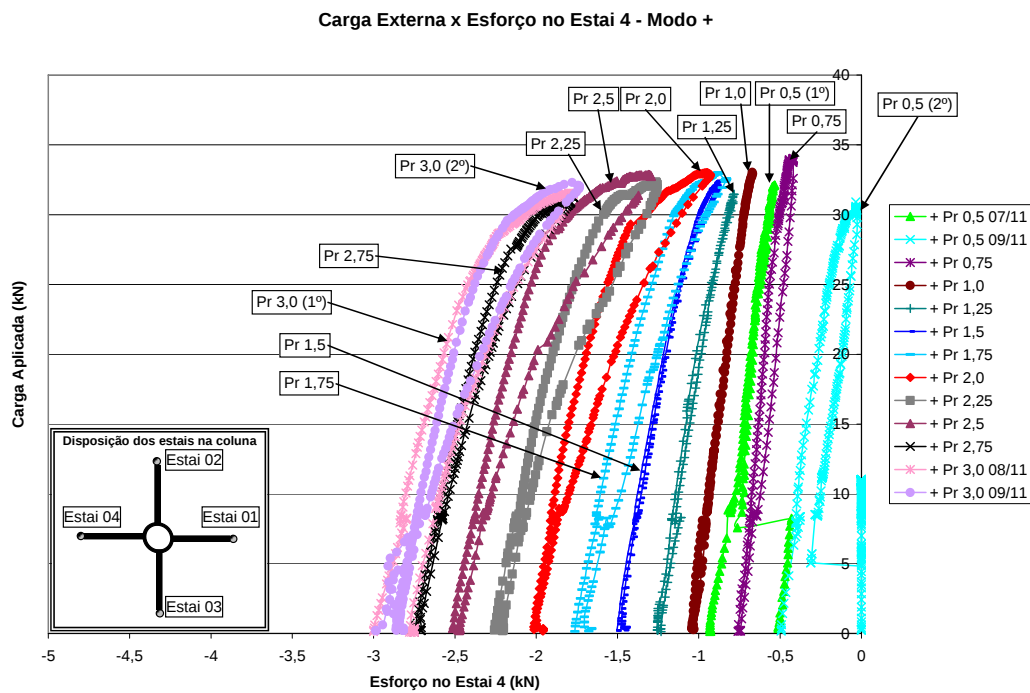


Figura B.91 – Comportamento do estai 4 na aplicação da carga externa na estrutura

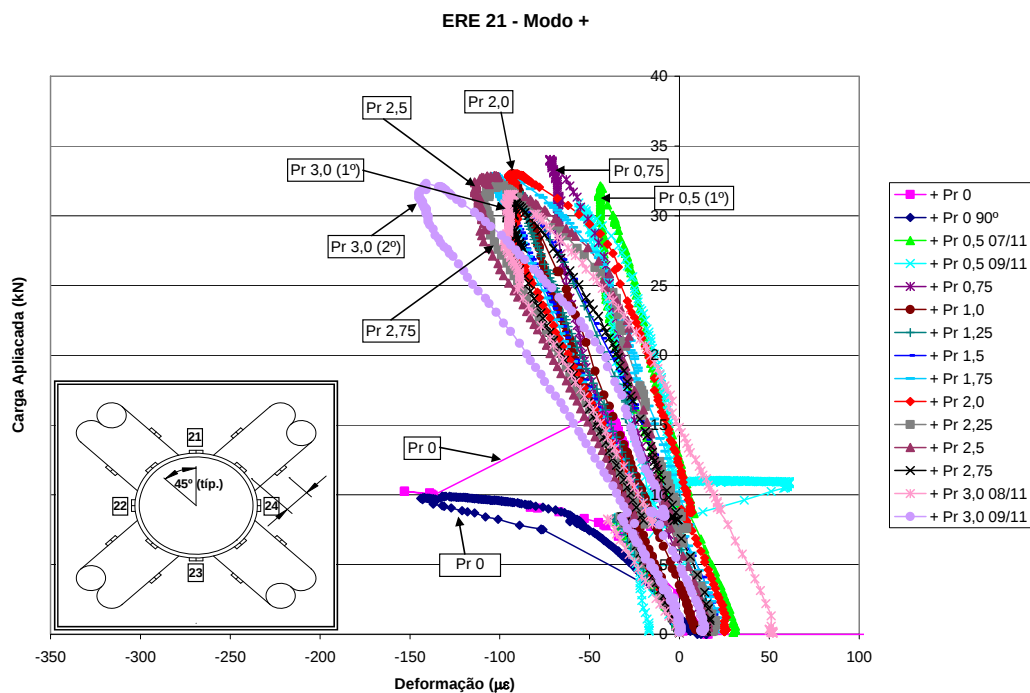


Figura B.92 – Gráfico referente ao extensômetro 21.

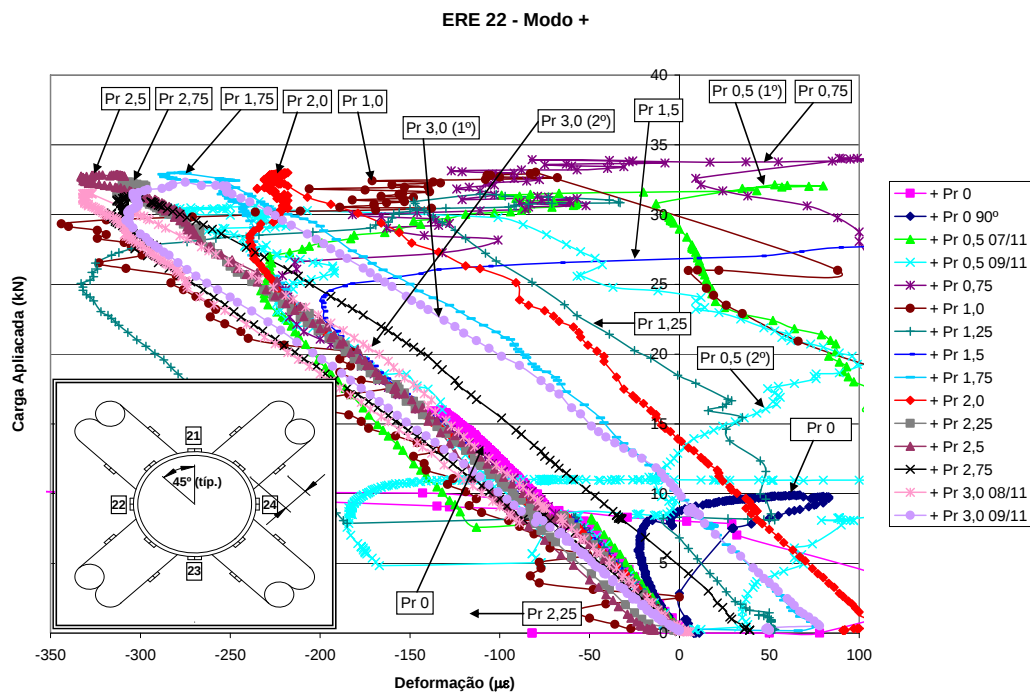


Figura B.93 – Gráfico referente ao extensômetro 22.

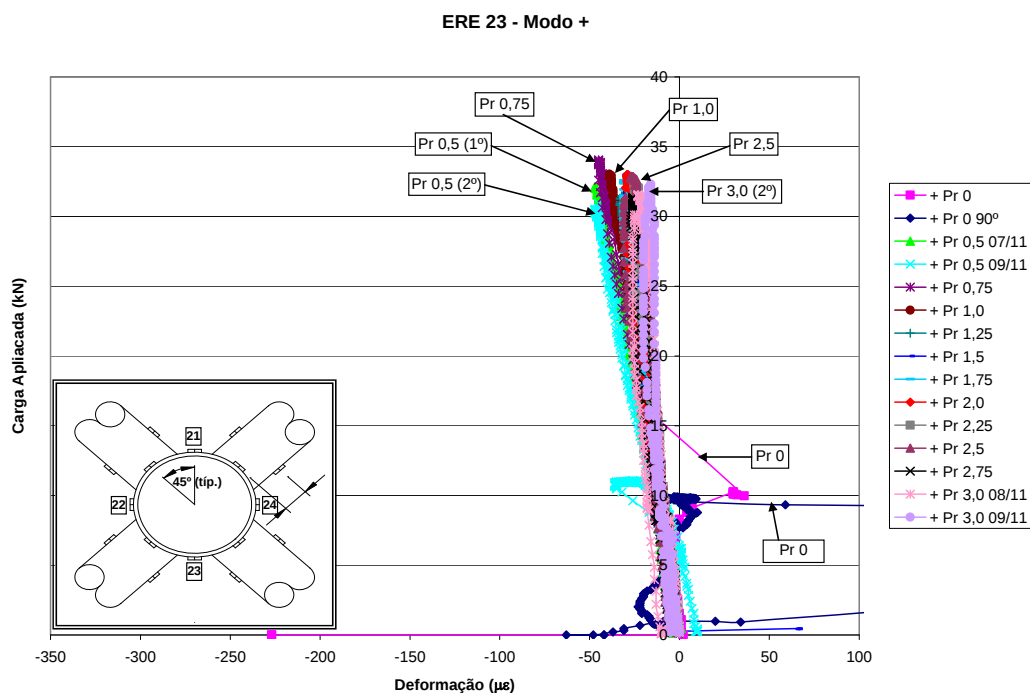


Figura B.94 – Gráfico referente ao extensômetro 23.

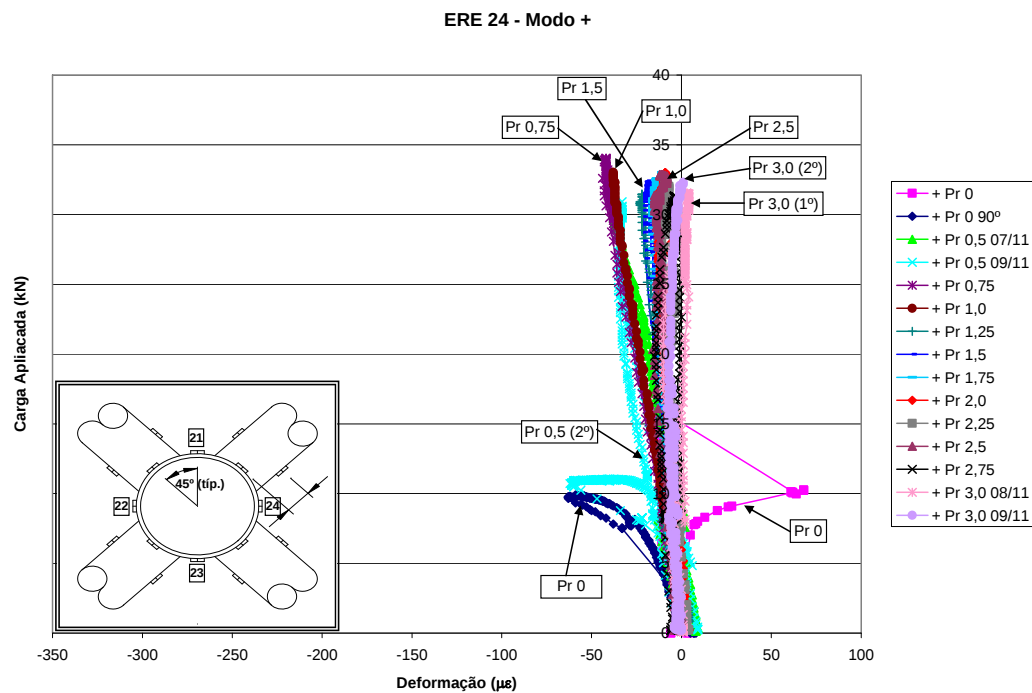


Figura B.95 – Gráfico referente ao extensômetro 24.

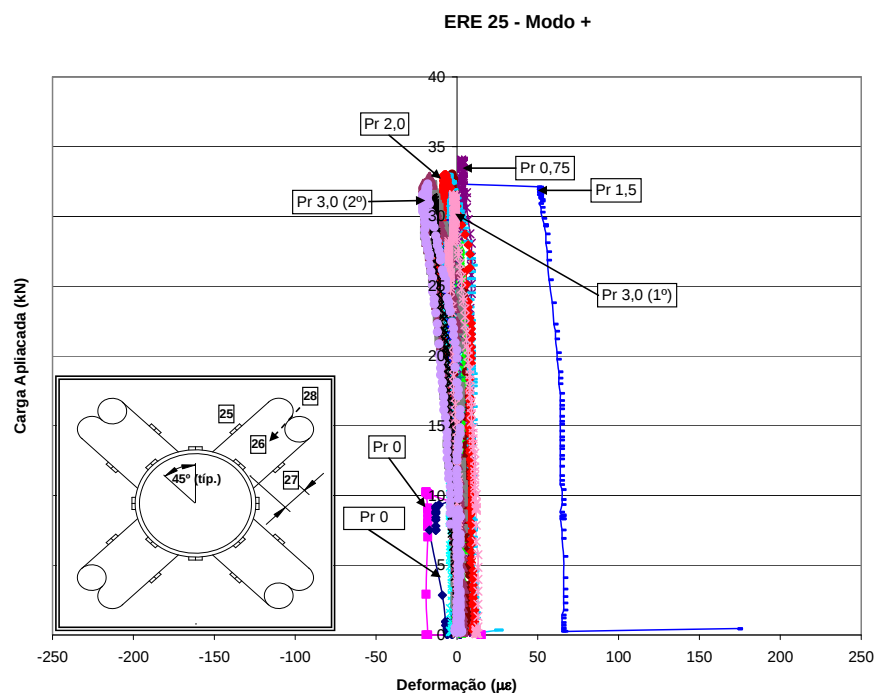


Figura B.96 – Gráfico referente ao extensômetro 25.

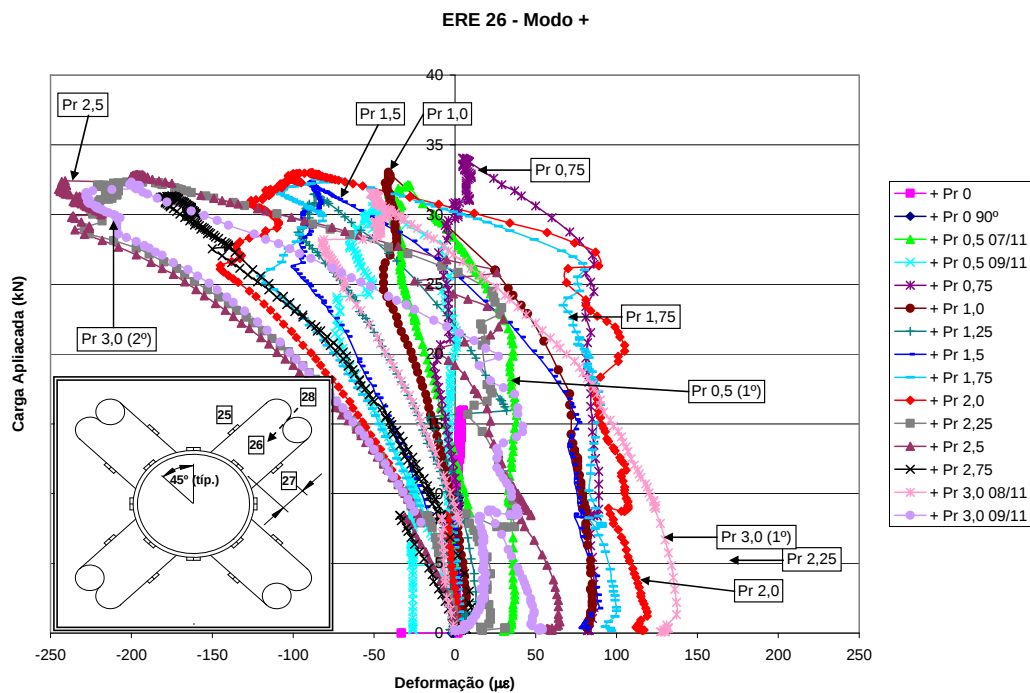


Figura B.97 – Gráfico referente ao extensômetro 26.

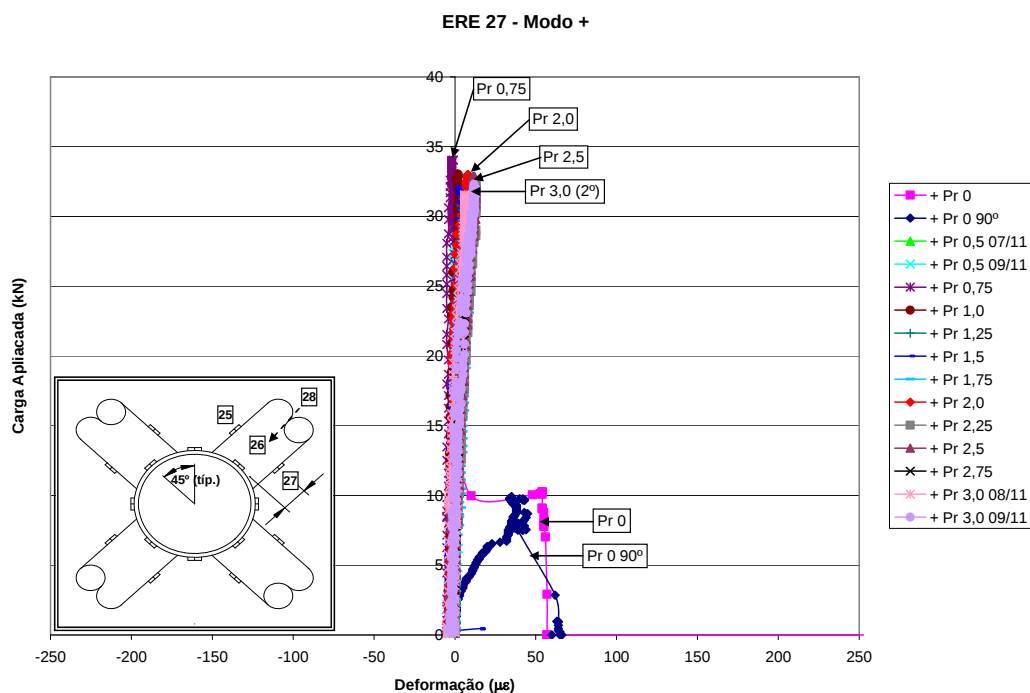


Figura B.98 – Gráfico referente ao extensômetro 27.

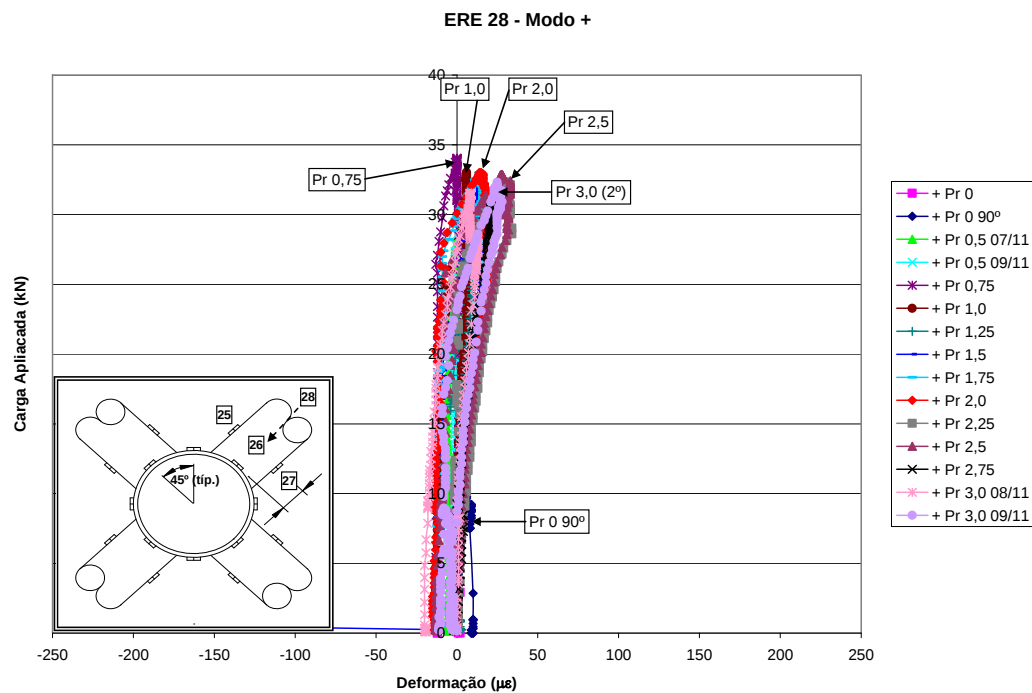


Figura B.99 – Gráfico referente ao extensômetro 28.

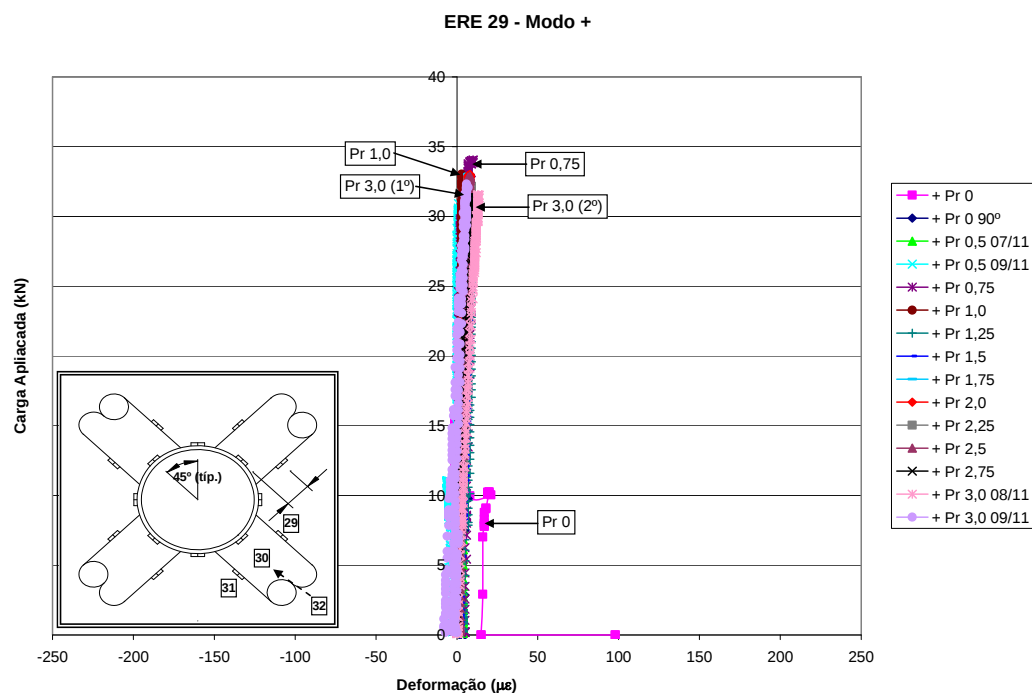


Figura B.100 – Gráfico referente ao extensômetro 29.

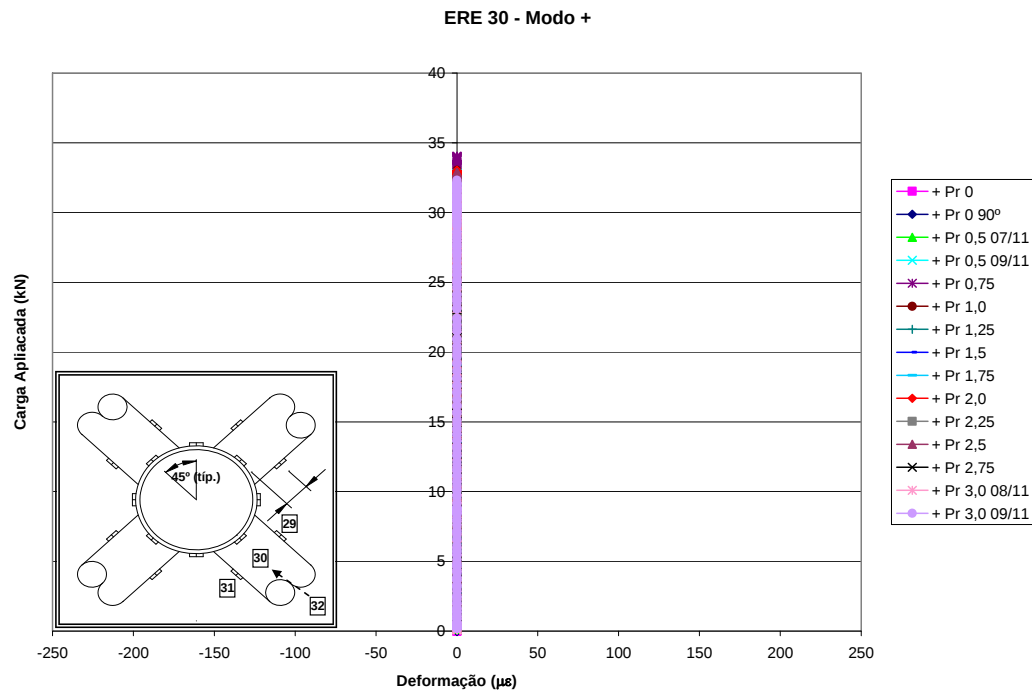


Figura B.101 – Gráfico referente ao extensômetro 30.

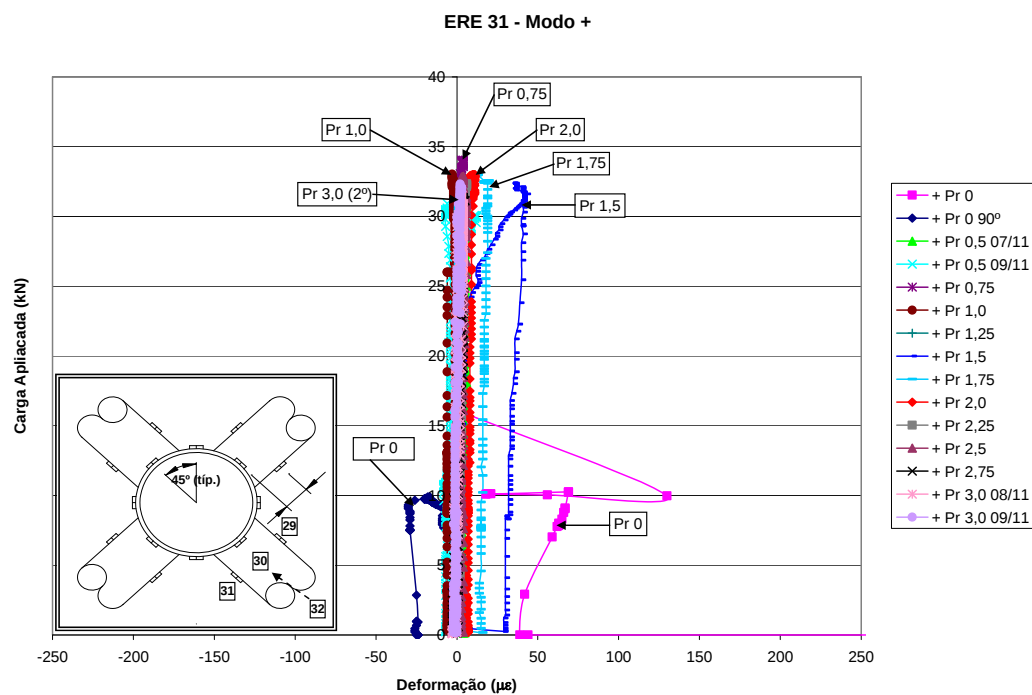


Figura B.102 – Gráfico referente ao extensômetro 31.

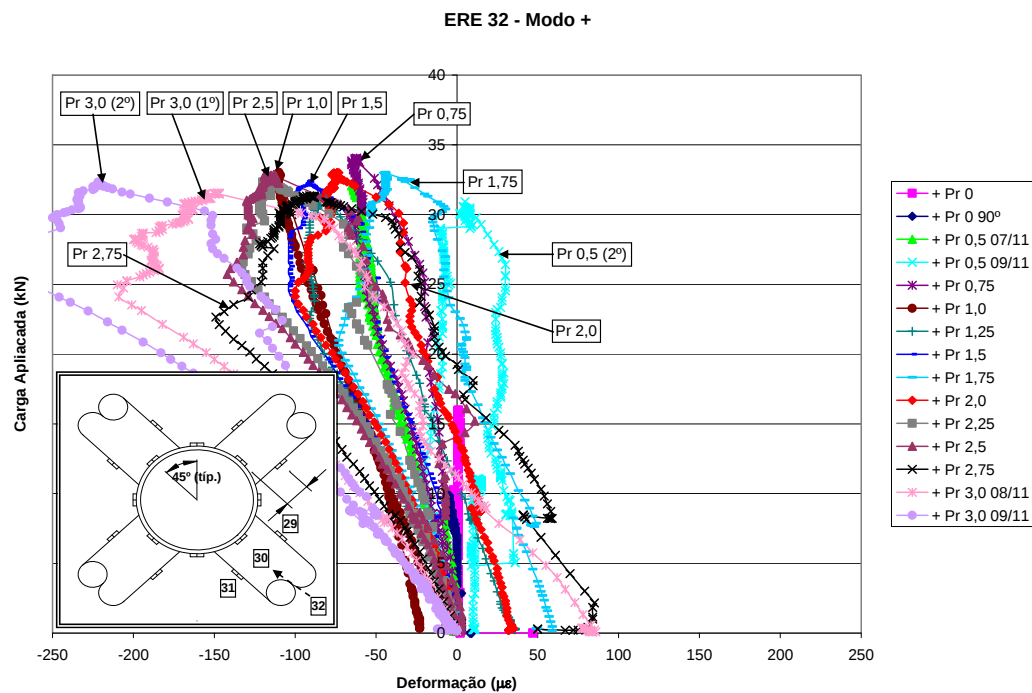


Figura B.103 – Gráfico referente ao extensômetro 32.

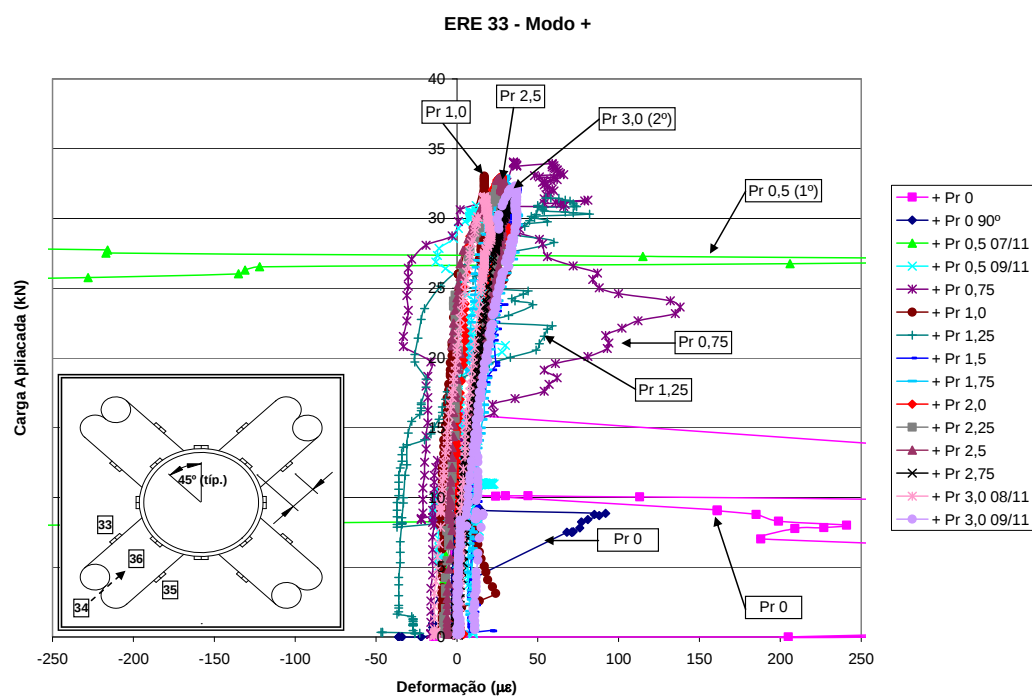


Figura B.104 – Gráfico referente ao extensômetro 33.

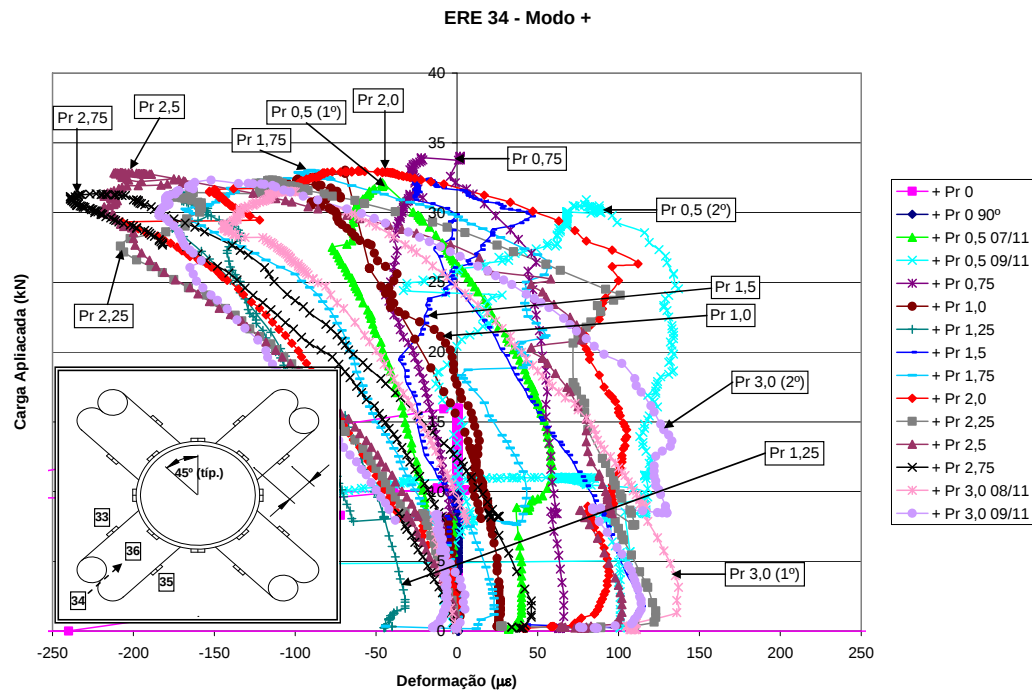


Figura B.105 – Gráfico referente ao extensômetro 34.

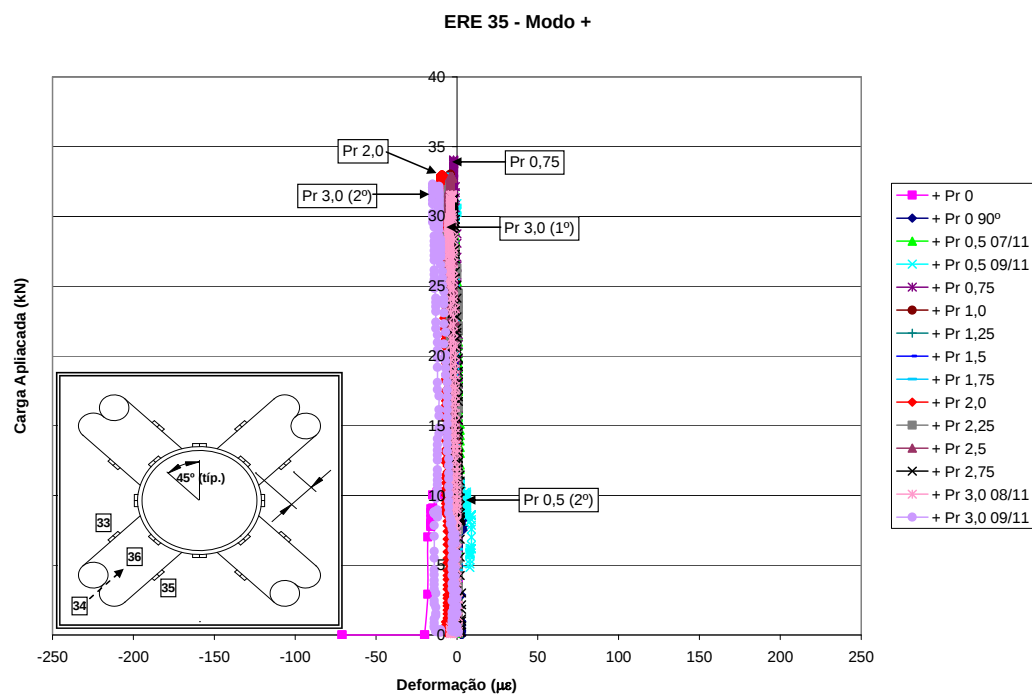


Figura B.106 – Gráfico referente ao extensômetro 35.

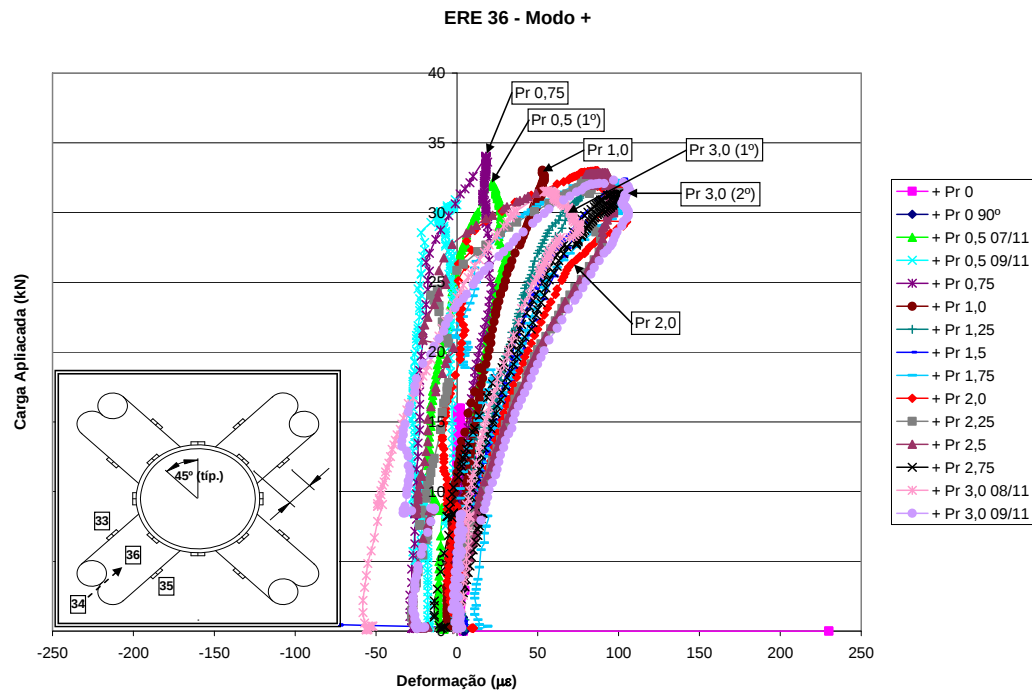


Figura B.107 – Gráfico referente ao extensômetro 36.