CIMENTACIÓN PROFUNDA

CAPACIDAD DE CARGA VERTICAL / AXIAL

Proyecto: Adecuación de Escenarios "Unidad Deportiva de La Calle 42" - Ibagué

DATOS INICIALES: SECTOR **"TRIBUNAS"** (Cimentación aislada)

Tipo de cimentación: Pilotes pre-excavados en suelo de sección circular

Condición de Carga: Carga Muerta + Carga Viva normal (Análisis Estático) - COMPRESIÓN

Estratos de suelo: Arenas limo-arcillosas con gravas - Material Aluvial

Resistencia por Punta - Método de Janbu, N. (1976)

Prof.	N_{55}	ϕ	CD	Su	γ	ψ	N.F.	$\sigma_{vo'}$	r_u	$\sigma_{v'}$	Nq	Nc	Pu_p (t)	Pu_p (t)	Pu_p (t)	Pu_p (t)	Estrato
m	g/pie	°		t/m²	t/m³		m	t/m²		t/m²	Diámetro =		0.60 m	0.80 m	1.00 m	1.20 m	
1.0	12	10	U	1.0	1.90	60	2.0	1.9	0.0	1.9	1.0	5.7	3.2	5.8	9.0	13.0	CH, MH
2.0	24	10	U	1.0	1.90	60	2.0	3.8	0.0	3.8	1.0	5.7	5.5	9.8	15.3	22.0	CH, MH
3.0	18	10	U	3.0	1.95	60	2.0	4.8	0.0	4.8	1.0	5.7	9.6	17.0	26.6	38.3	CH, MH
4.0	15	15	U	4.2	2.19	60	2.0	5.9	0.0	5.9	1.0	5.7	12.8	22.8	35.6	51.2	CH, MH
5.0	15	21	U	8.0	1.91	60	2.0	6.8	0.0	6.8	1.0	5.7	12.7	22.6	35.4	50.9	CH, MH
6.0	22	22	U	8.4	2.07	60	2.0	7.9	0.0	7.9	1.0	5.7	10.6	18.8	29.5	42.4	CH, MH
7.0	29	23	U	3.6	2.22	75	2.0	9.1	0.0	9.1	1.0	5.7	8.3	14.8	23.1	33.3	SM, GC
8.0	33	24	D	3.5	2.00	75	2.0	10.1	0.0	10.1	7.6	14.8	37.2	66.1	103.3	148.7	SM, GC
9.0	36	27	D	3.5	2.00	75	2.0	11.1	0.0	11.1	10.1	17.9	52.0	92.5	144.6	208.2	SM, GC
10.0	40	30	D	4.0	1.95	105	2.0	12.1	0.0	12.1	24.9	41.4	134.6	239.3	373.9	538.4	SM, GC
11.0	44	30	D	4.5	1.94	105	2.0	13.0	0.0	13.0	24.9	41.4	140.9	250.4	391.3	563.5	SM, GC
12.0	47	32	D	4.2	2.03	105	2.0	14.1	0.0	14.1	32.1	49.8	184.6	328.2	512.7	738.4	SM, GC
13.0	51	32	D	3.9	2.11	105	2.0	15.2	0.0	15.2	32.1	49.8	198.4	352.8	551.2	793.7	SM, GC
14.0	51	32	D	4.0	2.08	105	2.0	16.2	0.0	16.2	32.1	49.8	211.1	375.3	586.4	844.4	SM, GC
15.0	51	33	D	5.0	2.06	105	2.0	17.3	0.0	17.3	34.3	52.3	241.9	430.0	671.9	967.5	SM, GC

Resistencia por fricción en el Fuste - Métodos Alfa y Beta - Cimientos Excavados

Prof.	ΔL	γ'	σ'_v	N_{55}	ϕ	CD	Su	α	K	β	$\Sigma fs\alpha$	$\Sigma fs\beta$	Σfs_i	ΣPus_i (t)	ΣPus_i (t)	ΣPus_i (t)	ΣPus_i [t]
m	m	t/m³	t/m²	g/pie	°		t/m²		Ka/Ko		t/m²	t/m²	t/m²	0.60 m	0.80 m	1.00 m	1.20 m
1.0	1	1.9	1.9	12	10	U	1.0	1.14	0.70	0.08	1.1	0.2	1.1	2.1	2.9	3.6	4.3
2.0	1	0.9	3.8	24	10	U	1.0	1.14	0.70	0.08	2.3	0.5	2.3	4.3	5.7	7.1	8.6
3.0	1	1.0	4.8	18	10	U	3.0	0.81	0.70	0.08	4.7	0.9	4.7	8.9	11.9	14.8	17.8
4.0	1	1.2	5.9	15	15	U	4.2	0.68	0.59	0.11	7.6	1.5	7.6	14.2	19.0	23.7	28.5
5.0	1	0.9	6.8	15	21	U	8.0	0.41	0.47	0.12	10.8	2.3	10.8	20.4	27.3	34.1	40.9
6.0	1	1.1	7.9	22	22	U	8.4	0.39	0.45	0.12	14.1	3.3	14.1	26.7	35.5	44.4	53.3
7.0	1	1.2	9.1	29	23	U	3.6	0.74	0.44	0.12	16.8	4.4	16.8	31.7	42.3	52.8	63.4
8.0	1	1.0	10.1	33	24	D	3.5	0.75	0.42	0.13	19.4	5.7	19.4	36.7	48.9	61.1	73.3
9.0	1	1.0	11.1	36	27	D	3.5	0.75	0.38	0.13	22.1	7.1	22.1	41.6	55.5	69.4	83.3
10.0	1	1.0	12.1	40	30	D	4.0	0.70	0.33	0.13	24.9	8.7	24.9	46.9	62.5	78.1	93.8
11.0	1	0.9	13.0	44	30	D	4.5	0.65	0.33	0.13	27.8	10.3	27.8	52.4	69.8	87.3	104.7
12.0	1	1.0	14.1	47	32	D	4.2	0.68	0.31	0.13	30.6	12.1	30.6	57.7	77.0	96.2	115.5
13.0	1	1.1	15.2	51	32	D	3.9	0.71	0.31	0.13	33.4	14.1	33.4	62.9	83.9	104.9	125.9
14.0	1	1.1	16.2	51	32	D	4.0	0.70	0.31	0.13	36.2	16.2	36.2	68.2	90.9	113.7	136.4
15.0	1	1.1	17.3	51	33	D	5.0	0.60	0.30	0.13	39.2	18.4	39.2	73.9	98.5	123.1	147.7

Capacidad de carga admisible a Compresión - Q_{adm} (kN)

Nivel	Long.	FS_p	FS_f	Q_{adm} (t)				Q_{adm} promedio neta* (kN)			
(m)	(m)	Diámetros =		0.60 m	0.80 m	1.00 m	1.20 m	0.60 m	0.80 m	1.00 m	1.20 m
-4.0	4.0	3.0	1.8	12	18	25	33	91	126	164	205
-5.0	5.0	3.0	1.8	16	23	31	40	118	159	203	247
-6.0	6.0	3.0	1.8	18	26	35	44	138	181	223	265
-7.0	7.0	3.0	1.8	20	28	37	46	187	256	328	403
-8.0	8.0	3.0	1.8	33	49	68	90	253	361	480	612
-9.0	9.0	3.0	1.8	40	62	87	116	**411**	**630**	**890**	**1,191**
-10.0	10.0	3.0	1.8	71	114	168	232	**546**	**858**	**1,233**	**1,674**
-11.0	11.0	3.0	1.8	76	122	179	246	**713**	**1,142**	**1,665**	**2,283**
-12.0	12.0	3.0	1.8	94	152	224	310	**806**	**1,292**	**1,888**	**2,593**
-13.0	13.0	3.0	1.8	101	164	242	335	904	1,455	2,130	2,930
-14.0	14.0	3.0	1.8	108	176	259	357	989	1,593	2,334	3,212
-15.0	15.0	3.0	1.8	122	198	292	405	1,028	1,655	2,425	3,337

* **Nota**: Se incluye reducción por el Peso propio del elemento.

CIMENTACIÓN PROFUNDA

CAPACIDAD DE CARGA VERTICAL / AXIAL

Proyecto: Adecuación de Escenarios "Unidad Deportiva de La Calle 42" - Ibagué

DATOS INICIALES: SECTOR **"TRIBUNAS"** (Cimentación aislada)

Tipo de cimentación: Pilotes pre-excavados en suelo de sección circular

Condición de Carga: Carga Muerta + Carga Viva Extraordinaria (Análisis Estático) - COMPRESIÓN

Estratos de suelo: Arenas limo-arcillosas con gravas - Material Aluvial

Resistencia por Punta - Método de Janbu, N. (1976)

Prof.	N_{55}	ϕ	CD	Su	γ	ψ	N.F.	$\sigma_{vo'}$	r_u	$\sigma_{v'}$	Nq	Nc	Pu_p (t)	Pu_p (t)	Pu_p (t)	Pu_p (t)	Estrato
m	g/pie	°		t/m²	t/m³		m	t/m²		t/m²	Diámetro =		0.60 m	0.80 m	1.00 m	1.20 m	
1.0	12	10	U	1.0	1.90	60	2.0	1.9	0.0	1.9	1.0	5.7	3.2	5.8	9.0	13.0	CH, MH
2.0	24	10	U	1.0	1.90	60	2.0	3.8	0.0	3.8	1.0	5.7	5.5	9.8	15.3	22.0	CH, MH
3.0	18	10	U	3.0	1.95	60	2.0	4.8	0.0	4.8	1.0	5.7	9.6	17.0	26.6	38.3	CH, MH
4.0	15	15	U	4.2	2.19	60	2.0	5.9	0.0	5.9	1.0	5.7	12.8	22.8	35.6	51.2	CH, MH
5.0	15	21	U	8.0	1.91	60	2.0	6.8	0.0	6.8	1.0	5.7	12.7	22.6	35.4	50.9	CH, MH
6.0	22	22	U	8.4	2.07	60	2.0	7.9	0.0	7.9	1.0	5.7	10.6	18.8	29.5	42.4	CH, MH
7.0	29	23	U	3.6	2.22	75	2.0	9.1	0.0	9.1	1.0	5.7	8.3	14.8	23.1	33.3	SM, GC
8.0	33	24	D	3.5	2.00	75	2.0	10.1	0.0	10.1	7.6	14.8	37.2	66.1	103.3	148.7	SM, GC
9.0	36	27	D	3.5	2.00	75	2.0	11.1	0.0	11.1	10.1	17.9	52.0	92.5	144.6	208.2	SM, GC
10.0	40	30	D	4.0	1.95	105	2.0	12.1	0.0	12.1	24.9	41.4	134.6	239.3	373.9	538.4	SM, GC
11.0	44	30	D	4.5	1.94	105	2.0	13.0	0.0	13.0	24.9	41.4	140.9	250.4	391.3	563.5	SM, GC
12.0	47	32	D	4.2	2.03	105	2.0	14.1	0.0	14.1	32.1	49.8	184.6	328.2	512.7	738.4	SM, GC
13.0	51	32	D	3.9	2.11	105	2.0	15.2	0.0	15.2	32.1	49.8	198.4	352.8	551.2	793.7	SM, GC
14.0	51	32	D	4.0	2.08	105	2.0	16.2	0.0	16.2	32.1	49.8	211.1	375.3	586.4	844.4	SM, GC
15.0	51	33	D	5.0	2.06	105	2.0	17.3	0.0	17.3	34.3	52.3	241.9	430.0	671.9	967.5	SM, GC

Resistencia por fricción en el Fuste - Métodos Alfa y Beta - Cimientos Excavados

Prof.	ΔL	γ'	σ'_v	N_{55}	ϕ	CD	Su	α	K	β	$\Sigma fs\alpha$	$\Sigma fs\beta$	Σfs_i	ΣPus_i (t)	ΣPus_i (t)	ΣPus_i (t)	ΣPus_i [t]
m	m	t/m³	t/m²	g/pie	°		t/m²		Ka/Ko		t/m²	t/m²	t/m²	0.60 m	0.80 m	1.00 m	1.20 m
1.0	1	1.9	1.9	12	10	U	1.0	1.14	0.70	0.08	1.1	0.2	0.6	2.1	2.9	3.6	4.3
2.0	1	0.9	3.8	24	10	U	1.0	1.14	0.70	0.08	2.3	0.5	1.4	4.3	5.7	7.1	8.6
3.0	1	1.0	4.8	18	10	U	3.0	0.81	0.70	0.08	4.7	0.9	2.8	8.9	11.9	14.8	17.8
4.0	1	1.2	5.9	15	15	U	4.2	0.68	0.59	0.11	7.6	1.5	4.5	14.2	19.0	23.7	28.5
5.0	1	0.9	6.8	15	21	U	8.0	0.41	0.47	0.12	10.8	2.3	6.6	20.4	27.3	34.1	40.9
6.0	1	1.1	7.9	22	22	U	8.4	0.39	0.45	0.12	14.1	3.3	8.7	26.7	35.5	44.4	53.3
7.0	1	1.2	9.1	29	23	U	3.6	0.74	0.44	0.12	16.8	4.4	10.6	31.7	42.3	52.8	63.4
8.0	1	1.0	10.1	33	24	D	3.5	0.75	0.42	0.13	19.4	5.7	12.6	36.7	48.9	61.1	73.3
9.0	1	1.0	11.1	36	27	D	3.5	0.75	0.38	0.13	22.1	7.1	14.6	41.6	55.5	69.4	83.3
10.0	1	1.0	12.1	40	30	D	4.0	0.70	0.33	0.13	24.9	8.7	16.8	46.9	62.5	78.1	93.8
11.0	1	0.9	13.0	44	30	D	4.5	0.65	0.33	0.13	27.8	10.3	19.1	52.4	69.8	87.3	104.7
12.0	1	1.0	14.1	47	32	D	4.2	0.68	0.31	0.13	30.6	12.1	21.4	57.7	77.0	96.2	115.5
13.0	1	1.1	15.2	51	32	D	3.9	0.71	0.31	0.13	33.4	14.1	23.7	62.9	83.9	104.9	125.9
14.0	1	1.1	16.2	51	32	D	4.0	0.70	0.31	0.13	36.2	16.2	26.2	68.2	90.9	113.7	136.4
15.0	1	1.1	17.3	51	33	D	5.0	0.60	0.30	0.13	39.2	18.4	28.8	73.9	98.5	123.1	147.7

Capacidad de carga admisible a Compresión - Q_{adm} (kN)

Nivel	Long.	FS_p	FS_f	Q_{adm} (t)				Q_{adm} promedio neta* (kN)			
(m)	(m)	Diámetros =		0.60 m	0.80 m	1.00 m	1.20 m	0.60 m	0.80 m	1.00 m	1.20 m
-4.0	4.0	2.5	1.5	15	22	30	39	114	161	212	267
-5.0	5.0	2.5	1.5	19	27	37	48	148	203	262	323
-6.0	6.0	2.5	1.5	22	31	41	53	173	232	290	349
-7.0	7.0	2.5	1.5	24	34	44	56	234	324	420	521
-8.0	8.0	2.5	1.5	39	59	82	108	314	452	606	777
-9.0	9.0	2.5	1.5	49	74	104	139	**506**	**778**	**1,102**	**1,477**
-10.0	10.0	2.5	1.5	85	137	202	278	**669**	**1,053**	**1,517**	**2,062**
-11.0	11.0	2.5	1.5	91	147	215	295	**871**	**1,396**	**2,039**	**2,799**
-12.0	12.0	2.5	1.5	112	183	269	372	**983**	**1,579**	**2,310**	**3,176**
-13.0	13.0	2.5	1.5	121	197	290	401	1,102	1,777	2,604	3,586
-14.0	14.0	2.5	1.5	130	211	310	429	1,206	1,945	2,853	3,929
-15.0	15.0	2.5	1.5	146	238	351	485	1,253	2,022	2,966	4,085

* **Nota**: Se incluye reducción por el Peso propio del elemento.

CIMENTACIÓN PROFUNDA

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Proyecto: Adecuación de Escenarios "Unidad Deportiva de La Calle 42" - Ibagué

DATOS INICIALES: SECTOR **"TRIBUNAS"** (Cimentación aislada)

Tipo de cimentación: Pilotes pre-excavados en suelo de sección circular

Condición de Carga: Carga Muerta + Carga Viva normal (Análisis Estático) - LEVANTAMIENTO - TRACCIÓN

Estratos de suelo: Arenas limo-arcillosas con gravas - Material Aluvial

Resistencia por Punta - Método de Janbu, N. (1976)

Prof.	N_{55}	ϕ	CD	Su	γ	ψ	N.F.	$\sigma_{vo'}$	r_u	$\sigma_{v'}$	Nq	Nc	Pu_p (t)	Pu_p (t)	Pu_p (t)	Pu_p (t)	Estrato
m	g/pie	°		t/m²	t/m³		m	t/m²		t/m²	Diámetro =		0.60 m	0.80 m	1.00 m	1.20 m	
1.0	12	10	U	1.0	1.90	60	2.0	1.9	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	CH, MH
2.0	24	10	U	1.0	1.90	60	2.0	3.8	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	CH, MH
3.0	18	10	U	3.0	1.95	60	2.0	4.8	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	CH, MH
4.0	15	15	U	4.2	2.19	60	2.0	5.9	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	CH, MH
5.0	15	21	U	8.0	1.91	60	2.0	6.8	0.0	6.8	0.0	0.0	0.0	0.0	0.0	0.0	CH, MH
6.0	22	22	U	8.4	2.07	60	2.0	7.9	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	CH, MH
7.0	29	23	U	3.6	2.22	75	2.0	9.1	0.0	9.1	0.0	0.0	0.0	0.0	0.0	0.0	SM, GC
8.0	33	24	D	3.5	2.00	75	2.0	10.1	0.0	10.1	0.0	0.0	0.0	0.0	0.0	0.0	SM, GC
9.0	36	27	D	3.5	2.00	75	2.0	11.1	0.0	11.1	0.0	0.0	0.0	0.0	0.0	0.0	SM, GC
10.0	40	30	D	4.0	1.95	105	2.0	12.1	0.0	12.1	0.0	0.0	0.0	0.0	0.0	0.0	SM, GC
11.0	44	30	D	4.5	1.94	105	2.0	13.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	SM, GC
12.0	47	32	D	4.2	2.03	105	2.0	14.1	0.0	14.1	0.0	0.0	0.0	0.0	0.0	0.0	SM, GC
13.0	51	32	D	3.9	2.11	105	2.0	15.2	0.0	15.2	0.0	0.0	0.0	0.0	0.0	0.0	SM, GC
14.0	51	32	D	4.0	2.08	105	2.0	16.2	0.0	16.2	0.0	0.0	0.0	0.0	0.0	0.0	SM, GC
15.0	51	33	D	5.0	2.06	105	2.0	17.3	0.0	17.3	0.0	0.0	0.0	0.0	0.0	0.0	SM, GC

Resistencia por fricción en el Fuste - Métodos Alfa y Beta - Cimientos Excavados

Prof.	ΔL	γ '	σ'_v	N_{55}	ϕ	CD	Su	α	K	β	$\Sigma fs\alpha$	$\Sigma fs\beta$	Σfs_i	ΣPus_i (t)	ΣPus_i (t)	ΣPus_i (t)	ΣPus_i [t]
m	m	t/m³	t/m²	g/pie	°		t/m²		Ka/Ko		t/m²	t/m²	t/m²	0.60 m	0.80 m	1.00 m	1.20 m
1.0	1	1.9	1.9	12	10	U	1.0	1.14	0.70	0.08	1.1	0.2	0.6	2.1	2.9	3.6	4.3
2.0	1	0.9	3.8	24	10	U	1.0	1.14	0.70	0.08	2.3	0.5	1.4	4.3	5.7	7.1	8.6
3.0	1	1.0	4.8	18	10	U	3.0	0.81	0.70	0.08	4.7	0.9	2.8	8.9	11.9	14.8	17.8
4.0	1	1.2	5.9	15	15	U	4.2	0.68	0.59	0.11	7.6	1.5	4.5	14.2	19.0	23.7	28.5
5.0	1	0.9	6.8	15	21	U	8.0	0.41	0.47	0.12	10.8	2.3	6.6	20.4	27.3	34.1	40.9
6.0	1	1.1	7.9	22	22	U	8.4	0.39	0.45	0.12	14.1	3.3	8.7	26.7	35.5	44.4	53.3
7.0	1	1.2	9.1	29	23	U	3.6	0.74	0.44	0.12	16.8	4.4	10.6	31.7	42.3	52.8	63.4
8.0	1	1.0	10.1	33	24	D	3.5	0.75	0.42	0.13	19.4	5.7	12.6	36.7	48.9	61.1	73.3
9.0	1	1.0	11.1	36	27	D	3.5	0.75	0.38	0.13	22.1	7.1	14.6	41.6	55.5	69.4	83.3
10.0	1	1.0	12.1	40	30	D	4.0	0.70	0.33	0.13	24.9	8.7	16.8	46.9	62.5	78.1	93.8
11.0	1	0.9	13.0	44	30	D	4.5	0.65	0.33	0.13	27.8	10.3	19.1	52.4	69.8	87.3	104.7
12.0	1	1.0	14.1	47	32	D	4.2	0.68	0.31	0.13	30.6	12.1	21.4	57.7	77.0	96.2	115.5
13.0	1	1.1	15.2	51	32	D	3.9	0.71	0.31	0.13	33.4	14.1	23.7	62.9	83.9	104.9	125.9
14.0	1	1.1	16.2	51	32	D	4.0	0.70	0.31	0.13	36.2	16.2	26.2	68.2	90.9	113.7	136.4
15.0	1	1.1	17.3	51	33	D	5.0	0.60	0.30	0.13	39.2	18.4	28.8	73.9	98.5	123.1	147.7

Capacidad de carga admisible al Levantamiento / Tracción - T_{adm} (kN)

Nivel	Long.	FS_p	FS_f	T_{adm} (t)				T_{adm} promedio neta* (kN)			
(m)	(m)	Diámetros =		0.60 m	0.80 m	1.00 m	1.20 m	0.60 m	0.80 m	1.00 m	1.20 m
-4.0	4.0	3.0	1.8	8	11	13	16	106	153	206	265
-5.0	5.0	3.0	1.8	11	15	19	23	145	208	278	356
-6.0	6.0	3.0	1.8	15	20	25	30	183	262	350	446
-7.0	7.0	3.0	1.8	18	23	29	35	219	313	417	532
-8.0	8.0	3.0	1.8	20	27	34	41	253	361	481	613
-9.0	9.0	3.0	1.8	23	31	39	46	**287**	**410**	**545**	**694**
-10.0	10.0	3.0	1.8	26	35	43	52	**323**	**460**	**611**	**778**
-11.0	11.0	3.0	1.8	29	39	48	58	**358**	**510**	**679**	**863**
-12.0	12.0	3.0	1.8	32	43	53	64	**394**	**561**	**746**	**948**
-13.0	13.0	3.0	1.8	35	47	58	70	430	611	812	1,032
-14.0	14.0	3.0	1.8	38	51	63	76	466	662	880	1,118
-15.0	15.0	3.0	1.8	41	55	68	82	487	694	923	1,174

* **Nota**: Se incluye reducción por el Peso propio del elemento.

CIMENTACIÓN PROFUNDA

CAPACIDAD DE CARGA HORIZONTAL / VERTICAL

Proyecto: Adecuación de Escenarios "Unidad Deportiva de La Calle 42" - Ibagué

DATOS INICIALES: SECTOR **"TRIBUNAS"** (Cimentación aislada)

Tipo de cimentación: Pilotes pre-excavados en suelo de sección circular

Condición de Carga: Carga Muerta + Carga Viva normal (Análisis Estático) - COMPRESIÓN

Estratos de suelo: Arenas limo-arcillosas con gravas - Material Aluvial

MÓDULOS DE REACCIÓN HORIZONTAL / LATERAL Y RIGIDEZ DEL SUELO (ks, K) - PILOTES

Elementos de sección Circular - Diámetro D entre 0.60 m y 1.20 m

Cm = 1.82 Cm = 1.66 Cm = 1.56 Cm = 1.25

Elevación		D = 0.60 m		D = 0.80 m		D = 1.0 m		D = 1.20 m	
Niveles	**Long.**	**ks_h**	**K_h**	**ks_h**	**K_h**	**ks_h**	**K_h**	**ks_h**	**K_h**
m	m	MPa/m	MN/m	MPa/m	MN/m	MPa/m	MN/m	MPa/m	MN/m
-0.50	0.50	6.8	2.0	4.7	1.9	3.6	1.8	2.4	1.4
-1.50	1.50	8.3	4.5	5.8	4.2	4.4	4.0	2.9	3.2
-2.50	2.50	26.3	10.4	18.3	9.6	13.9	9.1	9.4	7.4
-3.50	3.50	37.0	19.0	25.7	17.6	19.5	16.7	13.2	13.5
-4.50	4.50	78.9	34.8	54.8	32.2	41.6	30.6	28.1	24.7
-5.50	5.50	89.6	50.6	62.2	46.8	47.1	44.4	31.8	35.9
-6.50	6.50	42.9	39.7	29.7	36.7	22.5	34.8	15.1	28.1
-7.50	7.50	286.9	98.9	205.1	93.9	159.9	91.2	110.8	75.5
-8.50	8.50	350.8	191.3	251.2	182.5	196.0	177.9	135.8	147.9
-9.50	9.50	608.1	287.7	432.3	273.4	334.5	265.2	229.8	219.4
-10.50	10.50	695.5	391.1	496.5	371.5	385.3	359.9	265.2	297.0
-11.50	11.50	823.7	455.7	591.8	435.3	461.1	423.2	318.5	350.2
-12.50	12.50	892.5	514.9	645.9	495.0	506.1	483.6	351.3	401.9
-13.50	13.50	895.9	536.5	649.8	518.3	509.7	507.9	353.9	423.1
-14.50	14.50	1,018.9	574.4	738.4	555.3	578.2	544.0	400.5	452.7

MÓDULOS DE REACCIÓN VERTICAL / AXIAL Y RIGIDEZ DEL SUELO (ks, K) - PILOTES

Elementos de sección Circular - Diámetro D entre 0.60 m y 1.20 m

Elevación		D = 0.60 m		D = 0.80 m		D = 1.0 m		D = 1.20 m	
Niveles	**Long.**	**ks_v**	**K_v**	**ks_v**	**K_v**	**ks_v**	**K_v**	**ks_v**	**K_v**
m	m	MPa/m	MN/m	MPa/m	MN/m	MPa/m	MN/m	MPa/m	MN/m
-2.0	2.00	1.8	0.5	1.3	0.7	1.1	0.8	0.9	1.0
-3.0	3.00	5.6	1.6	4.2	2.1	3.4	2.7	2.9	3.3
-4.0	4.00	7.8	2.2	6.0	3.0	4.8	3.8	4.1	4.6
-5.0	5.00	16.7	4.7	12.7	6.4	10.3	8.1	8.6	9.8
-6.0	6.00	19.0	5.4	14.4	7.3	11.6	9.1	9.8	11.1
-7.0	7.00	9.1	2.6	6.9	3.5	5.6	4.4	4.7	5.3
-8.0	8.00	166.3	47.0	126.4	63.6	102.0	80.1	85.6	96.8
-9.0	9.00	**215.9**	**61.0**	**164.4**	**82.7**	**132.8**	**104.3**	**111.4**	**126.0**
-10.0	10.00	**304.0**	**86.0**	**232.3**	**116.7**	**187.9**	**147.5**	**157.7**	**178.4**
-11.0	11.00	**369.7**	**104.5**	**283.5**	**142.5**	**229.8**	**180.4**	**193.1**	**218.4**
-12.0	12.00	**479.6**	**135.6**	**369.3**	**185.6**	**300.0**	**235.7**	**252.6**	**285.7**
-13.0	13.00	604.3	170.9	466.6	234.6	379.7	298.2	320.0	361.9
-14.0	14.00	627.6	177.5	486.3	244.4	396.4	311.4	334.5	378.3
-15.0	15.00	674.4	190.7	524.1	263.4	428.0	336.1	361.5	408.8

Módulos de reacción lateral de suelo (ks, K) - Bowles, J. E. (1997)

$ks = As + BZ^n$ $ks = 2 \times [Fw_1 \, Cm \, C \, (cNc + 0{,}50\gamma BN\gamma) + Fw_2 \, Cm \, C \, (\gamma NqZ^n)]$ $1.3 < Fw_1 < 1.7$ y $2.0 < Fw_2 < 4.4$ para Pilas circulares