



All results are valid for N60=33 at depth 7.92 m; Corrected SPT N1(60)~31 after Peck and Bazaraa, 1969

Table i : Input data and assumptions.

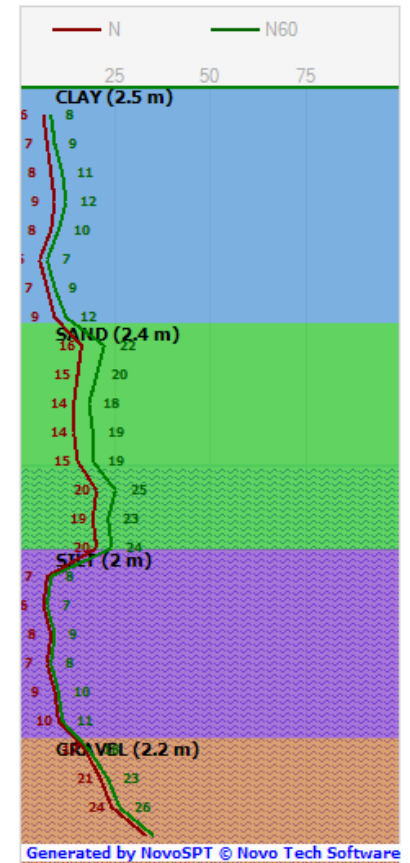
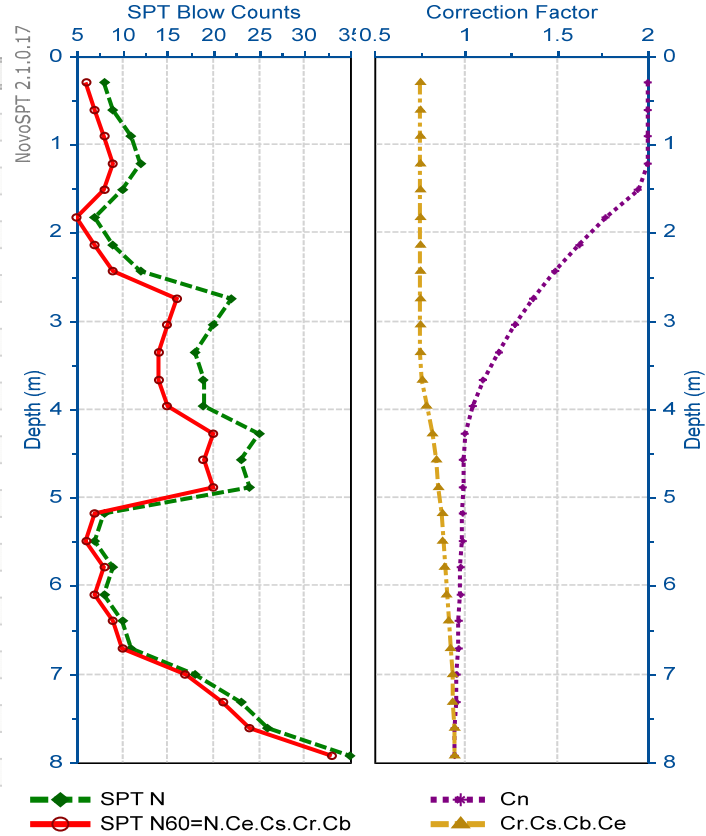
Input Parameter	Value
Footing B (m)	0.6
Footing L (m)	0.9
Footing Df (m)	0.6
Footing P (kPa)	100
Safety factor FS	3
Apply ground water cor	No
Ground water level (m)	4
Pile length (m)	5.6
Pile diameter (m)	0.3

Table ii : Soil layers from existing ground.

Thickness (m)	Unit Weig	Lithology
2.5	16.5	Clay
2.4	18.7	Sand
2	16	Silt
2.2	18	Gravel

Table iii : In-situ SPT test results.

Depth (m)	SPT Blow	N60	Cn	C
0.3	8	6	2	0.75
0.61	9	7	2	0.75
0.91	11	8	2	0.75
1.22	12	9	2	0.75
1.52	10	8	1.95	0.75
1.83	7	5	1.77	0.75
2.13	9	7	1.62	0.75
2.44	12	9	1.49	0.75
2.74	22	16	1.37	0.75
3.05	20	15	1.27	0.75
3.35	18	14	1.18	0.75
3.66	19	14	1.1	0.76
3.96	19	15	1.04	0.79
4.27	25	20	1	0.82
4.57	23	19	0.99	0.84
4.88	24	20	0.99	0.85
5.18	8	7	0.98	0.87
5.49	7	6	0.98	0.88
5.79	9	8	0.97	0.89
6.1	8	7	0.97	0.9
6.4	10	9	0.96	0.91
6.71	11	10	0.96	0.92
7.01	18	17	0.95	0.93
7.32	23	21	0.95	0.93
7.62	26	24	0.94	0.94
7.92	35	33	0.94	0.94



Young's Modulus (Es) MPa		Clay	Silt	Sand	Grvl	Comments	Ref#	Var.
Skempton, 1986	46	~	~	~	~			N60
Papadopoulos, 1992	33.9	~	~	~	~		25	N60
Mezenbach, 1961	43.2			*		Sand and gravel	25	N60
Stroud, 1988	~ 16.5 to 66	~	~	~	~	Weak rocks	47	N60
AASHTO, 1996	37.1				*	Sandy gravels	55	N1(60)

### List of 32 correlations for ::Friction Angle of Sands::

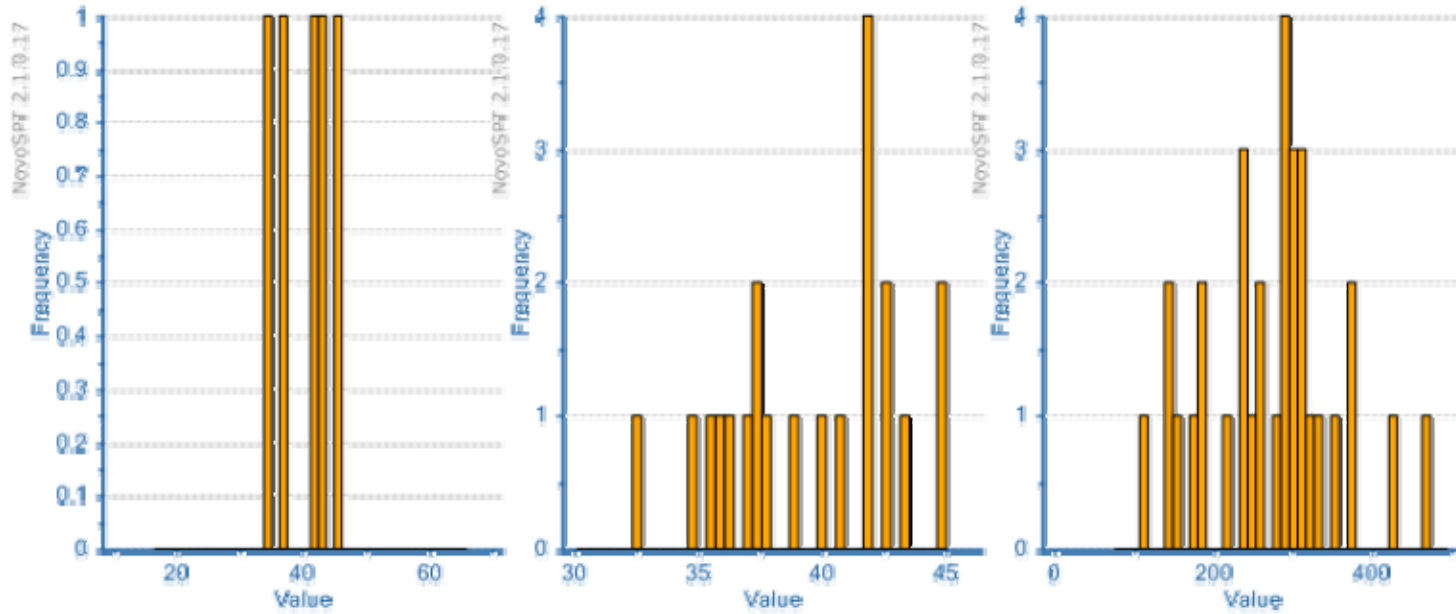
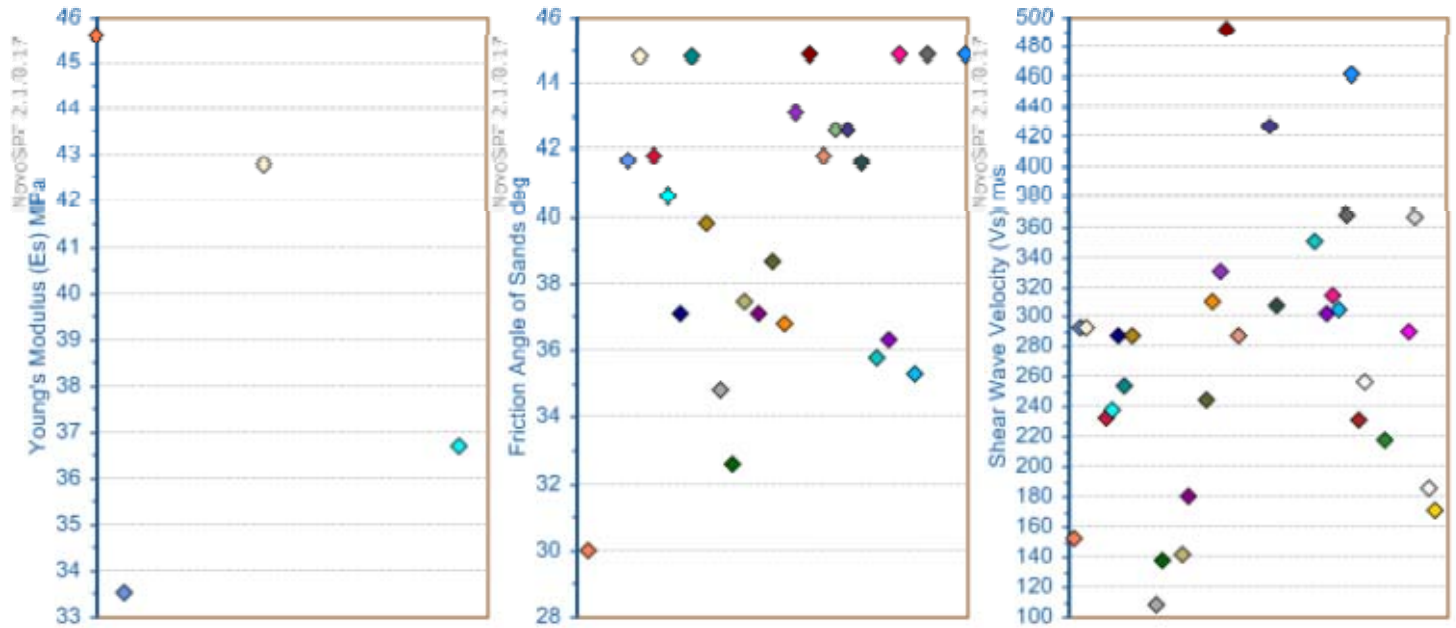
Friction Angle of Sands deg		Clay	Silt	Sand	Grvl	Comments	Ref#	Var.
Peck et al., 1953	30.1	~	~	~	~		4	N60
Hatanaka and Uchida, 1996	41.8	~	~	~	~		2	N1(60)
Hatanaka and Uchida, 1996	44.9	~	~	~	~		30,51	N1(60)
Hatanaka and Uchida, 1996	41.9	~	~	~	~		25	N1(60)
Ohsaki et al., 1959 and Kishida, 1967	40.7	~	~	~	~		4	N60
JRA, 1990	37.2	~	~	~	~	for N60>5 , Fi<=45	4	N60
Dunham, 1954	44.9			*		Angular and well-graded soils	4	N60
Dunham, 1954	39.9			*		Round and well-graded OR Angular and uniform-graded soils	4	N60
Dunham, 1954	34.9			*		Round and uniform-graded soils	4	N60
Shioi and Fukui, 1954	32.7	~	~	~	~	in general	1	N70
Shioi and Fukui, 1954	37.6	~	~	~	~	for roads and bridges	1	N70
Shioi and Fukui, 1954	37.2	~	~	~	~	for buildings	1	N70
Meyerhof, 1959	38.8	~	~	~	~	Dr from Yoshida, 1988		N60
Peck, Hanson and Thornburn, 1974	36.9	~	~	~	~	is not recommended for shallow depths (less than 1 to 2 metres)	49,51	N1(60)
Kampengsen	43.2	~	~	~	~		24	N60
Kampengsen	45	~	~	~	~		24	N1(60)
Chonburi	41.9	~	~	~	~		24	N60
Chonburi	42.7	~	~	~	~		24	N1(60)
Ayuthaya	42.7	~	~	~	~		24	N60
Ayuthaya	41.7	~	~	~	~		24	N1(60)
Wolff, 1989	35.9	~	~	~	~	an approximation based on Peck et al., 1974	30	N1(60)
Wolff, 1989	36.4	~	~	~	~	an approximation based on Peck et al., 1974	63	N60
Kulhawy and Mayne, 1990	45	~	~	~	~		30	N60
Moh, Chin, Lin and Woo, 1989	35.4			*		granular soils in Taipei	33	N1(60)
Duncan, 2004	45				*	Gravel, Cu>4	45	Dr
Schmertmann, 1975	45	~	~	~	~		51	N60

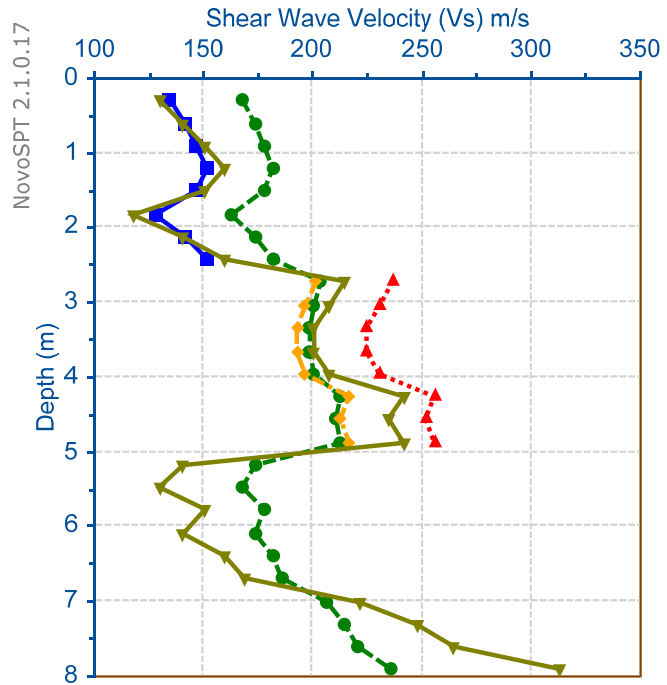
### List of 58 correlations for ::Shear Wave Velocity (Vs)::

Shear Wave Velocity (Vs) m/s		Clay	Silt	Sand	Grvl	Comments	Ref#	Var.
Kanai et al., 1966	155	*				for all soils	57	N60
Imai et al., 1975	296	*				for all soils	57	N60
Imai, 1977	296	*				for all soils	57	N60
Jinan, 1987	236	*				for all soils	57	N60
Imai and Yoshimura, 1970	241	*				for all soils	57,49	N60
Imai and Yoshimura, 1975	291	~	~	~	~	from 192 samples	31	N60
Imai and Tonouchi, 1982	257				*	for gravel		N60
Imai and Tonouchi, 1982	291	*				for all soils	57	N60
Ohta and Goto, 1978	111			*		for Holocene sands and gravels	34	N60
Ohta and Goto, 1978	141				*	for Holocene gravels	34	N60
Ohta and Goto, 1978	145			*		for Pleistocene sands and gravels	34	N60
Ohta and Goto, 1978	183				*	for Pleistocene gravels	34	N60
Ohba and Toriuma, 1970	248	~	~	~	~		49,57	N60

**List of 58 correlations for ::Shear Wave Velocity (Vs):: (... continued)**

Shear Wave Velocity (Vs) m/s		Clay	Silt	Sand	Grvl	Comments	Ref#	Var.
Iyisan	313	*				for all soils	13,57	N60
Tomio Inazaki, 2006	333	~	~	~	~	Public Works Research Institute of Japan	36	N60
Baziar, Fallah, Razeqhi and Khorasani, 1998	495	*				for all soils in Iran (function of depth)	58	N1(60)
Tamura and Yamazaki, 2002	291	~	~	~	~	function of depth		N1(60)
Ulugergerli and Uyanik, 2004	~ 76 to 487	*			*	Clay, slit and gravel in western Turkey	31	N60
Jafari et al., 1997	430	*				for all soils	57,35	N60
Yokota et al., 1991	311	*				for all soils		N60
Seed and Idriss, 1981	353	*				for all soils	57	N60
Ohsaki and Iwazaki, 1973	305			*		for coarse-grained soils		N60
Ohsaki and Iwazaki, 1973	318	*				for all soils	57	N60
Anbazhagan and Sitharam, 2008	308	~	~	~	~	based on 162 data points in Bangalore	43,50	N1(60)
Andrés Alfaro, 2007	371	~	~	~	~	function of N60	49	N60
Andrés Alfaro, 2007	464	~	~	~	~	function of N60 and depth	49	N60
National Center for Research on Earthquake Eng. (NCEE)		~	~	~	~	200 boreholes in Taiwan, function of Z and N	56	N1(60)
Hasancebi and Ulusay, 2006	260	*				for all soils	57	N60
Unal Dikmen (Ankara University), 2008	221	*				for all soils	57	N60
Fujiwara, 1972	293	*				for all soils	57	N60
Athanasopoulos, 1995	370	*				for all soils	57	N60
Sisman, 1995	189	*				for all soils	57	N60
Kiku, 2001	174	*				for all soils	57	N60





- Imai, 1977 (for clays)
- Jinan, 1987 (for all soils)
- ▲ Ohta et al., 1972 (for sand)
- ◆ JRA, 1980 (for sands)
- ▼ Iyisan (for all soils)