

DYNAMIC PENETRATION TEST

Възложител:	Министерство на Отбраната чрез Главна дирекция „Инфраструктура на отбраната“
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Equipment technical characteristics Пенетрометър30

Regulation ref.	DIN 4094
Weight of striking mass	30 Kg
Freefall height	0.50 m
Weight of striking system	21 Kg
Diameter of cone tip	43.70 mm
Area of tip base	15 cm ²
Rod length	1 m
Weight of rods /m	6.3 Kg/m
Depth first rod joint	1.10 m
Tip penetration	0.10 m
Number of blow by tip	N(10)
Correlation coeff.	1.066
Coating/Slurries	No
Cone tip angle	90 °

Изготвил:
/инж. Борислав Борисов/

TEST...DP1

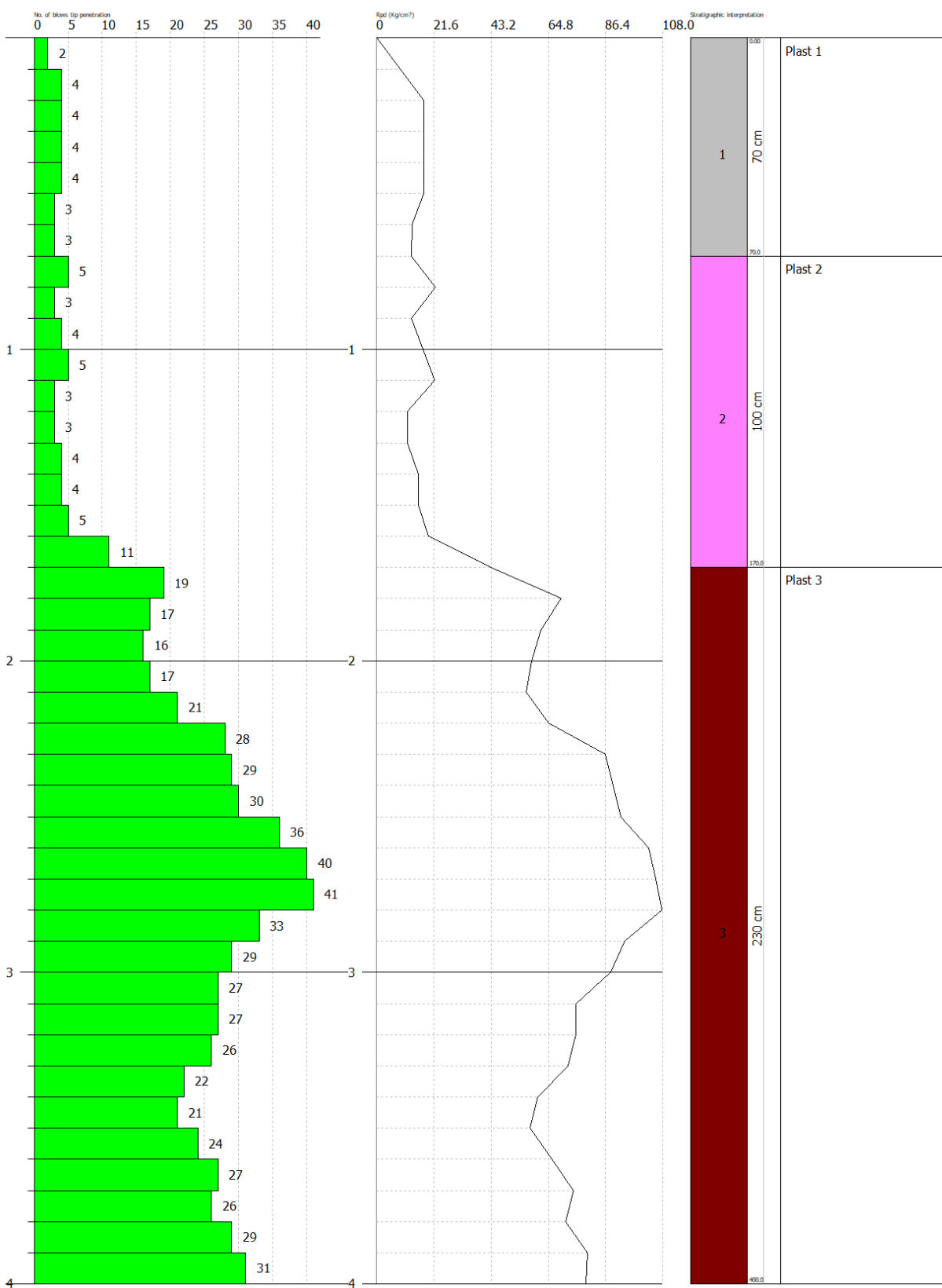
Equipment used...
 Test depth
 No GWT found

Пенетрометр30
 4.00 m

Processing type nr. blows: Average

Depth (m)	No. of blows	Calculation Chi probe reduction coeff.	Reduced dyn. resistance (Mpa)	Dynamic resistance (Mpa)	Reduced allowable pressure Herminier - Dutch (KPa)	Allow. pressure Herminier - Dutch (KPa)
0.10	2	0.857	0.88	1.03	43.98	51.34
0.20	4	0.855	1.76	2.05	87.76	102.69
0.30	4	0.853	1.75	2.05	87.56	102.69
0.40	4	0.851	1.75	2.05	87.36	102.69
0.50	4	0.849	1.74	2.05	87.17	102.69
0.60	3	0.847	1.30	1.54	65.23	77.02
0.70	3	0.845	1.30	1.54	65.09	77.02
0.80	5	0.843	2.16	2.57	108.25	128.36
0.90	3	0.842	1.30	1.54	64.81	77.02
1.00	4	0.840	1.72	2.05	86.23	102.69
1.10	5	0.838	2.15	2.57	107.57	128.36
1.20	3	0.836	1.16	1.39	58.03	69.39
1.30	3	0.835	1.16	1.39	57.91	69.39
1.40	4	0.833	1.54	1.85	77.05	92.52
1.50	4	0.831	1.54	1.85	76.90	92.52
1.60	5	0.830	1.92	2.31	95.93	115.64
1.70	11	0.828	4.21	5.09	210.64	254.42
1.80	19	0.776	6.82	8.79	341.16	439.45
1.90	17	0.775	6.09	7.86	304.62	393.19
2.00	16	0.773	5.72	7.40	286.13	370.06
2.10	17	0.772	6.07	7.86	303.40	393.19
2.20	21	0.720	6.36	8.84	318.24	441.93
2.30	28	0.719	8.47	11.78	423.44	589.24
2.40	29	0.717	8.75	12.21	437.66	610.29
2.50	30	0.716	9.04	12.63	451.83	631.33
2.60	36	0.664	10.06	15.15	503.23	757.60
2.70	40	0.613	10.32	16.84	515.86	841.77
2.80	41	0.611	10.55	17.26	527.54	862.82
2.90	33	0.660	9.17	13.89	458.37	694.46
3.00	29	0.709	8.65	12.21	432.49	610.29
3.10	27	0.707	8.04	11.36	401.90	568.20
3.20	27	0.706	7.36	10.42	367.98	521.22
3.30	26	0.705	7.07	10.04	353.70	501.92
3.40	22	0.703	5.97	8.49	298.73	424.70
3.50	21	0.702	5.69	8.11	284.64	405.39
3.60	24	0.701	6.49	9.27	324.72	463.31
3.70	27	0.700	7.29	10.42	364.66	521.22
3.80	26	0.698	7.01	10.04	350.54	501.92
3.90	29	0.697	7.81	11.20	390.32	559.83
4.00	31	0.646	7.73	11.97	386.60	598.44

Layer depth (m)	NPDM	Rd (Mpa)	Type	Clay Fraction (%)	Unit weight (KN/m ³)	Saturated unit weight (KN/m ³)	Effective stress (KPa)	Correlation Coeff. with Nspt	Nspt	Description
0.7	3.43	1.760294	Cohesive	0	16.48	18.34	5.77	1.07	3.66	Plast 1
1.7	4.7	2.260433	Cohesive	0	17.26	18.44	20.16	1.07	5.01	Plast 2
4	26.78	11.04523	Cohesive	0	20.99	22.85	52.93	1.07	28.55	Plast 3



ESTIMATE TEST GEOTECHNICAL PARAMETERS DP1

COHESIVE SOILS

Undrained cohesion (KPa)

	Nspt	Layer depth (m)	Terzaghi -Peck	Sanglerat	Terzaghi -Peck (1948)	U.S.D.M .S.M	Schmert mann 1975	SUNDA (1983) Benassi e Vannelli	Fletcher (1965) Chicago clay	Houston (1960)	Shioi - Fukui 1982	Begemma nn	De Beer
Plast 1	3.66	0.70	22.46	44.91	14.71	14.61	34.81	52.86	32.66	69.23	17.95	55.90	44.91
Plast 2	5.01	1.70	30.69	61.39	24.52	20.01	47.86	67.76	44.42	79.14	24.61	66.78	61.39
Plast 3	28.55	4.00	188.97	350.00	98.07	105.52	278.21	331.37	228.59	287.83	140.04	440.02	350.00

Qc (CPT Cone resistance)

	Nspt	Layer depth (m)	Correlation	Qc (Mpa)
Plast 1	3.66	0.70	Robertson (1983)	0.72
Plast 2	5.01	1.70	Robertson (1983)	0.98
Plast 3	28.55	4.00	Robertson (1983)	5.60

Oedometric module (Mpa)

	Nspt	Layer depth (m)	Stroud e Butler (1975)	Vesic (1970)	Trofimenkov (1974), Mitchell e Gardner	Buisman-Sanglerat
Plast 1	3.66	0.70	1.65	5.38	3.84	4.49
Plast 2	5.01	1.70	2.25	7.37	5.19	6.14
Plast 3	28.55	4.00	12.85	--	28.73	28.00

Young's modulus (Mpa)

	Nspt	Layer depth (m)	Schultze	Apollonia
Plast 1	3.66	0.70	2.13	3.59
Plast 2	5.01	1.70	3.65	4.91
Plast 3	28.55	4.00	30.20	28.00

AGI Classification (Assoc. It. Geolog.)

	Nspt	Layer depth (m)	Correlation	Classification
Plast 1	3.66	0.70	A.G.I. (1977)	POCO CONSISTENTE
Plast 2	5.01	1.70	A.G.I. (1977)	MODERAT. CONSISTENTE
Plast 3	28.55	4.00	A.G.I. (1977)	MOLTO CONSISTENTE

Unit weight

	Nspt	Layer depth (m)	Correlation	Unit weight (KN/m ³)
Plast 1	3.66	0.70	Meyerhof ed altri	16.48
Plast 2	5.01	1.70	Meyerhof ed altri	17.26
Plast 3	28.55	4.00	Meyerhof ed altri	20.99

Saturated unit weight

	Nspt	Layer depth (m)	Correlation	Saturated unit weight (KN/m ³)
Plast 1	3.66	0.70	Meyerhof ed altri	18.34
Plast 2	5.01	1.70	Meyerhof ed altri	18.44
Plast 3	28.55	4.00	Meyerhof ed altri	22.85

TEST...DP2

Equipment used...

Пенетрометр30

Test depth

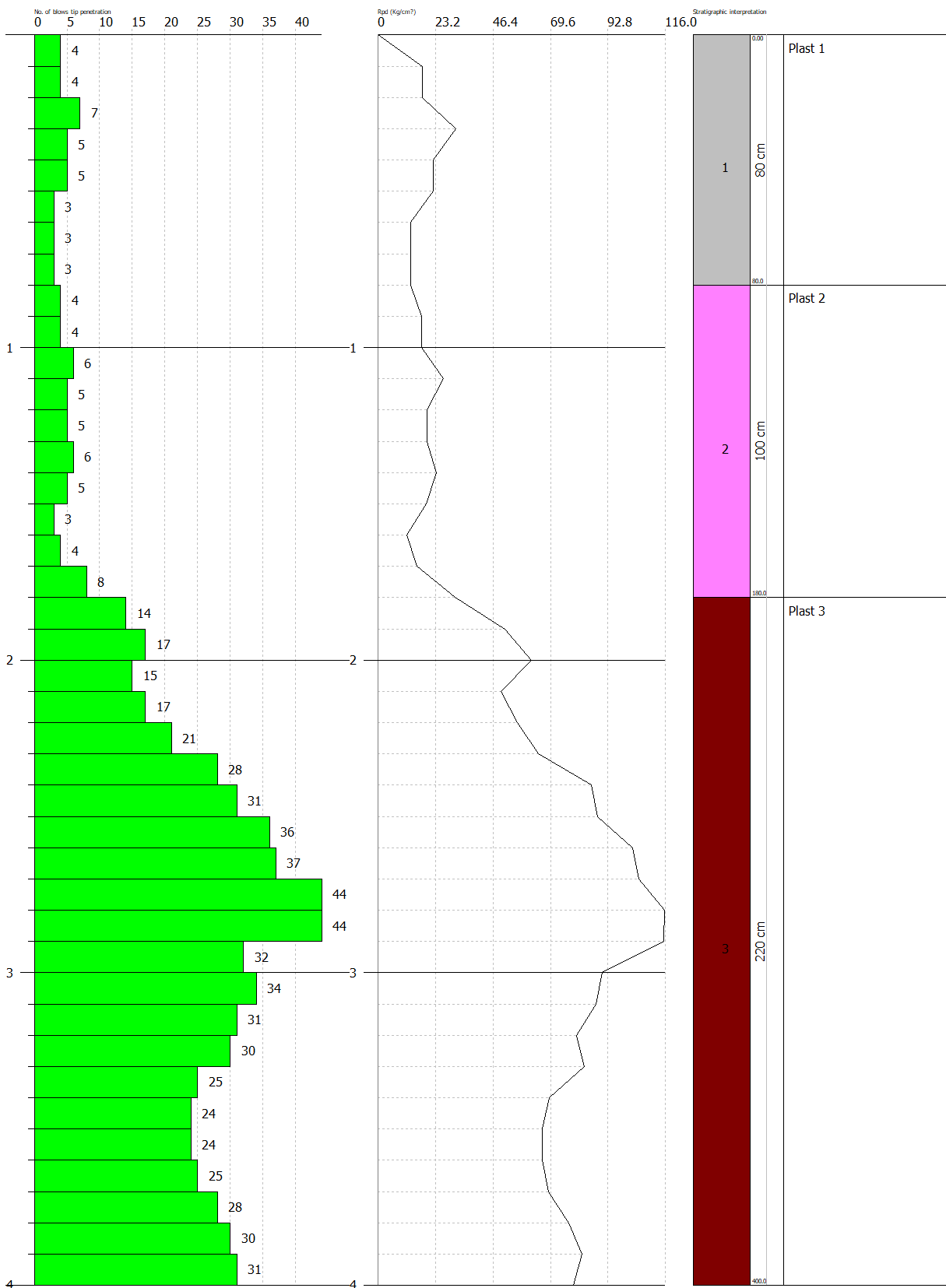
4.00 m

No GWT found

Processing type nr. blows: Average

Depth (m)	No. of blows	Calculation Chi probe reduction coeff.	Reduced dyn. resistance (Mpa)	Dynamic resistance (Mpa)	Reduced allowable pressure Herminier - Dutch (KPa)	Allow. pressure Herminier - Dutch (KPa)
0.10	4	0.857	1.76	2.05	87.96	102.69
0.20	4	0.855	1.76	2.05	87.76	102.69
0.30	7	0.853	3.06	3.59	153.23	179.70
0.40	5	0.851	2.18	2.57	109.20	128.36
0.50	5	0.849	2.18	2.57	108.96	128.36
0.60	3	0.847	1.30	1.54	65.23	77.02
0.70	3	0.845	1.30	1.54	65.09	77.02
0.80	3	0.843	1.30	1.54	64.95	77.02
0.90	4	0.842	1.73	2.05	86.41	102.69
1.00	4	0.840	1.72	2.05	86.23	102.69
1.10	6	0.838	2.58	3.08	129.08	154.03
1.20	5	0.836	1.93	2.31	96.71	115.64
1.30	5	0.835	1.93	2.31	96.51	115.64
1.40	6	0.833	2.31	2.78	115.58	138.77
1.50	5	0.831	1.92	2.31	96.12	115.64
1.60	3	0.830	1.15	1.39	57.56	69.39
1.70	4	0.828	1.53	1.85	76.60	92.52
1.80	8	0.826	3.06	3.70	152.90	185.03
1.90	14	0.775	5.02	6.48	250.87	323.80
2.00	17	0.773	6.08	7.86	304.01	393.19
2.10	15	0.772	5.35	6.94	267.71	346.93
2.20	17	0.770	5.51	7.16	275.51	357.75
2.30	21	0.719	6.35	8.84	317.58	441.93
2.40	28	0.717	8.45	11.78	422.57	589.24
2.50	31	0.666	8.69	13.05	434.27	652.37
2.60	36	0.664	10.06	15.15	503.23	757.60
2.70	37	0.663	10.32	15.57	516.10	778.64
2.80	44	0.611	11.32	18.52	566.15	925.95
2.90	44	0.610	11.30	18.52	564.86	925.95
3.00	32	0.659	8.87	13.47	443.56	673.42
3.10	34	0.657	9.41	14.31	470.32	715.51
3.20	31	0.656	7.85	11.97	392.58	598.44
3.30	30	0.705	8.16	11.58	408.11	579.13
3.40	25	0.703	6.79	9.65	339.47	482.61
3.50	24	0.702	6.51	9.27	325.30	463.31
3.60	24	0.701	6.49	9.27	324.72	463.31
3.70	25	0.700	6.75	9.65	337.65	482.61
3.80	28	0.698	7.55	10.81	377.51	540.52
3.90	30	0.697	8.08	11.58	403.78	579.13
4.00	31	0.646	7.73	11.97	386.60	598.44

Layer depth (m)	NPDM	Rd (Mpa)	Type	Clay Fraction (%)	Unit weight (KN/m ³)	Saturated unit weight (KN/m ³)	Effective stress (KPa)	Correlation Coeff. with Nspt	Nspt	Description
0.8	4.25	2.18198	Cohesive	0	16.97	18.34	6.79	1.07	4.53	Plast 1
1.8	5	2.383996	Cohesive	0	17.46	18.44	22.3	1.07	5.33	Plast 2
4	28.09	11.51791	Cohesive	0	21.18	23.24	54.33	1.07	29.94	Plast 3



ESTIMATE TEST GEOTECHNICAL PARAMETERS DP2

COHESIVE SOILS

Undrained cohesion (KPa)

	Nspt	Layer depth (m)	Terzaghi -Peck	Sanglerat	Terzaghi -Peck (1948)	U.S.D.M .S.M	Schmert mann 1975	SUNDA (1983) Benassi e Vannelli	Fletcher (1965) Chicago clay	Houston (1960)	Shioi - Fukui 1982	Begem ann	De Beer
Plast 1	4.53	0.80	27.75	55.51	24.52	18.04	43.15	65.51	40.21	75.61	22.26	69.63	55.51
Plast 2	5.33	1.80	32.66	65.31	24.52	21.18	50.90	71.49	47.17	81.49	26.09	70.90	65.31
Plast 3	29.94	4.00	198.19	367.06	98.07	110.13	291.94	345.49	238.20	302.34	146.81	463.76	367.06

Qc (CPT Cone resistance)

	Nspt	Layer depth (m)	Correlation	Qc (Mpa)
Plast 1	4.53	0.80	Robertson (1983)	0.89
Plast 2	5.33	1.80	Robertson (1983)	1.05
Plast 3	29.94	4.00	Robertson (1983)	5.87

Oedometric module (Mpa)

	Nspt	Layer depth (m)	Stroud e Butler (1975)	Vesic (1970)	Trofimenkov (1974), Mitchell e Gardner	Buisman-Sanglerat
Plast 1	4.53	0.80	2.04	6.66	4.71	5.55
Plast 2	5.33	1.80	2.40	7.84	5.51	6.53
Plast 3	29.94	4.00	13.47	--	30.12	29.36

Young's modulus (Mpa)

	Nspt	Layer depth (m)	Schultze	Apollonia
Plast 1	4.53	0.80	3.11	4.44
Plast 2	5.33	1.80	4.01	5.23
Plast 3	29.94	4.00	31.76	29.36

AGI Classification (Assoc. It. Geolog.)

	Nspt	Layer depth (m)	Correlation	Classification
Plast 1	4.53	0.80	A.G.I. (1977)	MODERAT. CONSISTENTE
Plast 2	5.33	1.80	A.G.I. (1977)	MODERAT. CONSISTENTE
Plast 3	29.94	4.00	A.G.I. (1977)	MOLTO CONSISTENTE

Unit weight

	Nspt	Layer depth (m)	Correlation	Unit weight (KN/m ²)
Plast 1	4.53	0.80	Meyerhof ed altri	16.97
Plast 2	5.33	1.80	Meyerhof ed altri	17.46
Plast 3	29.94	4.00	Meyerhof ed altri	21.18

Saturated unit weight

	Nspt	Layer depth (m)	Correlation	Saturated unit weight (KN/m ²)
Plast 1	4.53	0.80	Meyerhof ed altri	18.34
Plast 2	5.33	1.80	Meyerhof ed altri	18.44
Plast 3	29.94	4.00	Meyerhof ed altri	23.24