



土 木 研 究 所 資 料

第 9 0 7 号

大口径ぐいの鉛直載荷試験資料

昭和 49 年 6 月

建設省土木研究所

まえがき

施工機械，施工法の進歩と省力化の要請に伴って，鋼管ぐい，コンクリートぐいともに最近大口径のぐいが盛んに用いられるようになってきており，それらの鉛直支持力の正確な算定が必要とされている。すなわち大口径の鋼管ぐいでは先端閉塞効果の評価，中掘り式PCぐい，場所打ちコンクリートぐいでは施工に伴う地盤の乱れの評価が特に問題になるため，従来の支持力算定法では適合性が悪い。そこで基礎研究室では，過去に行なわれた鉛直載荷試験データを広範囲に収集し，大口径ぐいにも適用可能な支持力算定法を提案した。（土木研究所資料899号「鉛直載荷試験による単ぐいの極限支持力の推定」）。本資料は，この時集めたデータのうち，特に直径1 m以上の大口径ぐいのみを取りだし，土質柱状図と載荷試験結果（荷重－変位曲線）を対比して収録したものである。収録資料数は鋼管ぐい20例，PCぐい20例，場所打ちコンクリートぐい12例の計52例である。なお，施工法は鋼管ぐいはすべて打撃によるもの，PCぐいは中掘圧入工法またはそれに準ずるものである。

昭和49年6月

基礎研究室

山 川 朝 生

飯 島 均

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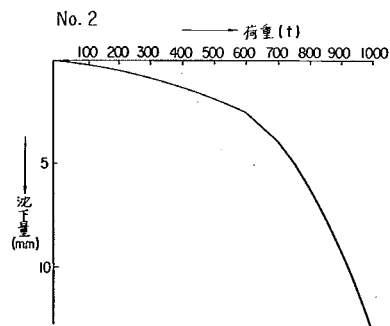
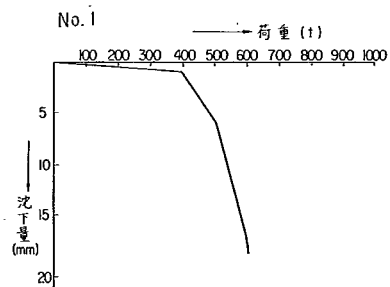
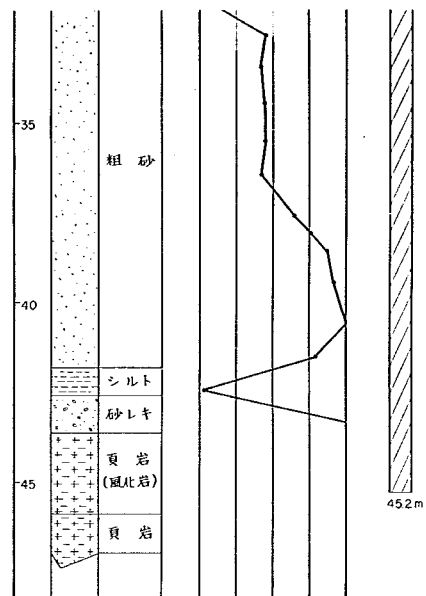
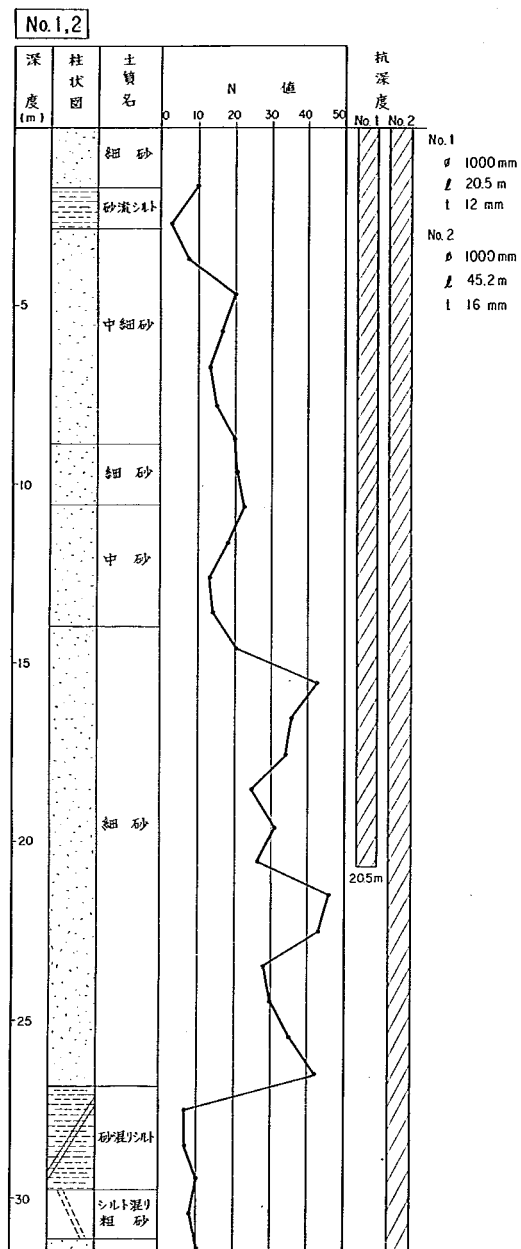
1. 鋼 管 ぐ い



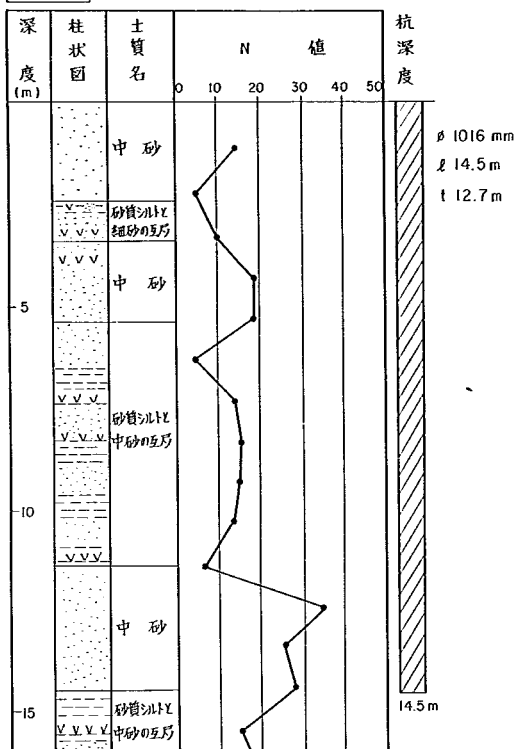
1.1 鋼管ぐい一覧表

NO	く い				先端地盤	最大試験 荷重(沈下量)	降伏荷重 (沈下量)	極限荷重 (沈下量)
	種類	くい径 _{mm}	くい長 _m	肉厚 _{mm}				
1	鋼管	1,000	20.5	12	細砂	600t (136)mm	400t (10)mm	600t (136)mm
2	"	"	45.2	16	頁岩	1000 (77)	640 (29)	-
3	"	1,016	14.5	12.7	中砂	270	120 (15)	270 (18)
4	"	"	"	"	細砂	330 (105)	220 (34)	330 (105)
5	"	"	"	"	中砂	315 (158)	270 (52)	315 (158)
6	"	"	"	"	細砂	380 (158)	270 (5)	380 (158)
7	"	"	"	"	粘土質シルト 細砂の互属	330 (179)	300 (94)	330 (179)
8	"	"	15	"	シルト質 細砂	450 (31)	360 (98)	450 (31)
9	"	"	21	"	細砂	435 (46)	270 (48)	435 (46)
10	"	"	21	"	細砂	440 (138)	270 (43)	-
11	"	"	39	"	粘土混り レキ	500 (28)	335 (12)	500 (38)
12	"	"	52.927	"	シルト混り 細砂	1,000 (57)	-	-
13	"	1,200	222	13	レキ混り砂	400 (95)	-	-
14	"	"	42.6	16	砂礫	600 (26)	350 (7.5)	600 (26)
15	"	1,500	238.56	9	シルト質砂	320 (28)	160 (5)	320 (28)
16	"	"	37.94		粘土質 ローム	850 (21)	530 (7.7)	850 (21)
17	"	"	38.9	16	中砂	1,177 (42.54)	850 (20)	1,200 (43)
18	"	"	50.5	12.7	粘土質 シルト	980 (26.51)	650 (11.5)	980 (26.51)
19	"	"	74.8	15	砂質ローム	1,200 (52.5)	-	-
20	"	2,500	41.8	30~ 33	中砂	3,000 (21.51)	3,500 (推定)	

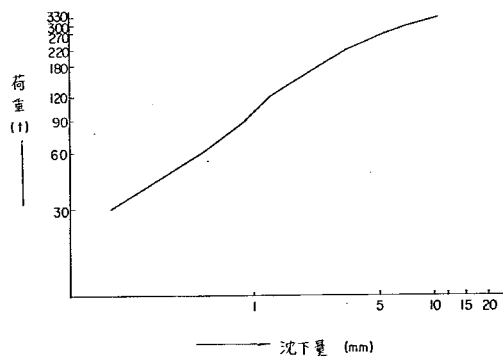
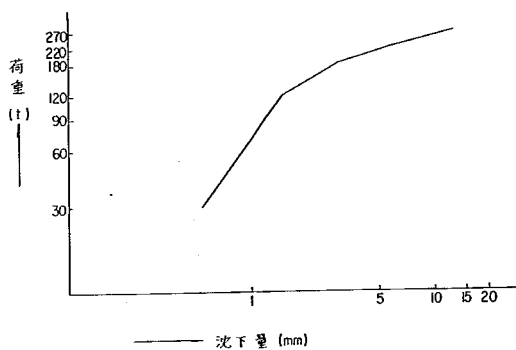
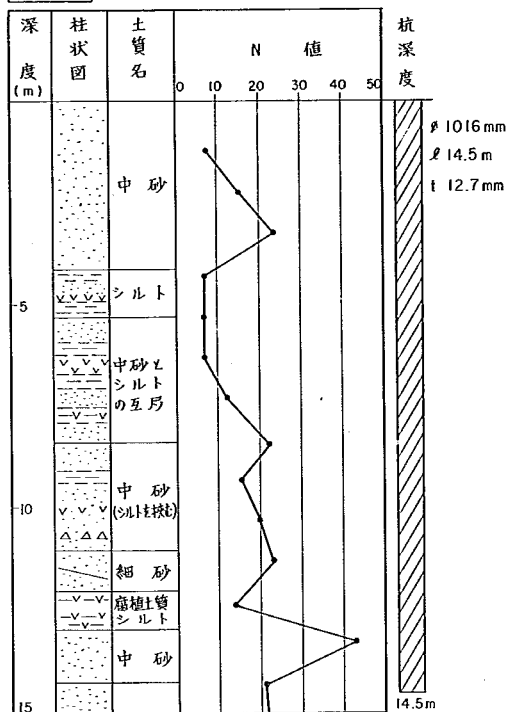
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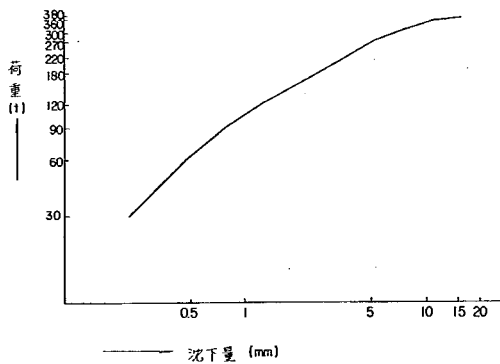
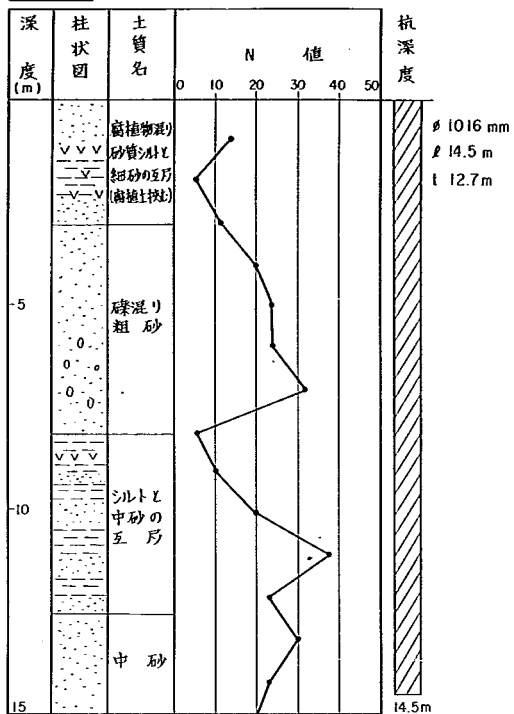
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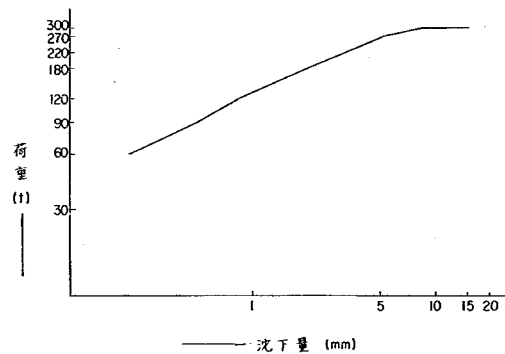
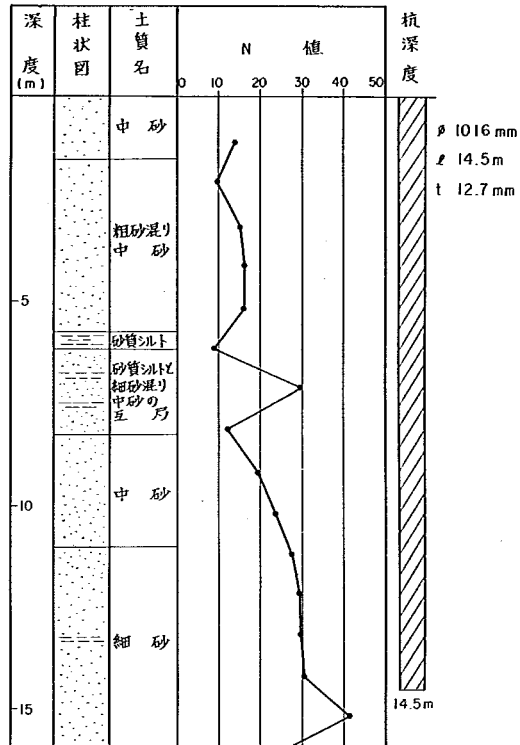
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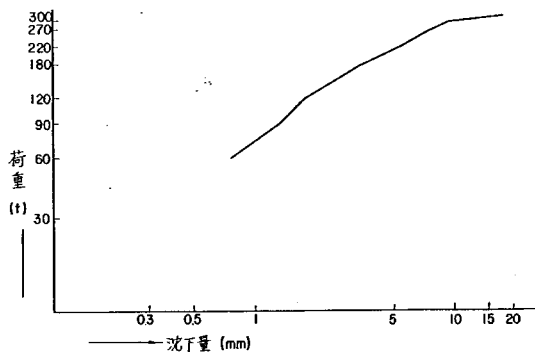
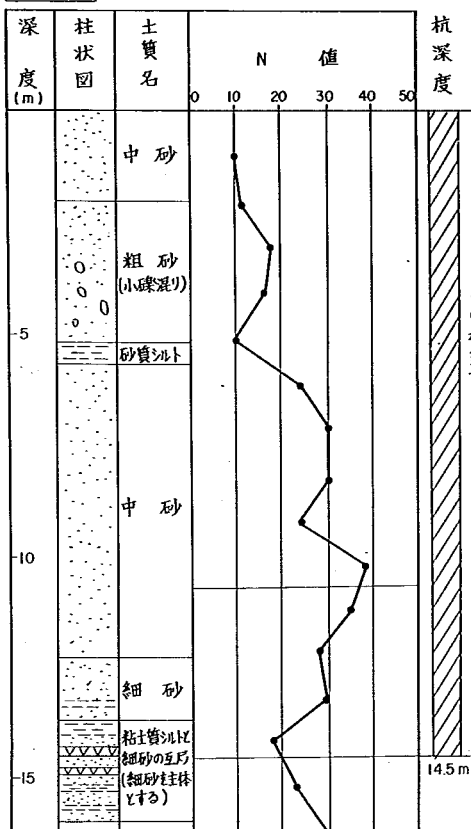
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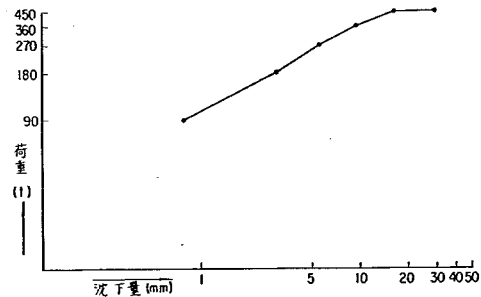
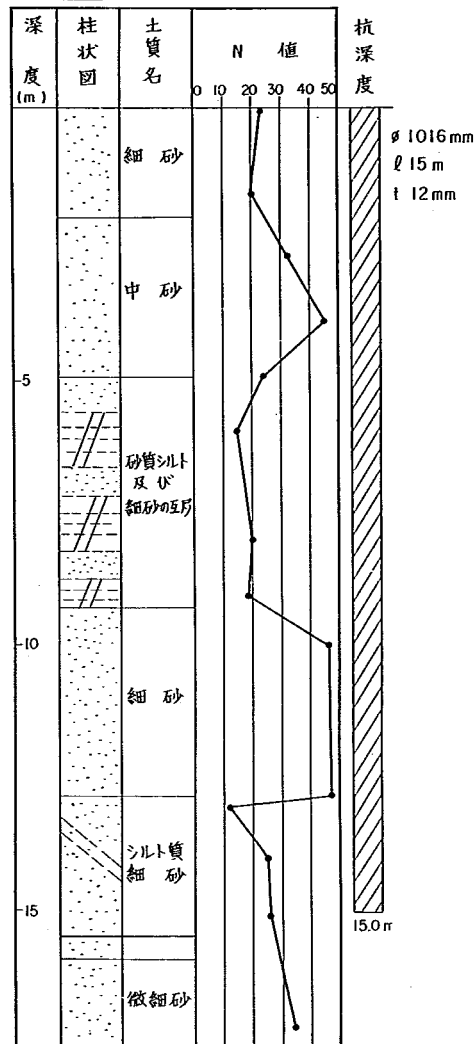
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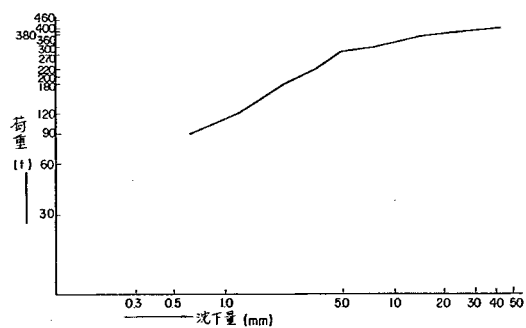
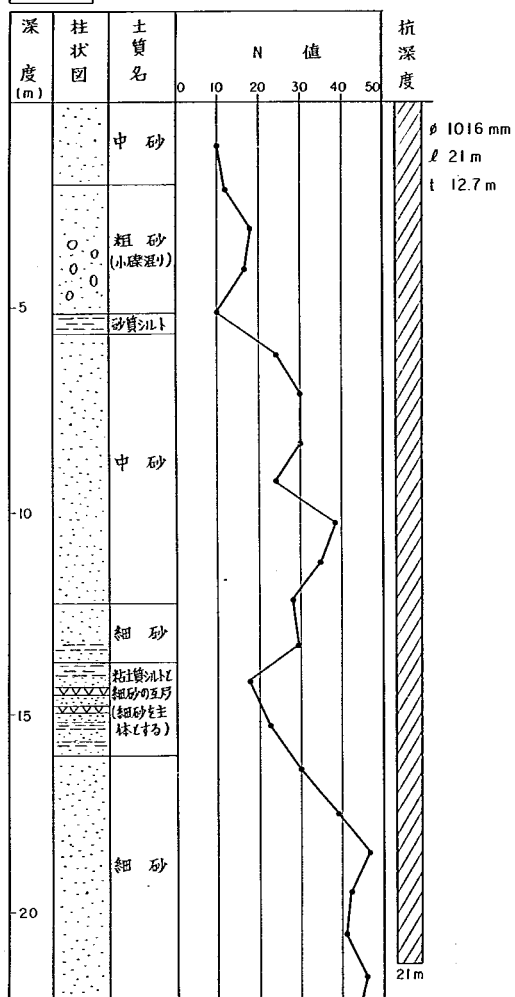
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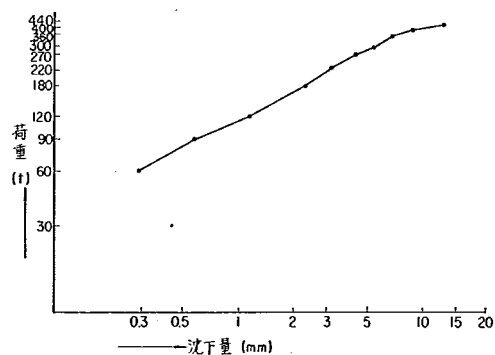
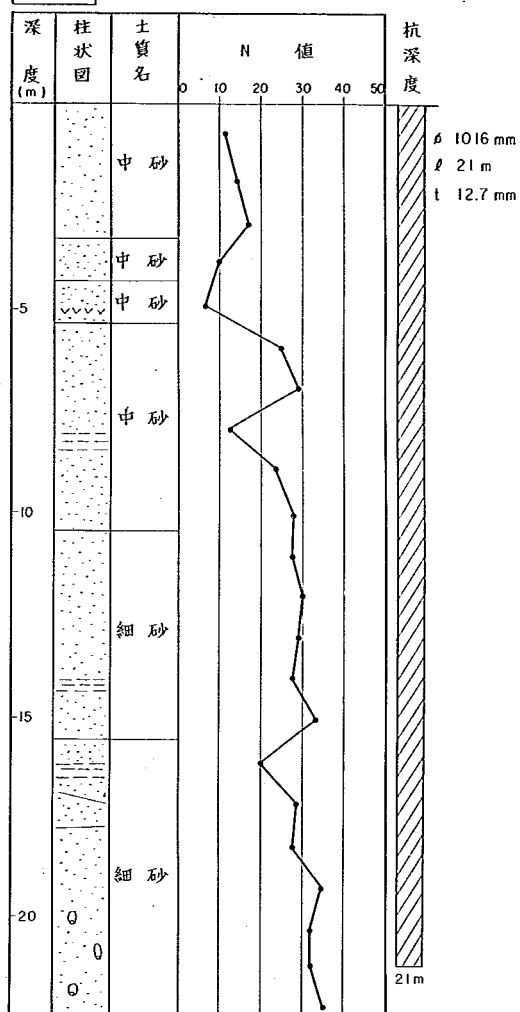
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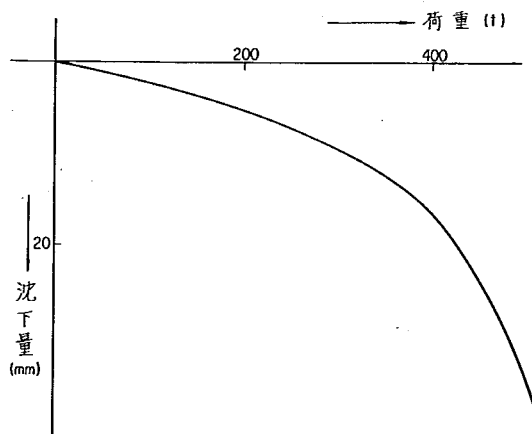
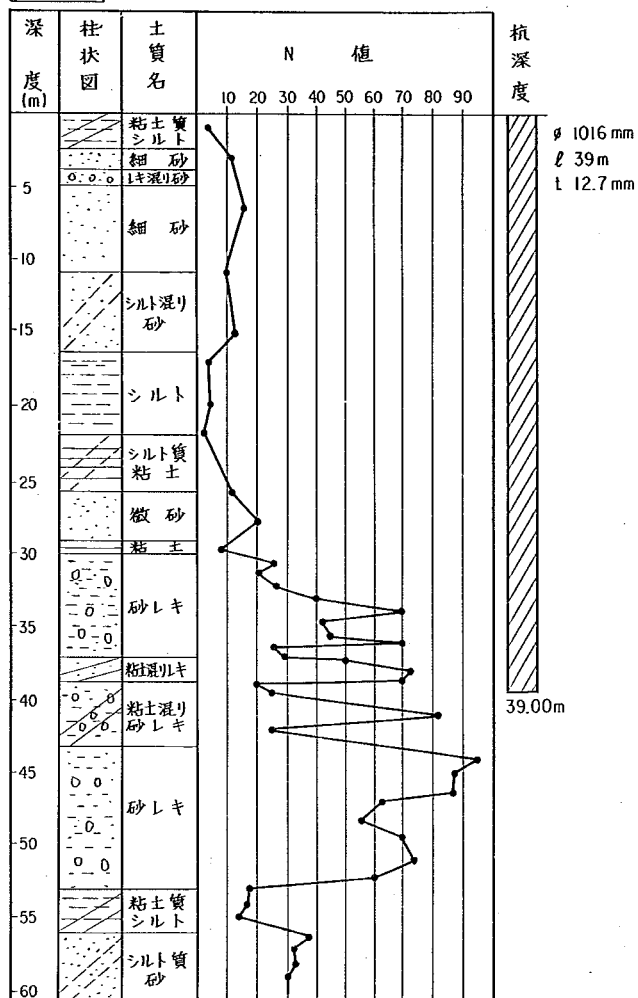
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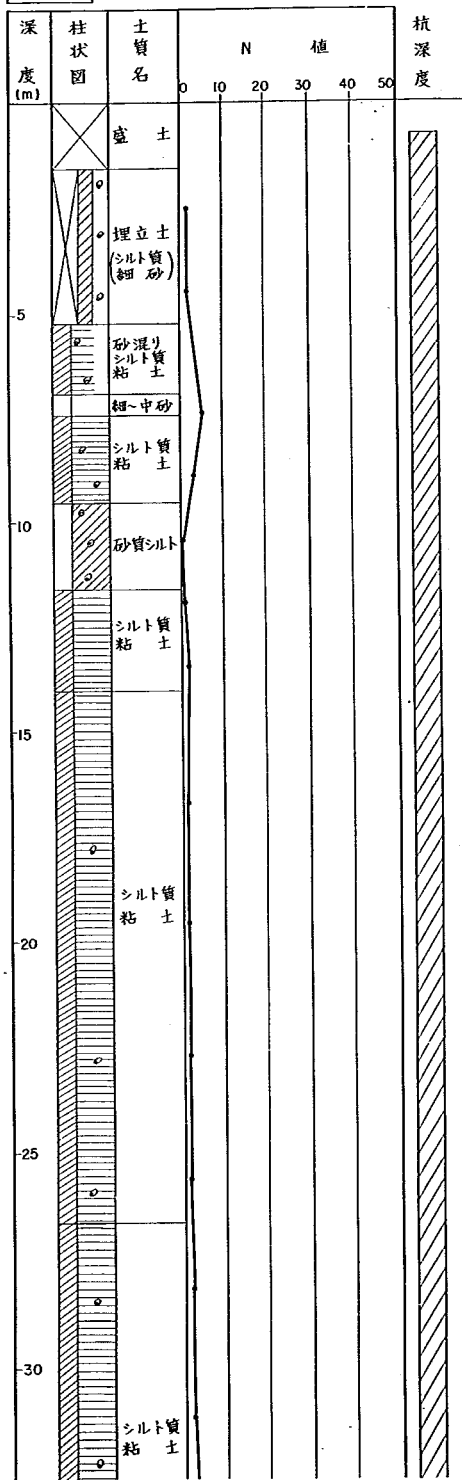
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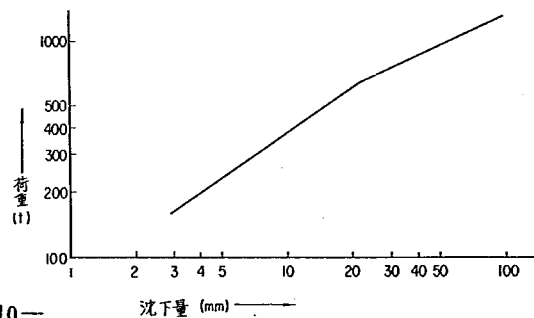
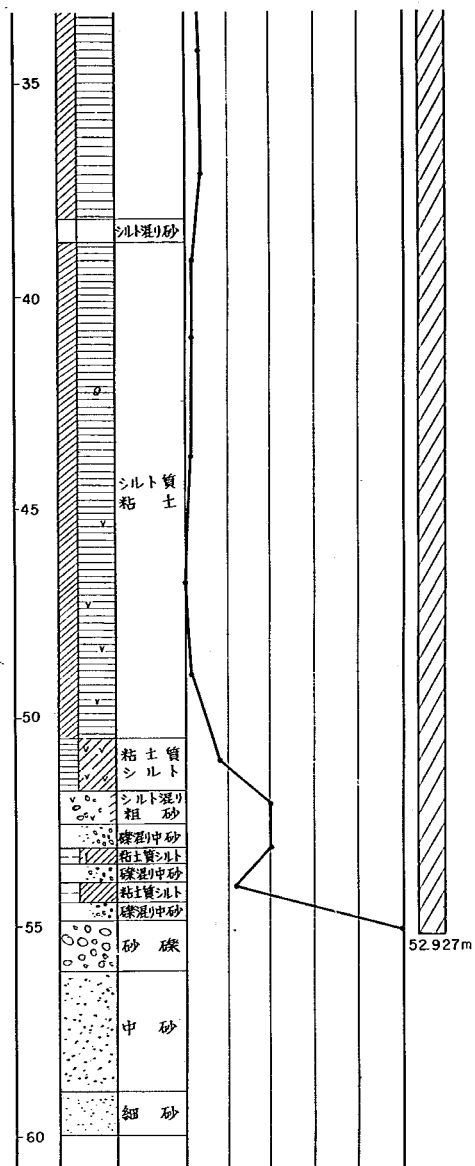
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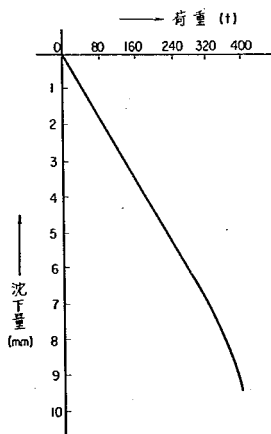
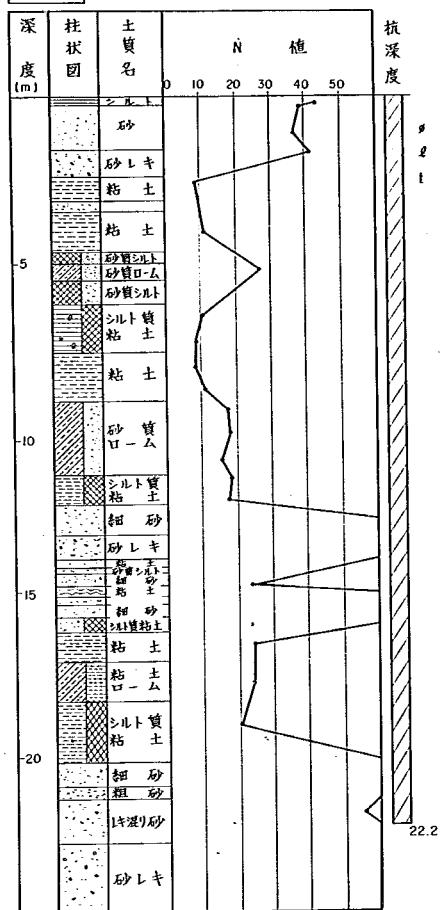
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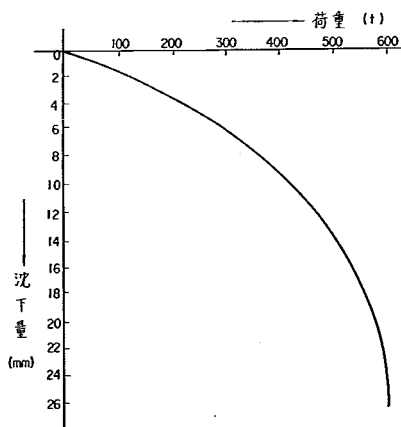
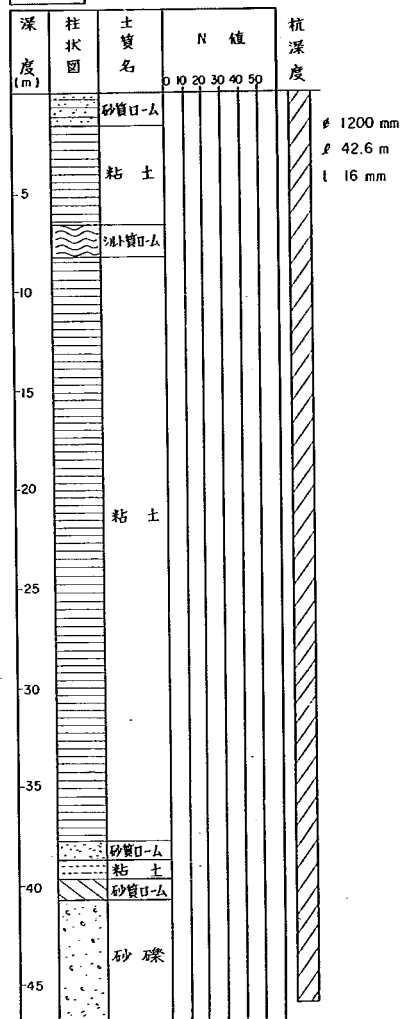
φ 1016 mm
L 52.927m
t 12.7 mm



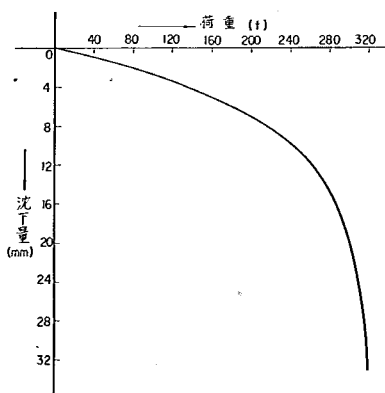
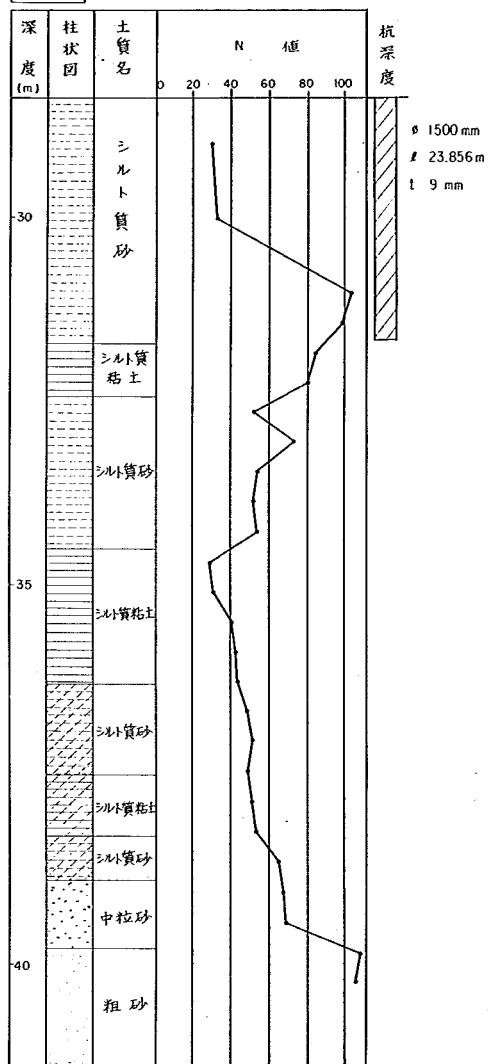
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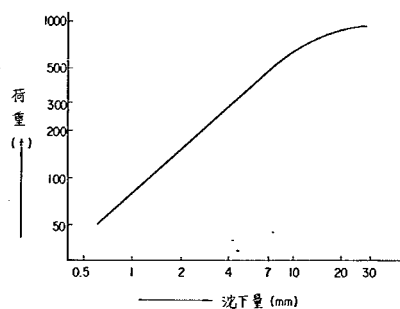
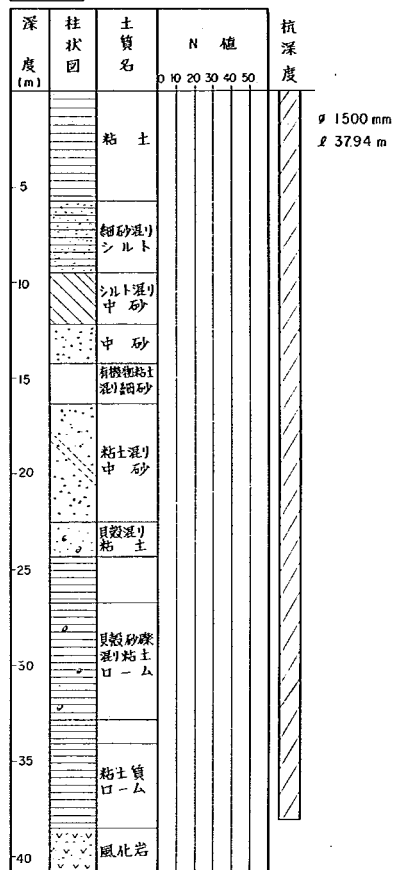
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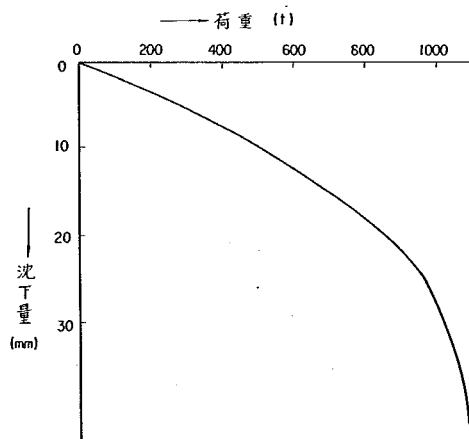
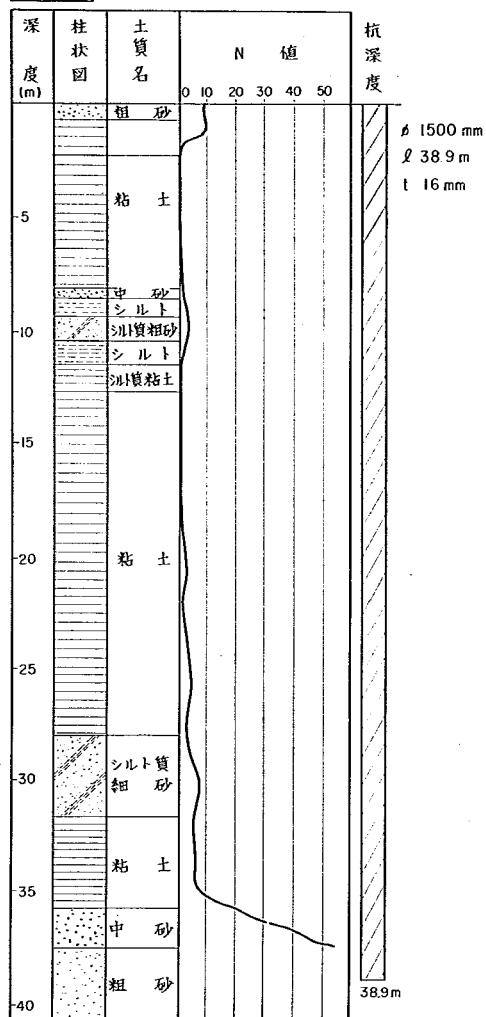
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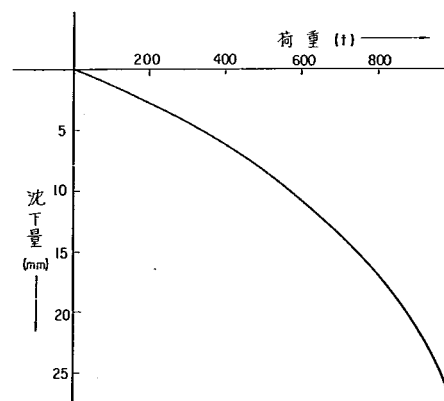
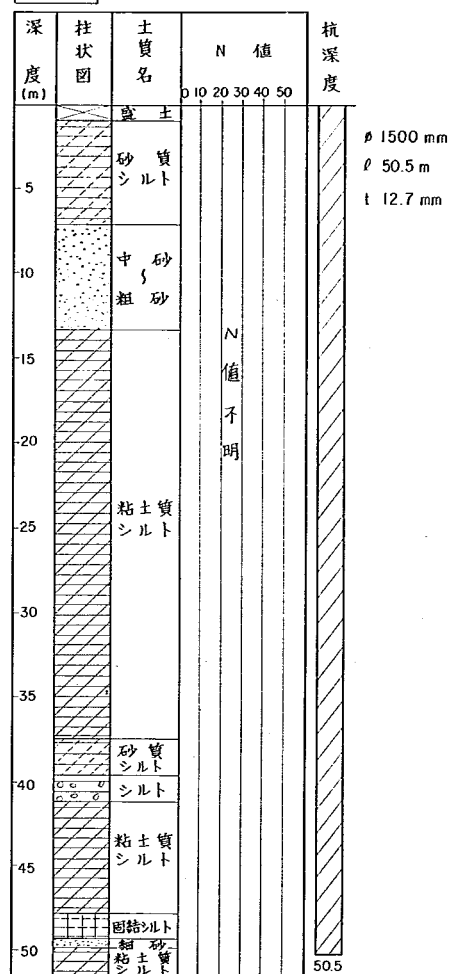
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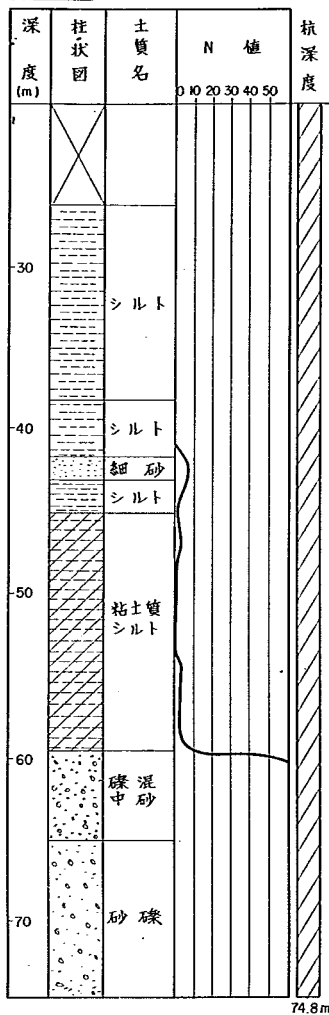
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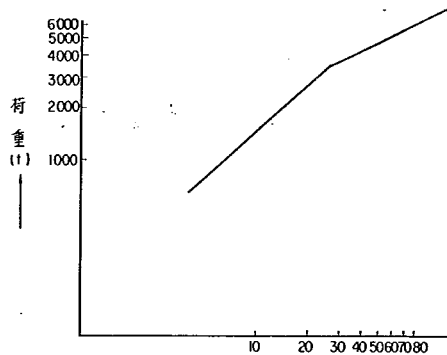
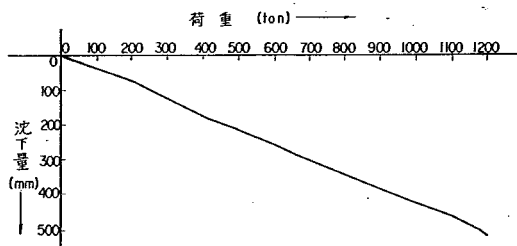
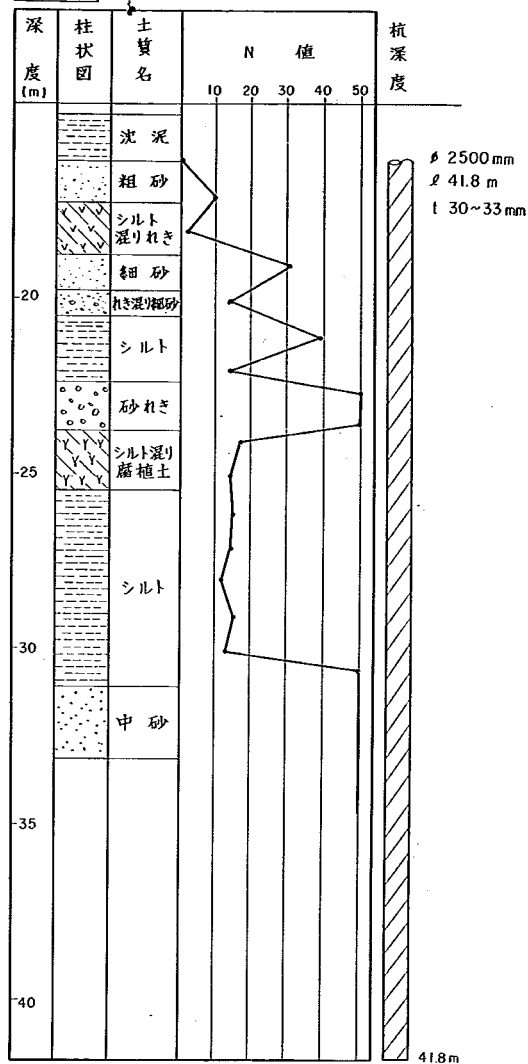
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No. 19



No. 20

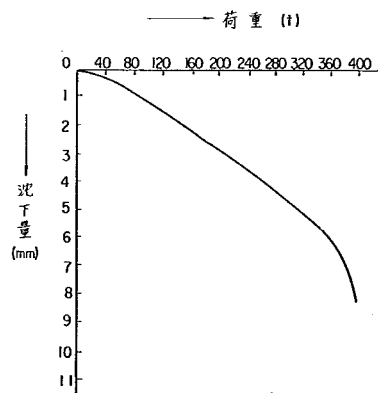
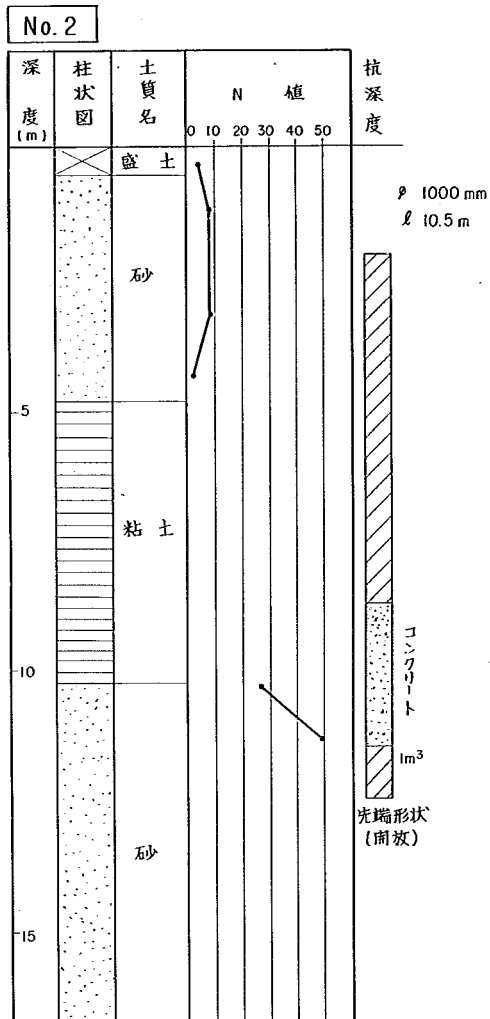
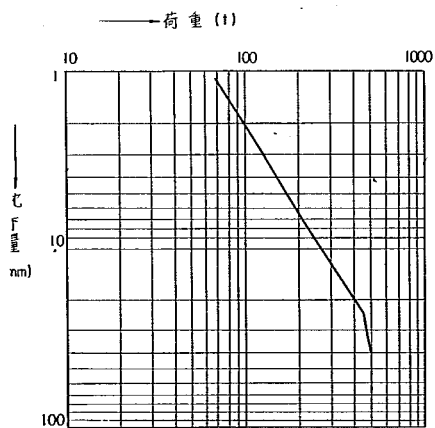
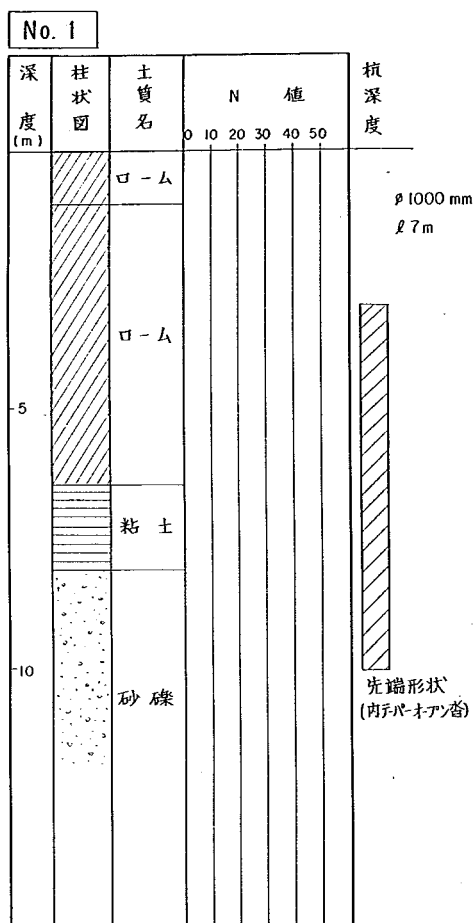


2 . P C ぐ い

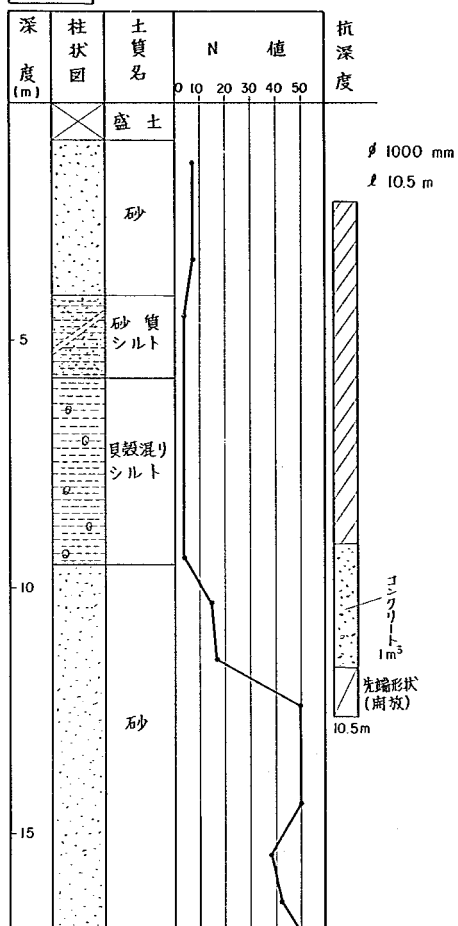
2.1 P C ぐいー覧表

N O					先端地盤	最大試験 荷重(沈下量)	降伏荷重 (沈下量)	極限荷重 (沈下量)
	種 類	ぐい径 _{mm}	ぐい長 _m	肉 厚 _{mm}				
1	PCぐい (ドロップ工法)	1000	7		砂レキ	500t (40)mm	225~ 250t (10)mm	>500t
2	PCぐい (N・N工法)	"	10.5		砂	400 (82)	>400	
3	"	"	10.5		砂	400 (82)	>400	
4	"	"	11.5		砂レキ	500 (45)	440 (31.5)	
5	"	"	14.0		砂質粘土	550 (45)	360 (6)	>550
6	"	"	14.0		砂質粘土	125 (>12)	83 (12)	125 (12)
7	"	"	14.0		砂質粘土	400 (60)	>400	>400
8	"	"	16.4		レキ混り砂	450 (46)	300 (8.5)	
9	"	"	18.0		レキ混り 粗 砂	570 (64)	>570	>570
10	"	"	18.0		レキ混り 粗 砂	420 (5)	>420	>420
11	"	"	18.0		砂	560 (19.6)		
12	"	"	18.5		砂	750 (85)	>750	
13	10.9mmまでバイプロ ハンマー 以後ウオ タージェット併用	"	20		細 砂	800 (26)	700 (11.6)	800 (26)
14	PCぐい (N・N工法)	"	25		砂	700 (27)		
15	"	"	25		砂	700 (27)	550 (13)	
16	"	"	25		砂レキ	600 (88)		
17	"	"	28		砂	400 (15.5)	360 (12.6)	
18	バイプロハンマーと ハンマグラブで 掘削	"	29		砂 質 シルト	750 (15)	700 (10.8)	
19	PCぐい (N・N工法)	"	30		シルト 質砂	500 (19)		
20	"	"	39		粘 土	650 (19)	550 (12.7)	650 (19)

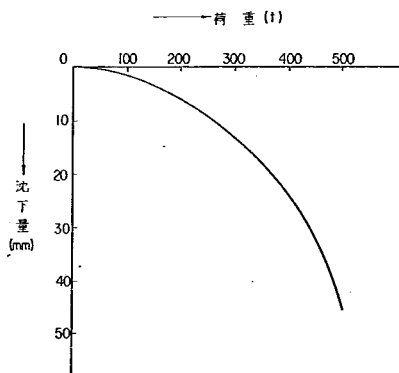
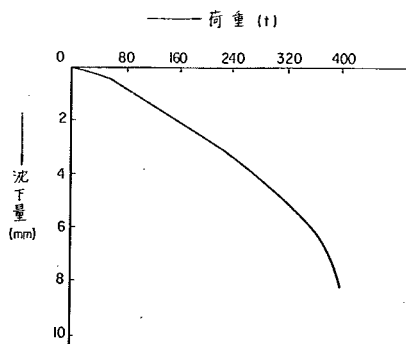
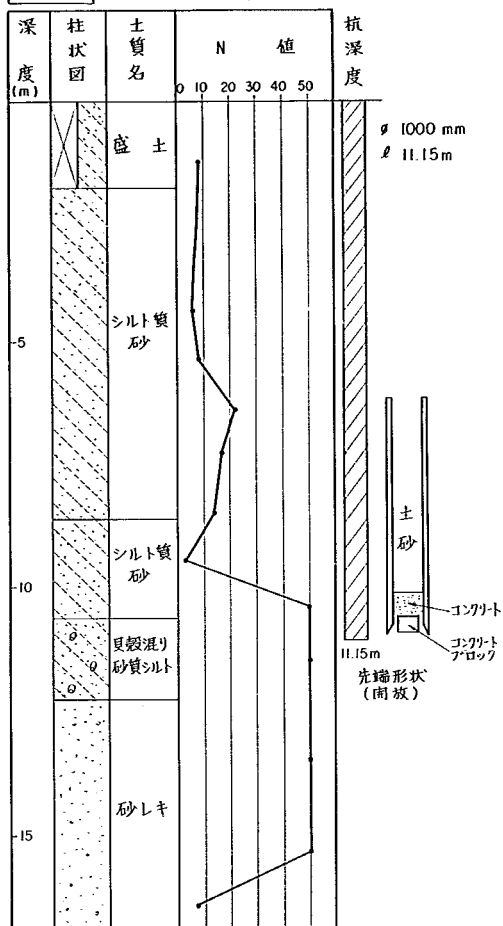
2.2 土質柱状図と載荷試験結果



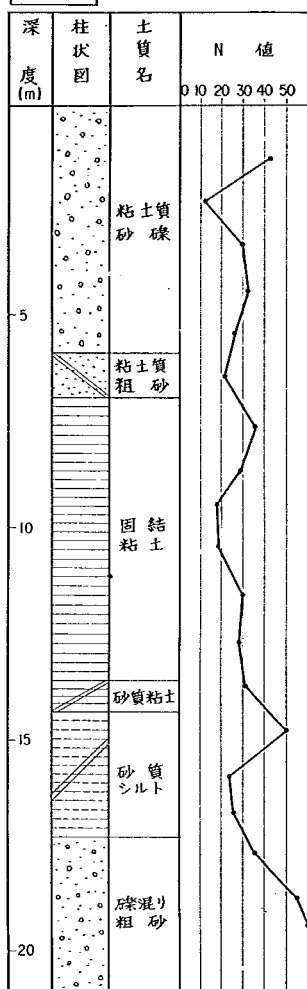
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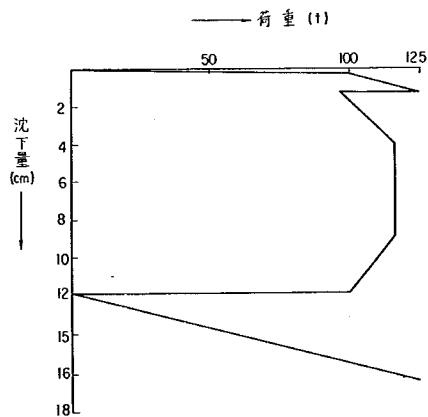
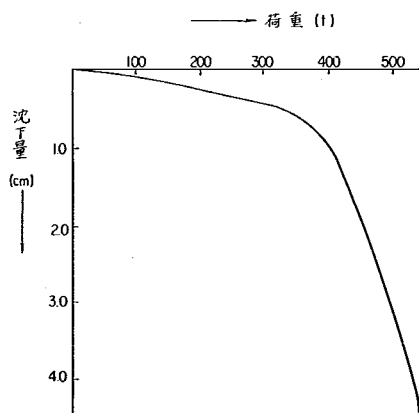
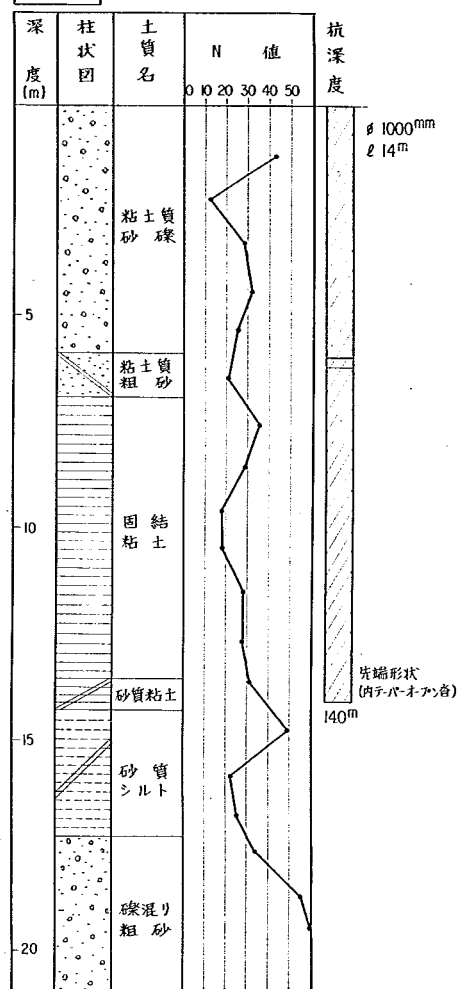
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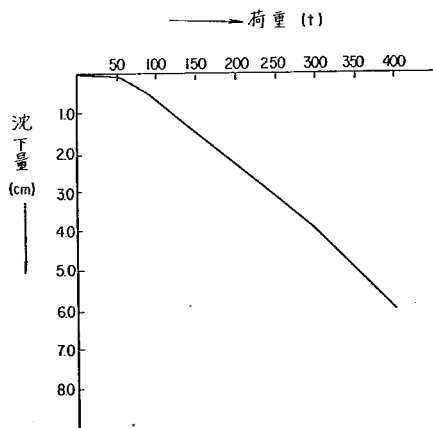
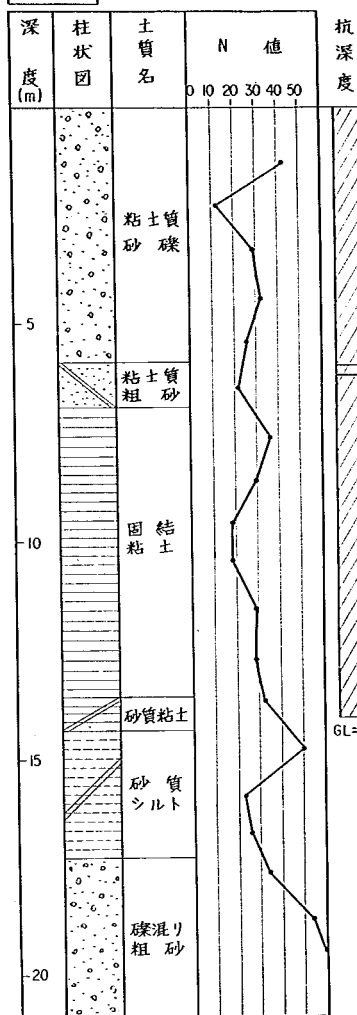
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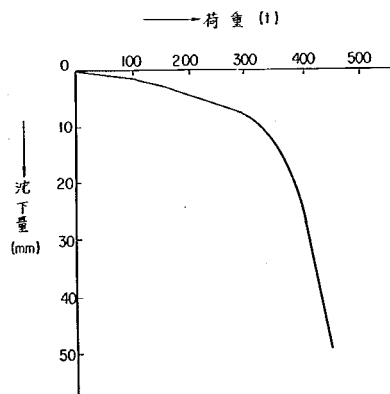
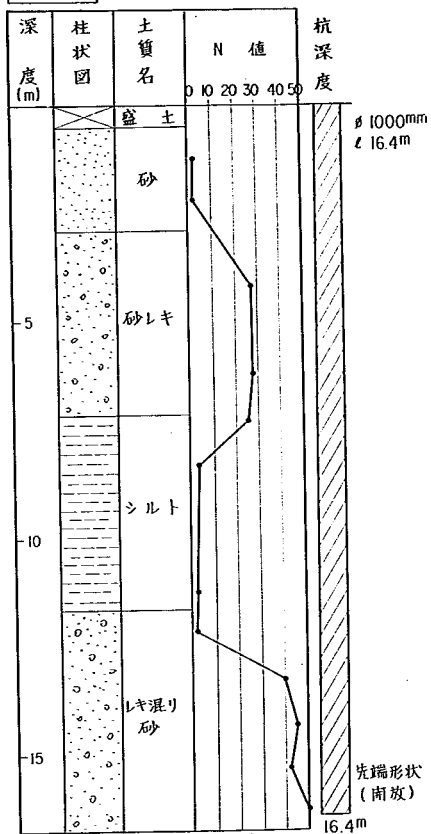
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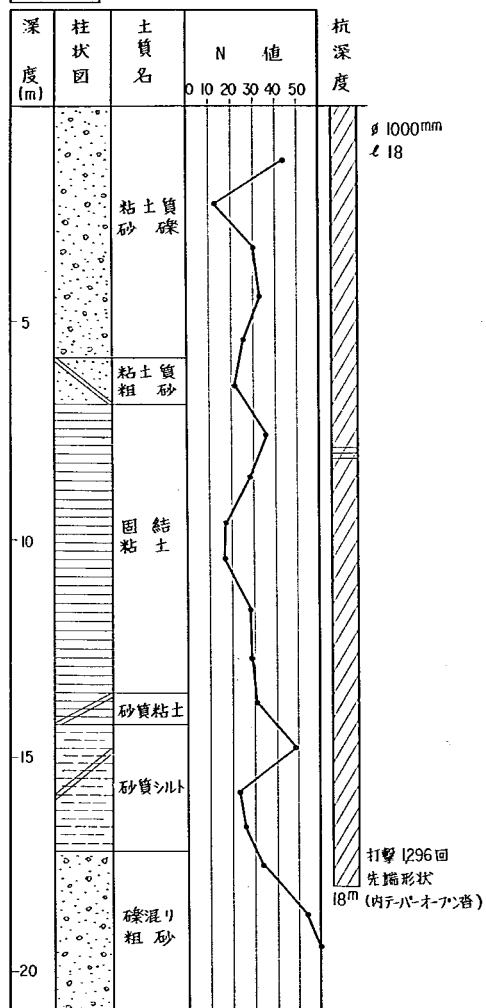
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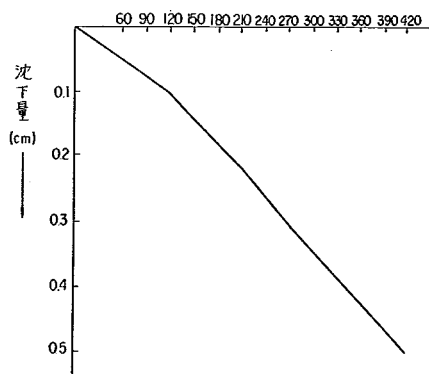
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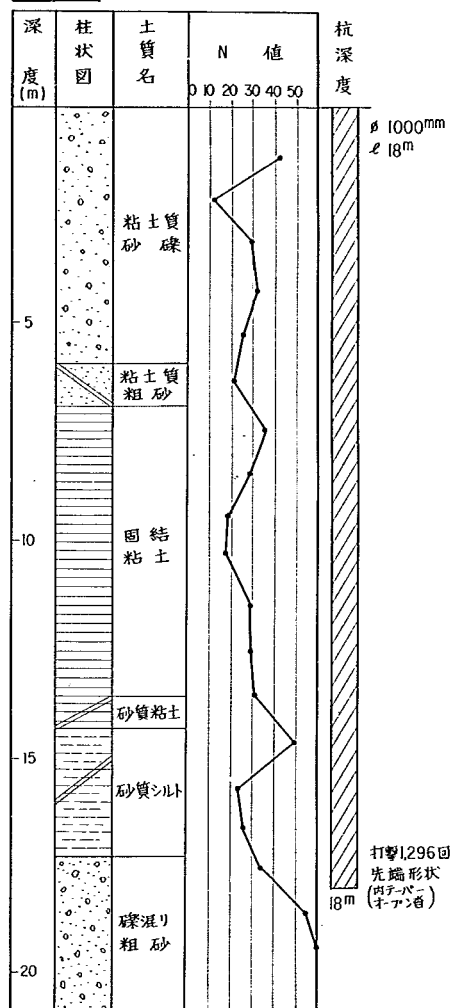
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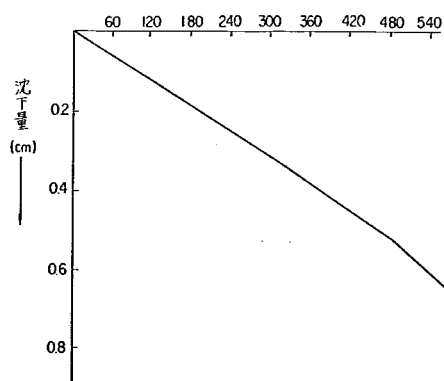
→ 荷重 (t)



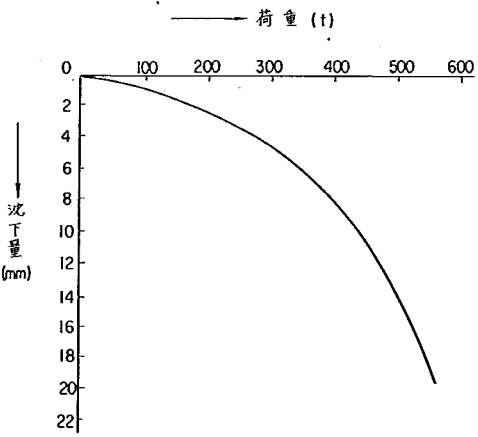
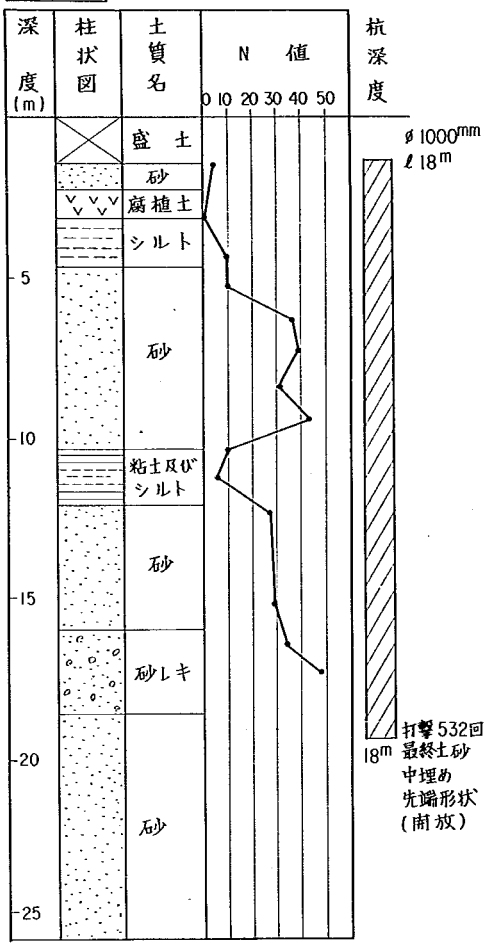
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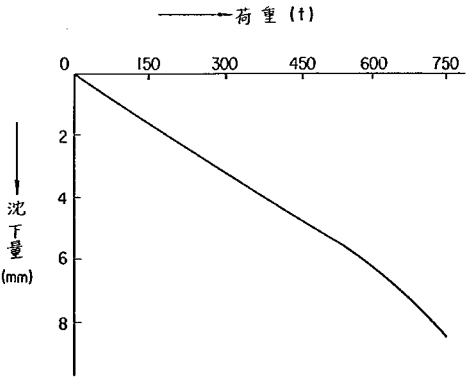
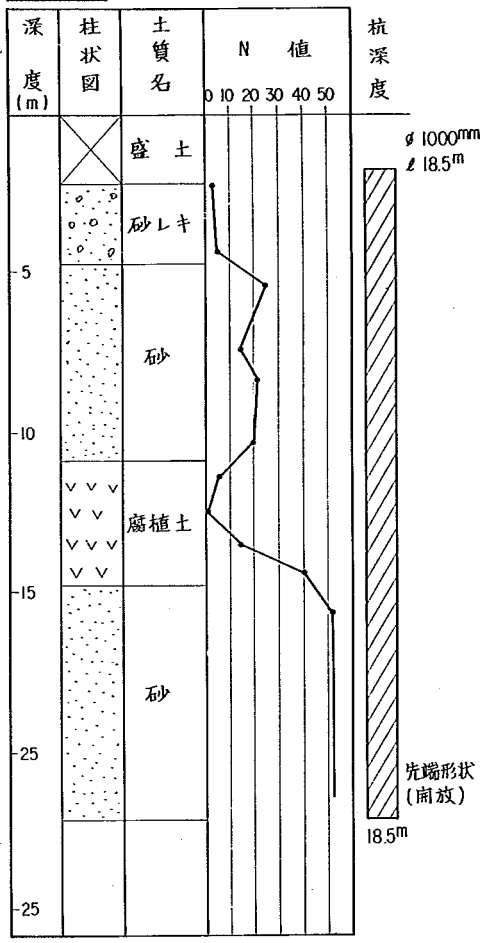
→ 荷重 (t)



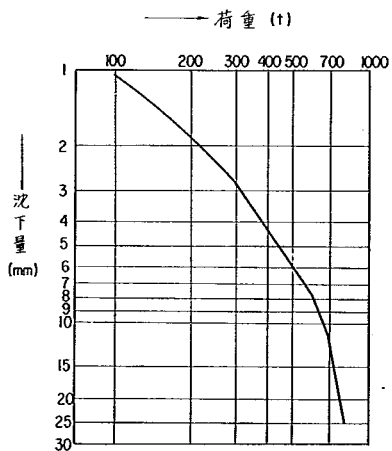
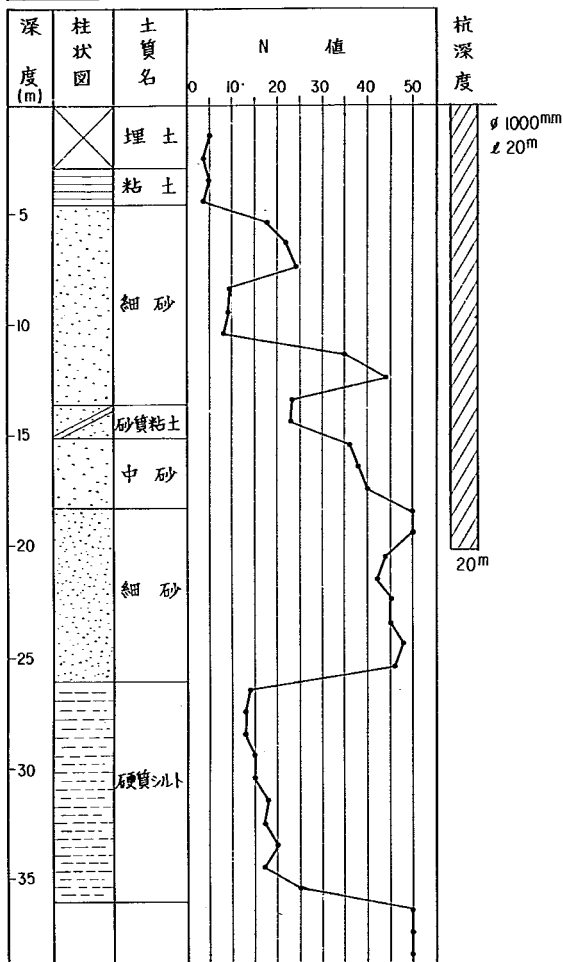
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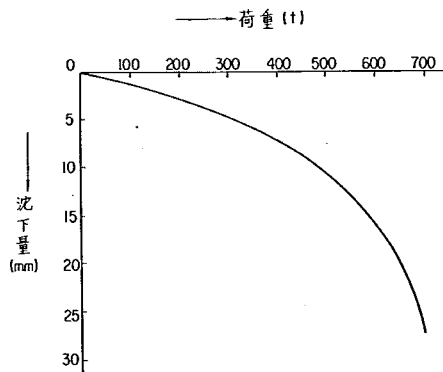
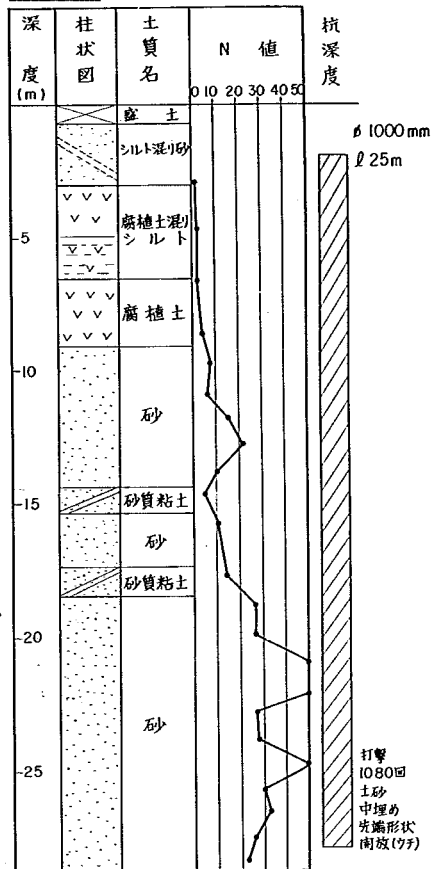
No. 12



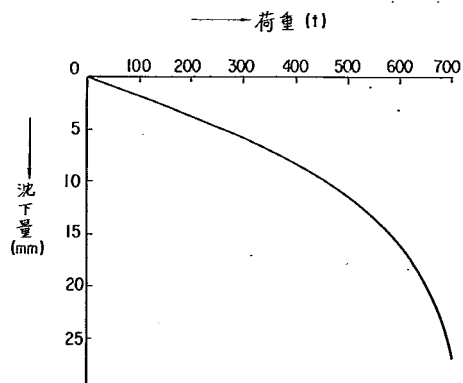
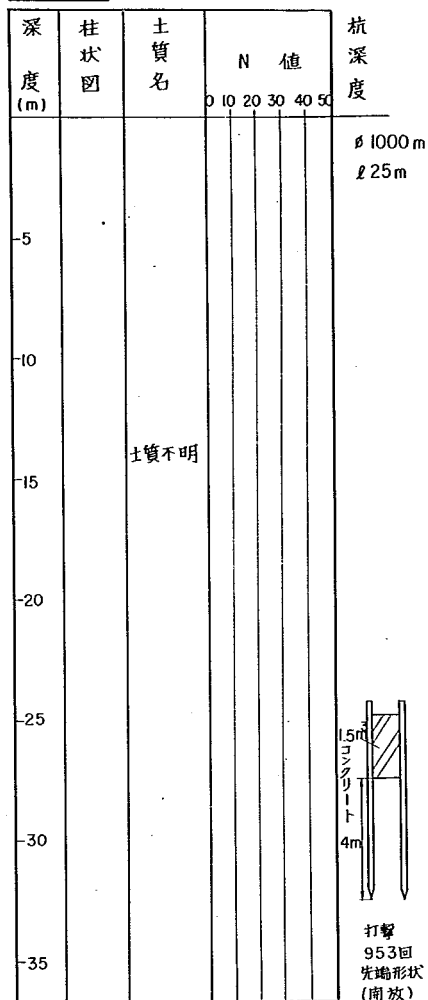
No. 13



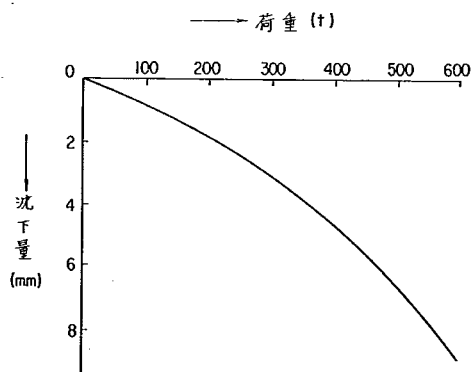
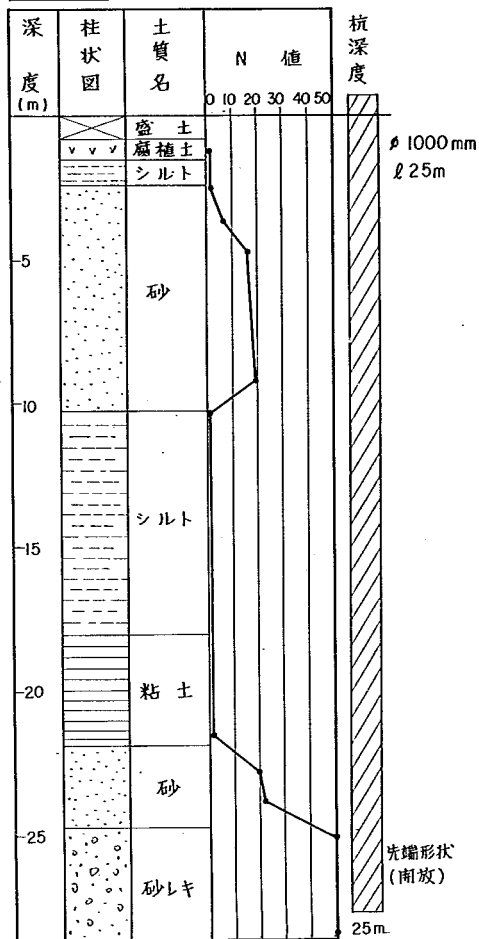
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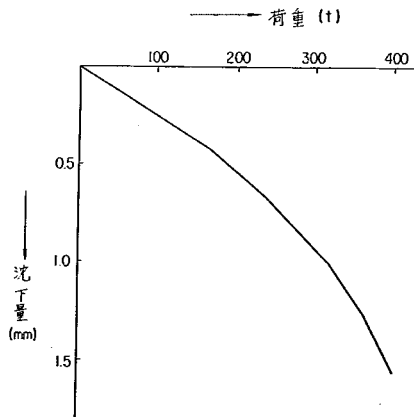
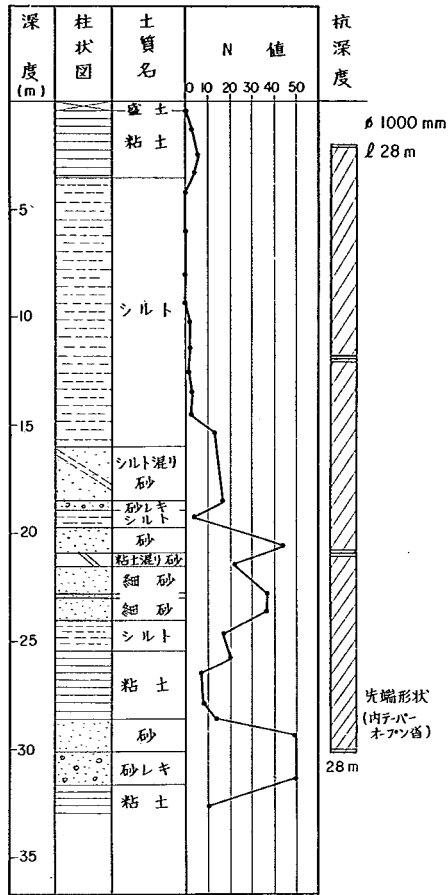
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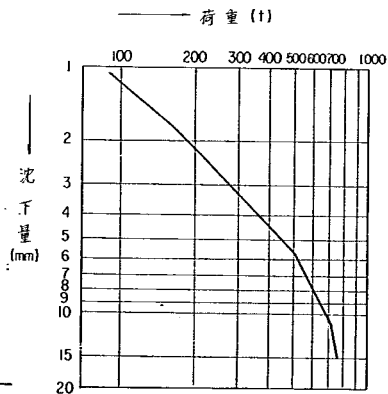
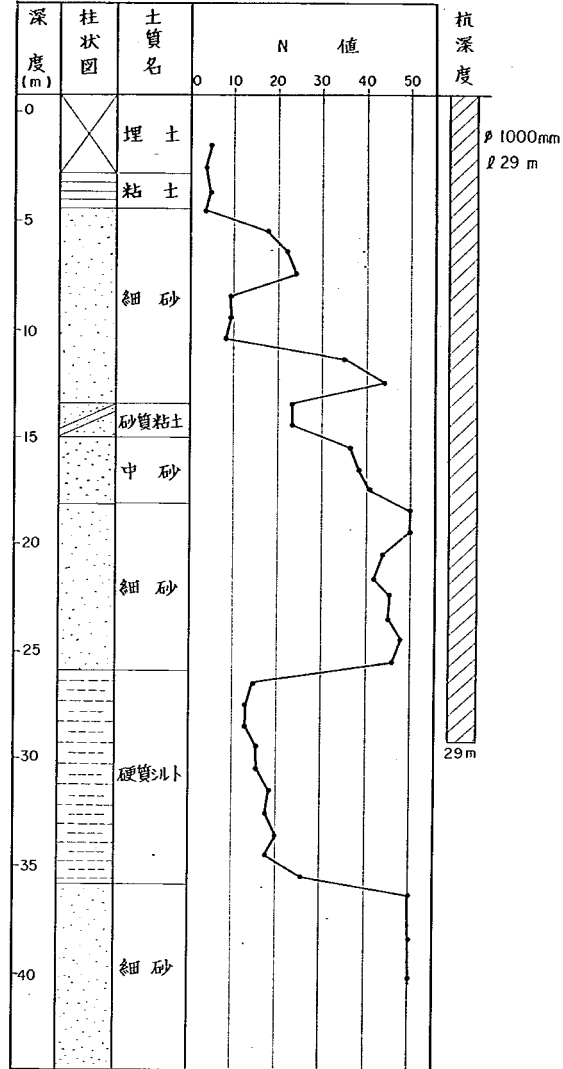
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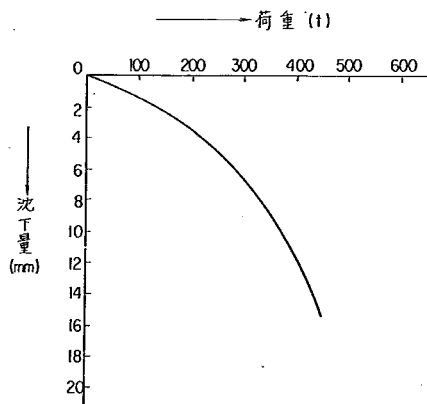
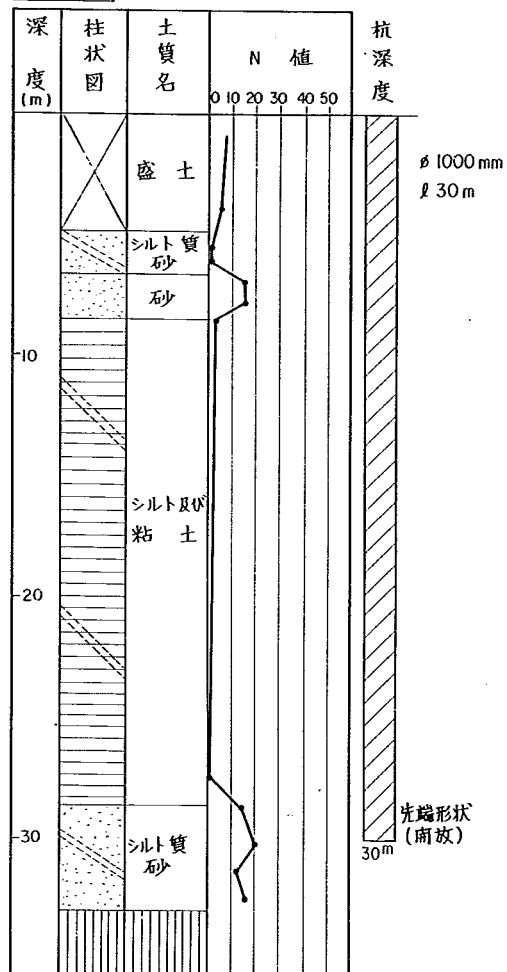
No. 17



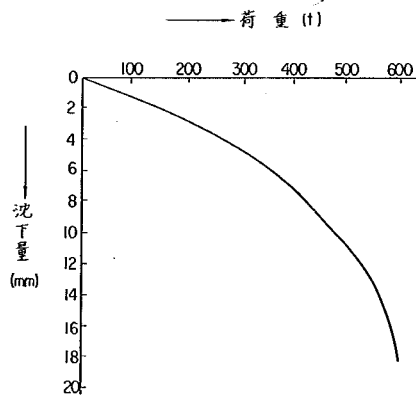
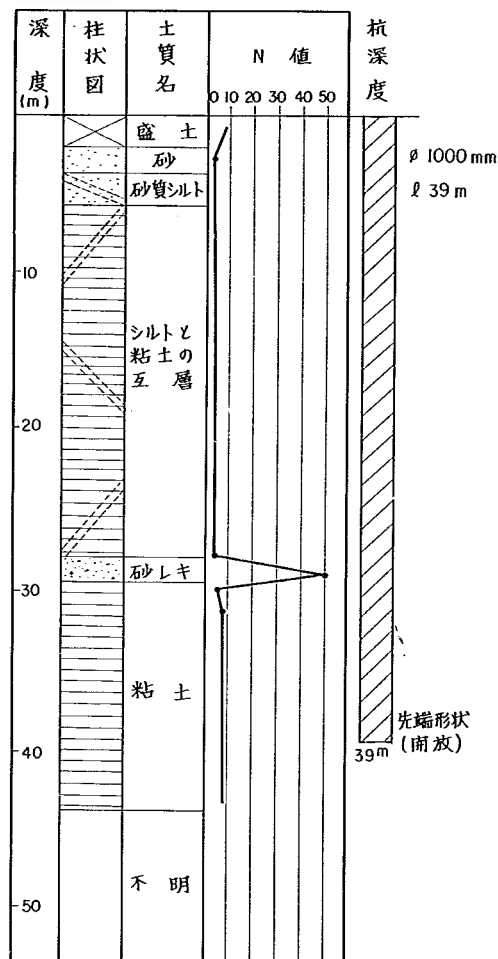
No. 18



No. 19



No. 20



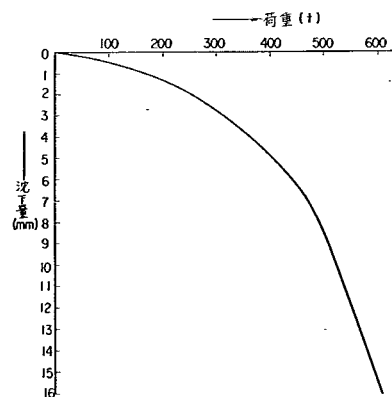
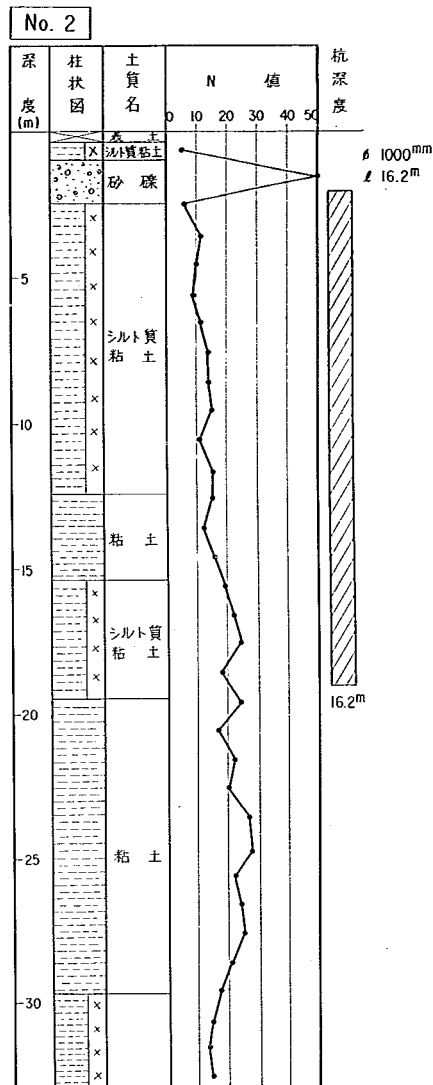
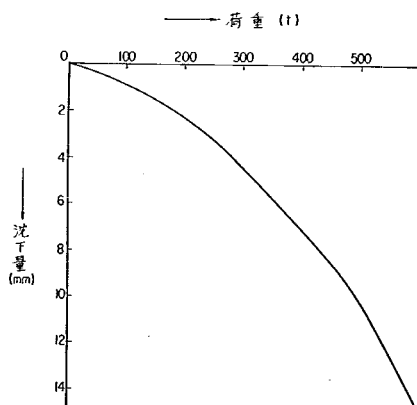
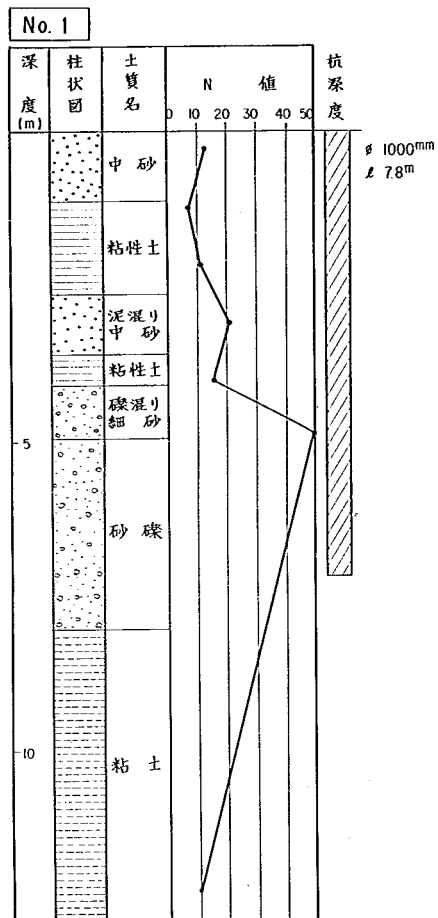
3. 場所打ちコンクリートぐい



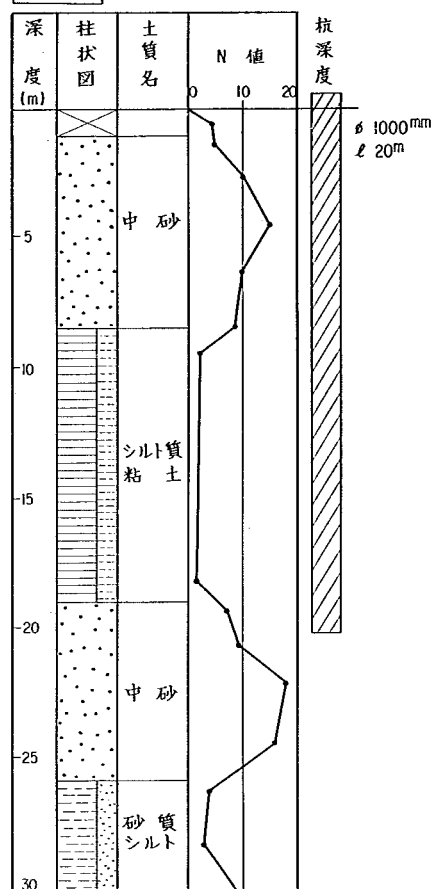
3.1 場所打ちコンクリートぐいー覧表

	ぐいー				先端地盤	最大試験 荷重(沈下量)	降伏荷重 (沈下量)	極限荷重 (沈下量)
	種類	ぐい径 _{mm}	ぐい長 _m	肉厚 _{mm}				
1	ベノト	1,000	7.8		砂 礫 (50以上)	600t (14.6) _{mm}		
2	"	"	16.2		シルト質粘土 (18)	600 (16)		
3	"	"	18.8		礫混り砂 (50以上)	600 (98)		
4	"	"	20		中 砂 (18)	330 (14)		
5	"	"	20		粘土質 (19)	550	400	550 (35)
6	アース ドリル	"	20		砂 礫 (50以上)	730 (117.5)		
7	ベノト	"	34.3		砂 (40)	800 (34)		
8	"	"	36.0		砂 (50以上)	500 (61.2)		
9	"	"	36.0		砂 (>50)	500 (61.9)		
10	リバース	1,016	45.0		砂 礫 (50以上)	800 (125.3)		
11	ベノト	1,200	10		砂 礫 (50以上)	1200 (73.2)		
12	アース ドリル	1,200	19		砂 礫 (50以上)	750 (72.1)		

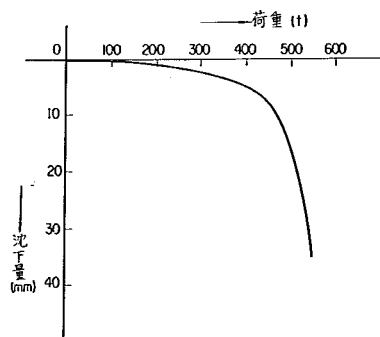
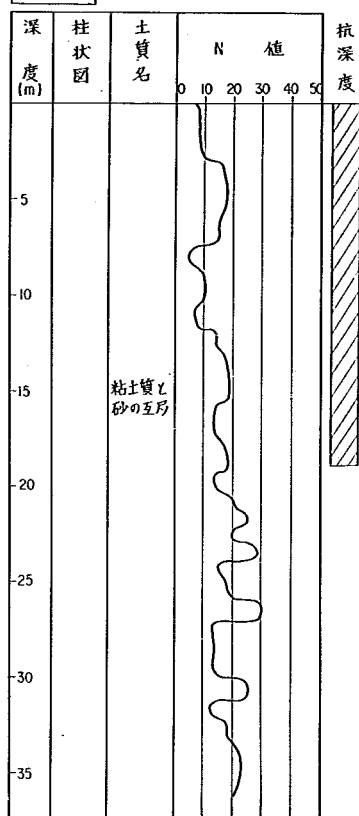
3.2 土質柱状図と載荷試験結果



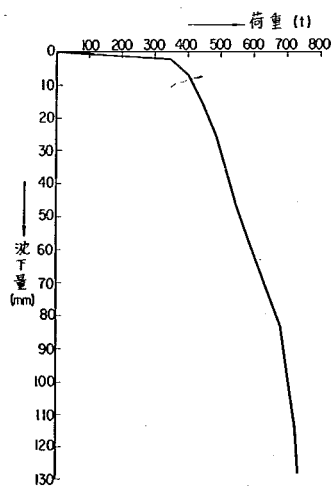
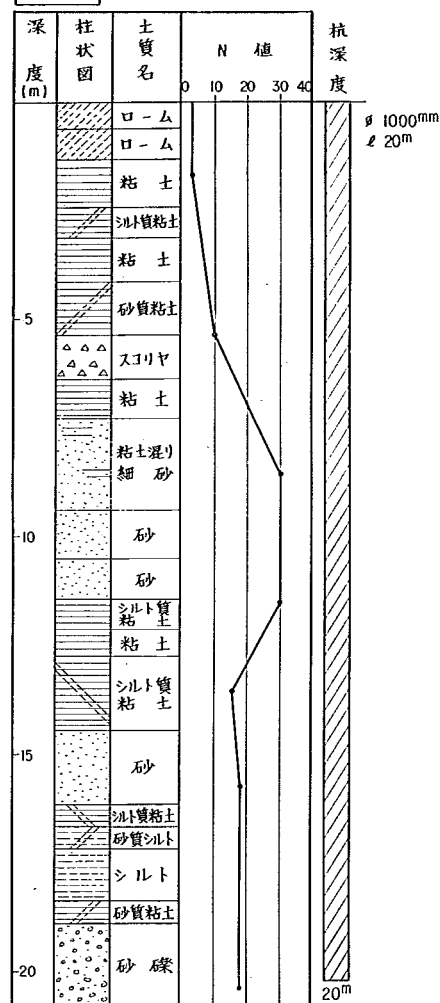
深度 (m)	柱状图	土質名	N 値					杭深度	
			0	10	20	30	40	50	
0		粘性土							 φ 1000mm L 18.8m
5									
10									
15		砂Lキ							
20									



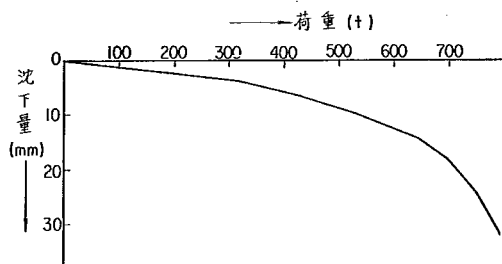
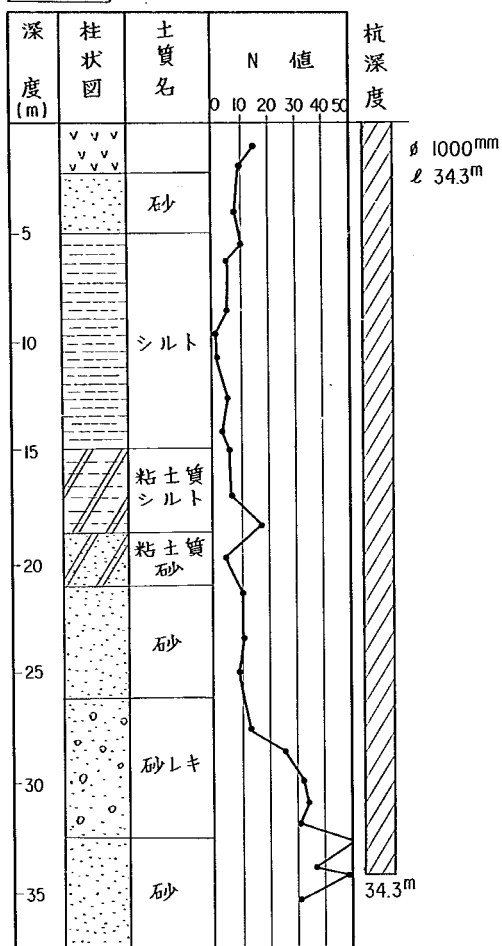
No. 5



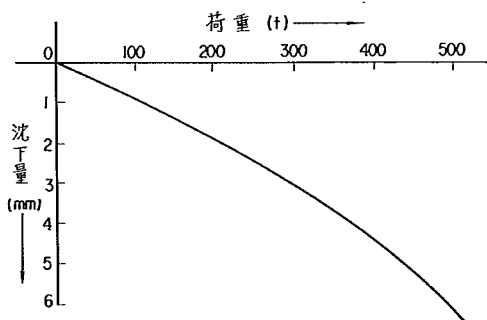
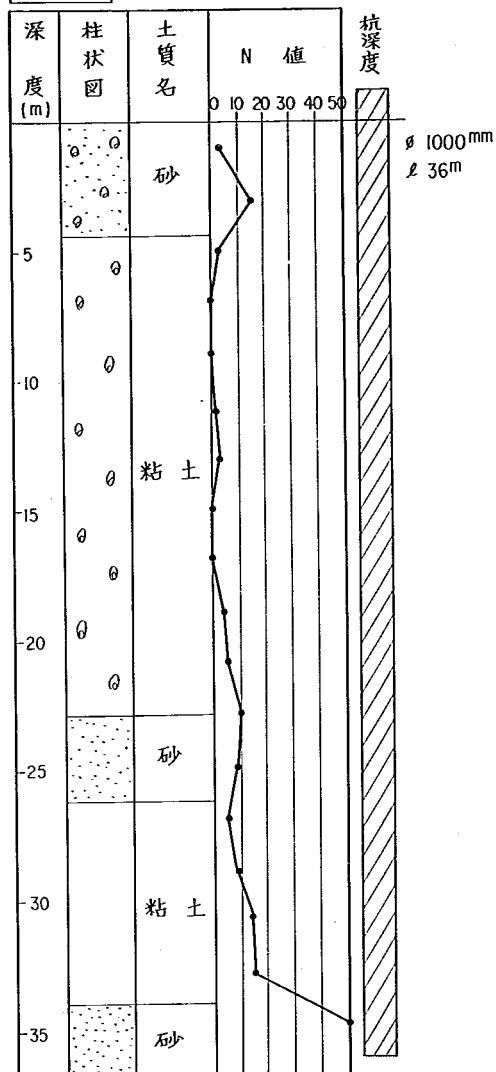
No. 6



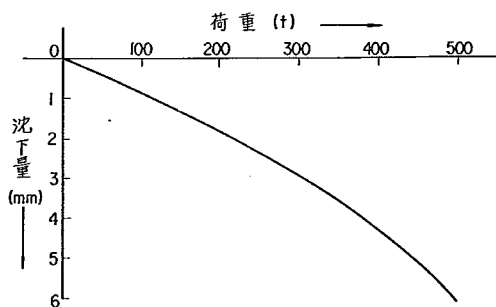
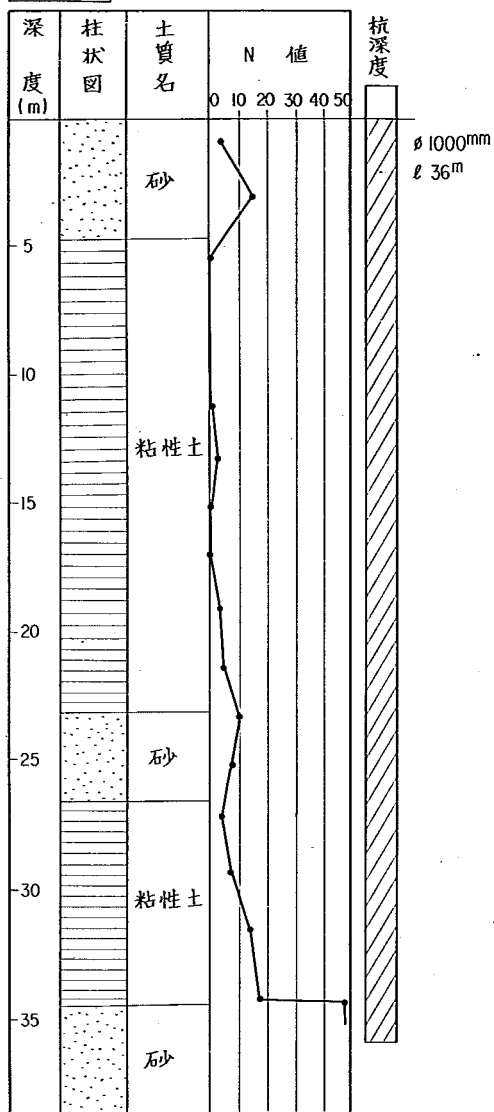
No. 7



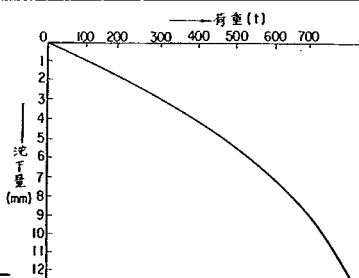
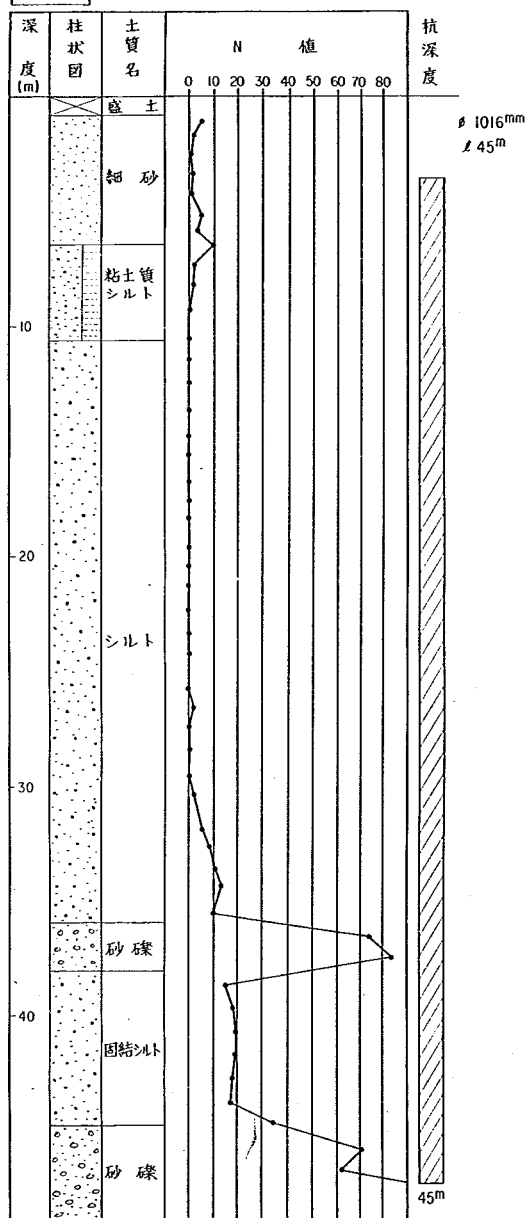
No. 8



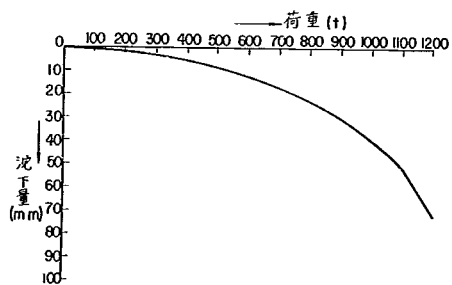
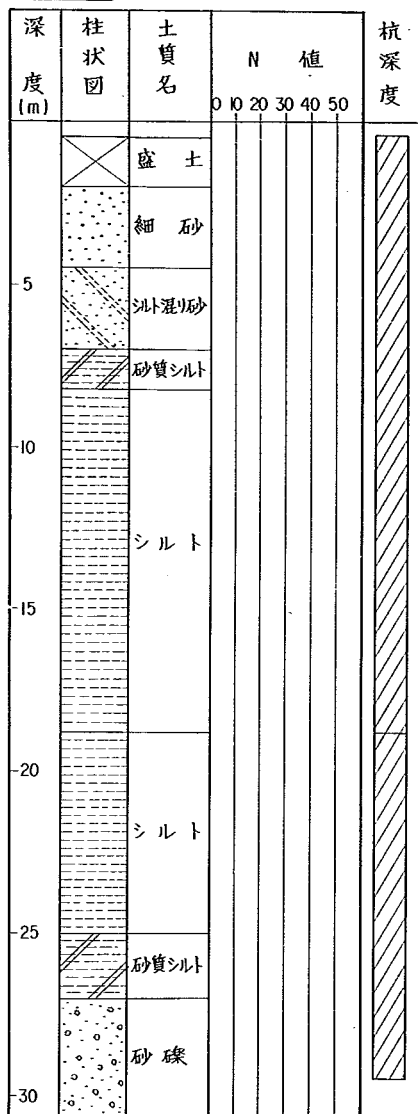
No. 9



No. 10



No. 11



No. 12

