

ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

ATTERBERG LIMITS TEST

Project: Subsidence in Bangkok Vicinity Location: _____
 Borehole No.: A-1/1 Depth (m) 122.60-123.30 Sample No.: UD-C-3A Test No.: A-2
 Soil Description: _____ Tested By: WY Date: 5-2-1993

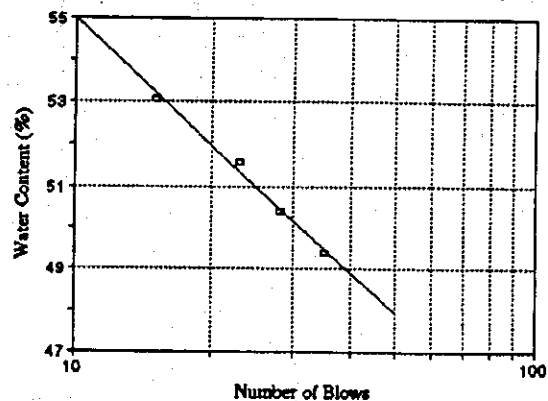
Container No.	NATURAL WATER CONTENT		PLASTIC LIMIT	
			95	3
Weight of Container	g		3.19	3.34
Weight of Wet Soil + Container	g		11.26	11.56
Weight of Dry Soil + Container	g		9.84	10.12
Weight of Water	g		1.42	1.44
Weight of Dry Soil	g		6.65	6.78
Water Content	%		21.4	21.2
Average Water Content	%		21.3	

LIQUID LIMIT

Number of Blows	15	23	28	35
Container No.	86	3	2	5
Weight of Container	g 5.54	5.44	5.41	5.47
Weight of Wet Soil + Container	g 18.72	18.78	19.91	19.90
Weight of Dry Soil + Container	g 14.15	14.24	15.05	15.13
Weight of Water	g 4.57	4.54	4.86	4.77
Weight of Dry Soil	g 8.61	8.80	9.64	9.66
Water Content	% 53.1	51.6	50.4	49.4

Nat. Water Content	=	%
Liquid Limit, LL	=	51.0 %
Plastic Limit, PL	=	21.3 %
Plasticity Index, PI	=	29.7 %
Liquidity Index, LI	=	

Remarks: _____



ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

ATTERBERG LIMITS TEST

Project: Subsidence in Bangkok Vicinity Location: _____
 Borehole No.: A-1/1 Depth (m) 154.00-154.80 Sample No.: UD-C-4A Test No.: A-1
 Soil Description: _____ Tested By: WY Date: 5-2-1993

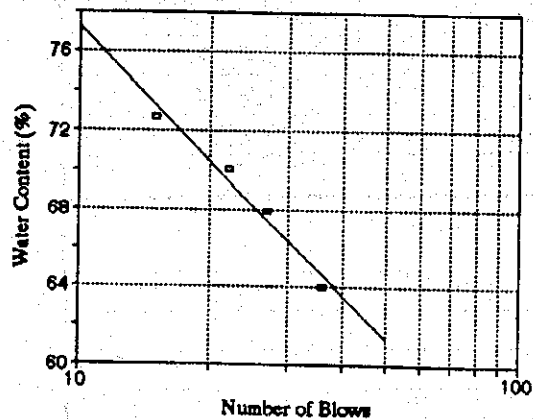
Container No.	NATURAL WATER CONTENT		PLASTIC LIMIT	
			80	77
Weight of Container	g		3.17	3.18
Weight of Wet Soil + Container	g		12.10	11.12
Weight of Dry Soil + Container	g		10.43	9.66
Weight of Water	g		1.67	1.46
Weight of Dry Soil	g		7.26	6.48
Water Content	%		23.0	22.5
Average Water Content	%		22.8	

LIQUID LIMIT

	15	22	27	38
Number of Blows	15	22	27	38
Container No.	12	4	32	1
Weight of Container	g	5.41	5.42	5.49
Weight of Wet Soil + Container	g	23.72	23.18	23.34
Weight of Dry Soil + Container	g	16.01	15.86	16.12
Weight of Water	g	7.71	7.32	7.22
Weight of Dry Soil	g	10.60	10.44	10.63
Water Content	%	72.7	70.1	67.9
				64.0

Nat. Water Content	=	42.4 %
Liquid Limit, LL	=	68.2 %
Plastic Limit, PL	=	22.8 %
Plasticity Index, PI	=	45.4 %
Liquidity Index, LI	=	0.43

Remarks: _____



ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

CONSOLIDATION

Project Subsidence in Bangkok Vicinity

Location: MINBURI

Borehole No.: A Depth (m) 20-28

Sample No.: _____

Test No.: OS-4

Soil Description: _____

Tested By: _____

SIH

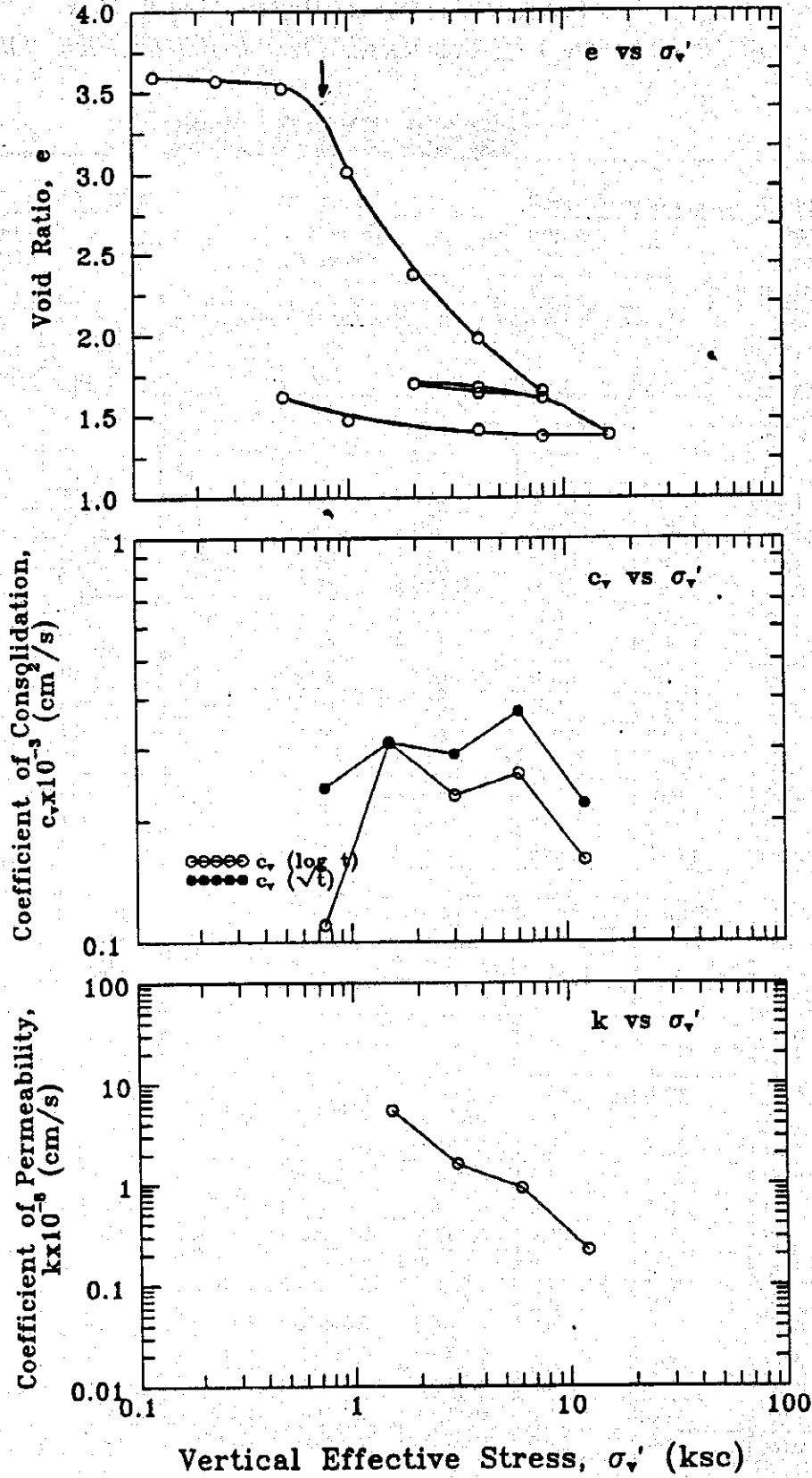
Date: 18-2-1993

Height of Solids (H_s): 0.4107 cm

Incrim No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H ₁	e ₁₀₀	e ₁	e ₅₀	e ₁₀₀	e ₁
1	0.125			1.886		0.7			3.592
2	0.25			1.875		1.3			3.565
3	0.50			1.856		2.3			3.519
4	1.00	1.753	1.646	1.597	13.4	15.9	3.268	3.008	2.888
5	2.00	1.490	1.384	1.353	27.2	28.8	2.628	2.370	2.294
6	4.00	1.290	1.223	1.220	35.6	35.8	2.141	1.978	1.971
7	8.00	1.155	1.090	1.069	42.6	43.7	1.812	1.654	1.603
8	4.00	1.070	1.084	1.086	42.9	42.8	1.605	1.639	1.644
9	2.00	1.095	1.109	1.110	41.6	41.6	1.666	1.700	1.703
10	4.00	1.105	1.099	1.097	42.2	42.3	1.691	1.676	1.671
11	8.00	1.085	1.072	1.062	43.6	44.1	1.642	1.610	1.586
12	16.00	1.017	0.978	0.962	48.5	49.4	1.476	1.381	1.342
13	8.00	0.968	0.974	0.975	48.7	48.7	1.357	1.372	1.374
14	4.00	0.982	0.990	0.995	47.9	47.6	1.391	1.411	1.423
15	1.00	1.004	1.015	1.020	46.6	46.3	1.445	1.471	1.484
16	0.50	1.047	1.075	1.083	43.4	43.0	1.549	1.617	1.637

Incrim No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 ⁸ cm/s	CR (%)
		t ₅₀	t ₉₀	\sqrt{t}	log t	Average		
1	0.125							
2	0.25							
3	0.50							
4	1.00	46.1	24.0	0.00024	0.00011	0.00017		44.4
5	2.00	25.0	5.8	0.00031	0.00031	0.00031	5.43	45.8
6	4.00	20.4	6.1	0.00029	0.00023	0.00026	1.59	28.1
7	8.00	12.6	4.2	0.00037	0.00026	0.00032	0.91	23.3
8	4.00	5.4	1.3	0.00074	0.00072	0.00073	0.25	2.6
9	2.00	10.4	20.0	0.00041	0.00005	0.00023	0.26	4.4
10	4.00	6.3	1.9	0.00069	0.00053	0.00061	0.28	1.7
11	8.00	6.3	1.8	0.00067	0.00054	0.00060	0.37	4.7
12	16.00	16.5	5.2	0.00022	0.00016	0.00019	0.22	16.4
13	8.00	6.3	1.8	0.00053	0.00043	0.00048	0.07	2.1
14	4.00	13.8	4.3	0.00025	0.00018	0.00022	0.09	2.8
15	1.00	32.6	11.0	0.00011	0.00008	0.00009	0.08	2.2
16	0.50	87.9	27.0	0.00004	0.00003	0.00004	0.44	10.5

STANDARD OEDOMETER TEST NO. OS-4
 DEPTH: 2.0-2.8 m SITE: A



ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

CONSOLIDATION

Project Subsidence in Bangkok Vicinity

Location:

MINBURI

Borehole No.: A Depth (m) 4.0-5.0

Sample No.:

Test No.: OS-5

Soil Description:

Tested By:

SIH

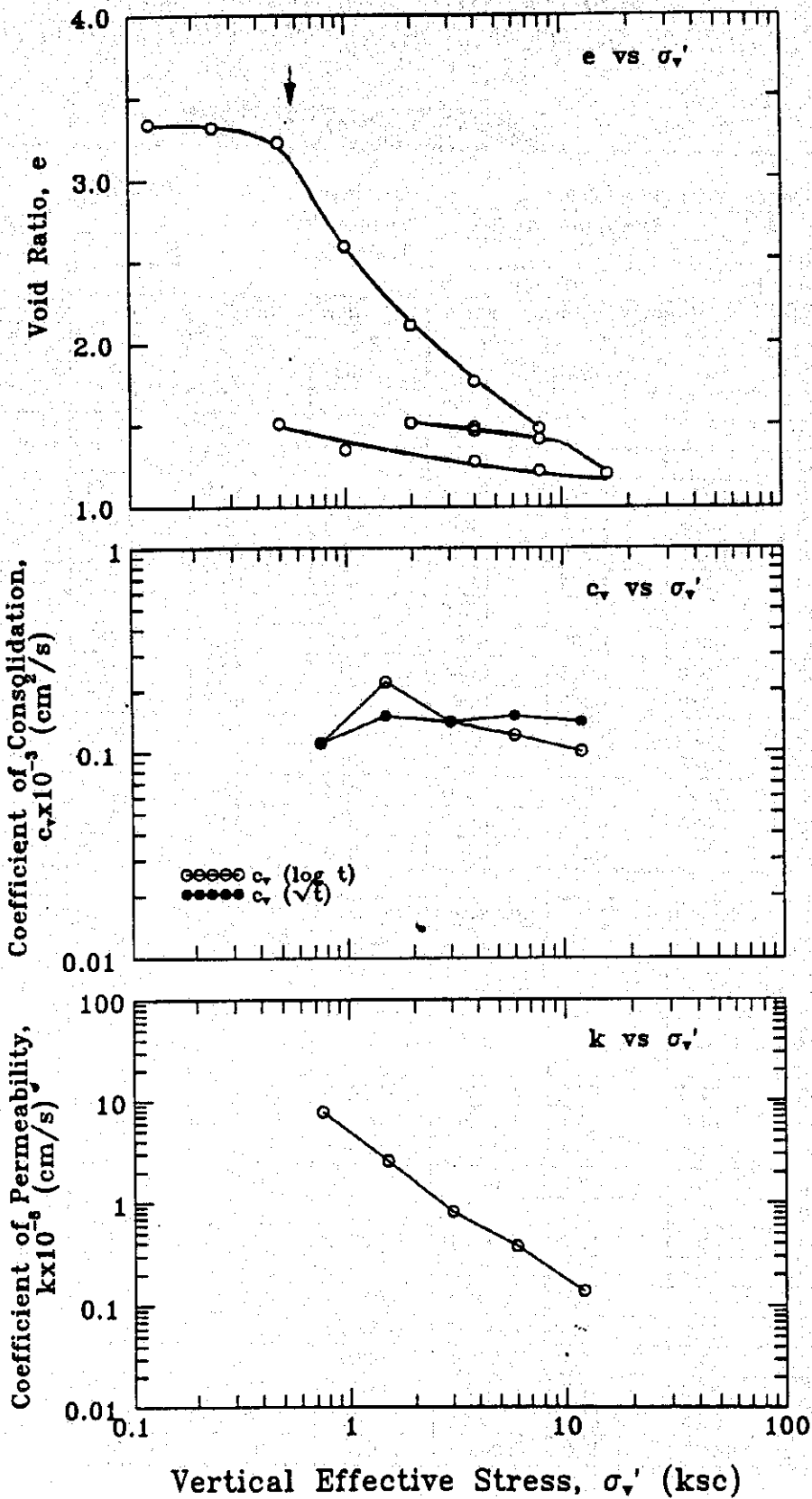
Date: 3-3-1993

Height of Solids (Hs) : 0.4375 cm

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.125			1.899		0.1			3.341
2	0.25			1.889		0.6			3.318
3	0.50			1.849		2.7			3.226
4	1.00	1.711	1.571	1.523	17.3	19.8	2.911	2.591	2.481
5	2.00	1.456	1.362	1.233	28.3	35.1	2.328	2.113	1.818
6	4.00	1.264	1.212	1.186	36.2	37.6	1.889	1.770	1.711
7	8.00	1.135	1.084	1.067	42.9	43.8	1.594	1.478	1.439
8	4.00			1.077		43.3			1.462
9	2.00	1.088	1.099	1.103	42.2	41.9	1.487	1.512	1.521
10	4.00	1.096	1.088	1.086	42.7	42.8	1.505	1.487	1.482
11	8.00	1.069	1.055	1.046	44.5	44.9	1.443	1.411	1.391
12	16.00	1.002	0.962	0.952	49.4	49.9	1.290	1.199	1.176
13	8.00	0.963	0.970	0.972	48.9	48.8	1.201	1.217	1.222
14	4.00	0.995	0.996	1.000	47.6	47.4	1.274	1.277	1.286
15	1.00	1.014	1.027	1.032	45.9	45.7	1.318	1.347	1.359
16	0.50	1.064	1.097	1.106	42.3	41.8	1.432	1.507	1.528

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁸ cm/s	CR (%)
		t ₅₀	t ₉₀	f _t	log t	Average		
1	0.125							
2	0.25							1.7
3	0.50							7.0
4	1.00	92.9	22.0	0.00011	0.00011	0.00011	7.81	48.6
5	2.00	51.0	8.0	0.00015	0.00022	0.00018	2.60	36.5
6	4.00	39.1	9.4	0.00014	0.00014	0.00014	0.83	26.2
7	8.00	30.0	8.8	0.00015	0.00012	0.00014	0.38	22.4
8	4.00							
9	2.00	40.5	10.0	0.00010	0.00010	0.00010	0.20	3.8
10	4.00	17.4	3.3	0.00024	0.00030	0.00027	0.14	1.9
11	8.00	19.4	4.0	0.00021	0.00023	0.00022	0.17	5.8
12	16.00	25.0	8.0	0.00014	0.00010	0.00012	0.14	16.3
13	8.00	14.8	3.7	0.00022	0.00021	0.00021	0.05	3.1
14	4.00	25.0	7.0	0.00014	0.00012	0.00013	0.08	4.5
15	1.00	61.8	25.0	0.00006	0.00003	0.00005	0.05	2.7
16	0.50	141.0	43.0	0.00003	0.00002	0.00002	0.33	12.2

STANDARD OEDOMETER TEST NO. OS-5
 DEPTH: 4.0-5.0 m SITE: A



ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

CONSOLIDATION

Project Subsidence in Bangkok Vicinity
Borehole No.: A Depth (m) 6.00-6.80
Soil Description: _____
Height of Solids (Hs) : 0.4188 cm

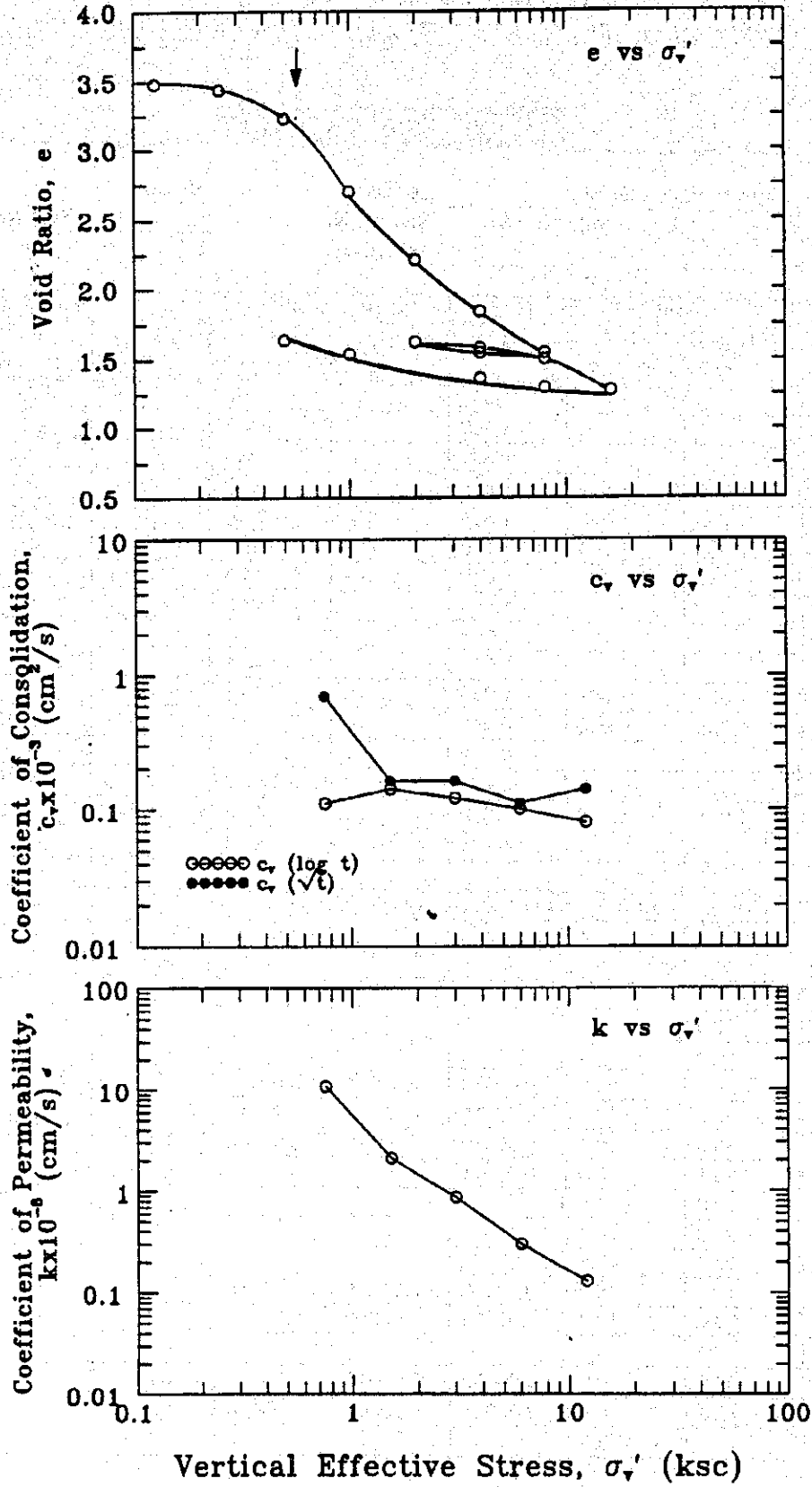
Location: _____
Sample No.: _____
Tested By: _____

Minburi
Test No.: OS-6
Date: 18-2-1993

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _t	e ₁₀₀	e _t	e ₅₀	e ₁₀₀	e _t
1	0.125			1.877		1.2			3.482
2	0.25			1.859		2.2			3.439
3	0.50			1.770		6.8			3.226
4	1.00	1.660	1.550	1.528	18.4	19.6	2.964	2.701	2.649
5	2.00	1.435	1.345	1.324	29.2	30.3	2.426	2.212	2.161
6	4.00	1.260	1.190	1.170	37.4	38.4	2.009	1.841	1.794
7	8.00	1.117	1.066	1.049	43.9	44.8	1.667	1.545	1.505
8	4.00			1.066		43.9			1.545
9	2.00			1.099		42.2			1.624
10	4.00			1.081		43.1			1.581
11	8.00	1.062	1.047	1.039	44.9	45.3	1.536	1.500	1.481
12	16.00	0.995	0.953	0.940	49.8	50.5	1.376	1.276	1.245
13	8.00			0.961		49.4			1.295
14	4.00	0.976	0.990	0.993	47.9	47.7	1.330	1.364	1.371
15	1.00	1.025	1.063	1.072	44.1	43.6	1.447	1.538	1.560
16	0.50			1.105		41.8			1.638

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁸ cm/s	CR (%)
		t ₅₀	t ₉₀	\bar{c}_v	log t	Average		
1	0.125							
2	0.25	6.3						3.1
3	0.50	16.0						15.6
4	1.00	8.2	20.0	0.00070	0.00011	0.00041	10.78	61.2
5	2.00	46.2	12.0	0.00016	0.00014	0.00015	2.11	35.8
6	4.00	35.3	10.5	0.00016	0.00012	0.00014	0.87	27.1
7	8.00	39.1	10.0	0.00011	0.00010	0.00011	0.30	21.7
8	4.00	11.6						3.0
9	2.00	25.0						5.8
10	4.00	17.6	17.6					3.1
11	8.00	16.2	16.2	0.00025	0.00006	0.00015	0.12	5.9
12	16.00	25.0	10.0	0.00014	0.00008	0.00011	0.13	16.4
13	8.00	6.3						3.7
14	4.00	36.0	8.0	0.00009	0.00010	0.00010	0.07	5.1
15	1.00	12.0	46.4	0.00031	0.00002	0.00016	0.39	6.4
16	0.50		175.3					

STANDARD OEDOMETER TEST NO. OS-6
 DEPTH: 6.0-6.8 m SITE: A



ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

CONSOLIDATION

Project Subsidence in Bangkok Vicinity
Borehole No.: A Depth (m) 8.0-8.8
Soil Description: _____
Height of Solids (Hs) : 0.5836 cm

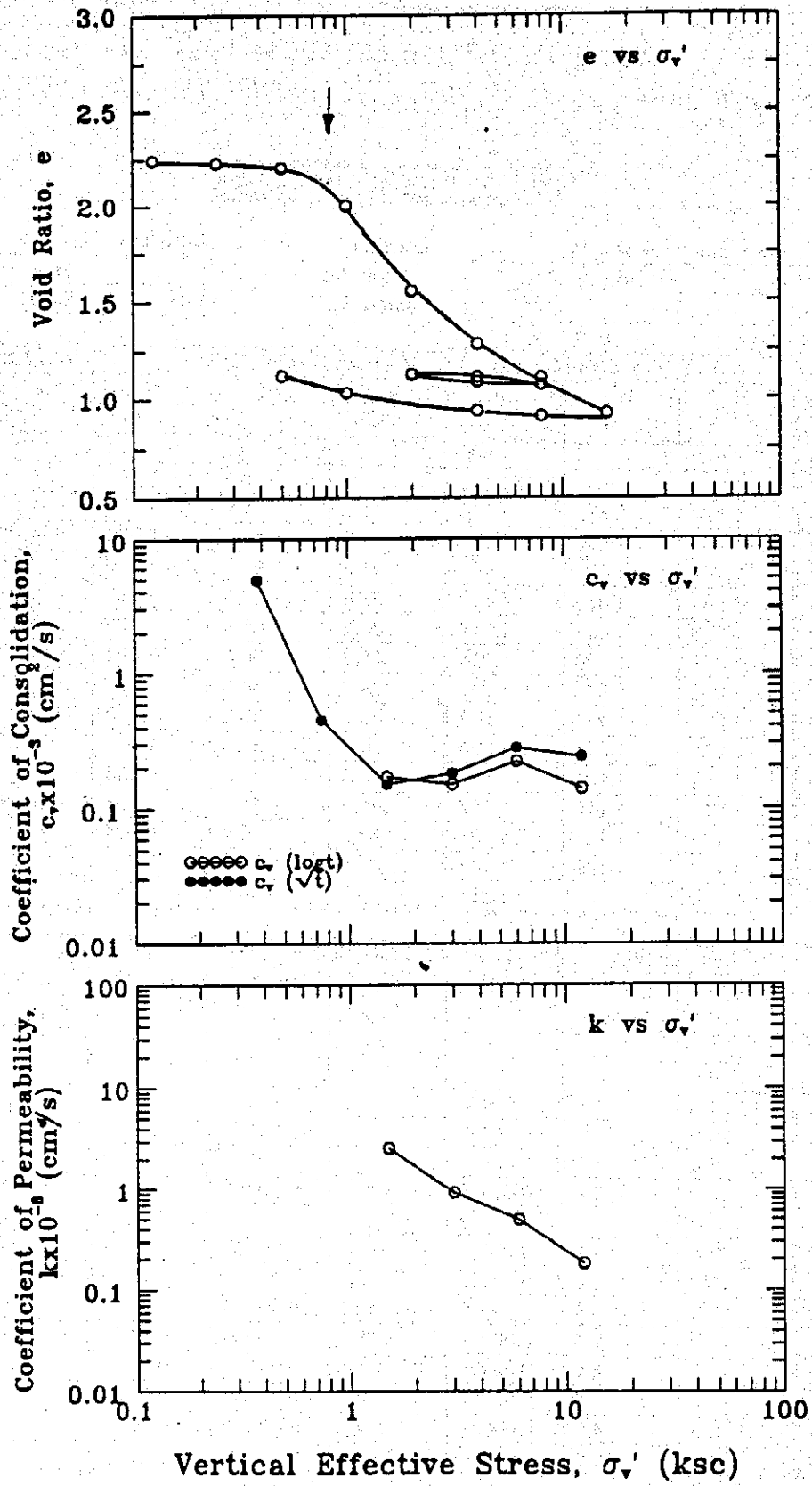
Location: _____
Sample No.: _____
Tested By: _____

MINBURI
Test No.: OS-7
Date: 18-2-1993

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.125			1.895		0.3			2.247
2	0.25			1.885		0.8			2.230
3	0.50	1.877	1.870	1.865	1.6	1.8	2.216	2.204	2.196
4	1.00	1.780	1.750	1.682	7.9	11.5	2.050	1.999	1.882
5	2.00	1.587	1.490	1.456	21.6	23.4	1.719	1.553	1.495
6	4.00	1.394	1.333	1.312	29.8	30.9	1.389	1.284	1.248
7	8.00	1.270	1.232	1.217	35.2	35.9	1.176	1.111	1.085
8	4.00	1.219	1.220	1.223	35.8	35.6	1.088	1.090	1.096
9	2.00	1.232	1.242	1.243	34.6	34.6	1.111	1.128	1.130
10	4.00	1.239	1.234	1.232	35.1	35.2	1.123	1.114	1.111
11	8.00	1.221	1.211	1.204	36.3	36.6	1.092	1.075	1.063
12	16.00	1.163	1.122	1.110	40.9	41.6	0.993	0.923	0.902
13	8.00	1.113	1.116	1.117	41.3	41.2	0.907	0.912	0.914
14	4.00	1.123	1.131	1.133	40.5	40.4	0.924	0.938	0.941
15	1.00	1.159	1.185	1.188	37.6	37.5	0.986	1.031	1.036
16	0.50			1.237		34.9			1.120

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 ⁻⁸ cm/s	CR (%)
		t ₅₀	t ₉₀	\bar{c}_v	log t	Average		
1	0.125							
2	0.25	4.0						
3	0.50	26	1.0	0.00486		0.00486		2.6
4	1.00	25.0		0.00045		0.00045		21.0
5	2.00	60.8	12.0	0.00015	0.00017	0.00016	2.56	45.5
6	4.00	37.1	11.0	0.00018	0.00015	0.00016	0.92	27.4
7	8.00	20.3	6.0	0.00028	0.00022	0.00025	0.49	17.7
8	4.00	7.5	2.8	0.00070	0.00044	0.00057	0.03	0.5
9	2.00	18.9	3.6	0.00028	0.00035	0.00031	1.11	15.9
10	4.00	7.8	0.9	0.00069	0.00140	0.00105	0.34	1.4
11	8.00	10.8	2.4	0.00049	0.00051	0.00050	0.24	4.0
12	16.00	19.9	8.0	0.00024	0.00014	0.00019	0.18	15.6
13	8.00	5.4	2.4	0.00081	0.00042	0.00062	0.04	1.0
14	4.00	13.8	4.0	0.00032	0.00026	0.00029	0.10	2.6
15	1.00	44.4	18.0	0.00011	0.00006	0.00008	0.13	4.7
16	0.50	240.0						

STANDARD OEDOMETER TEST NO. OS-7
 DEPTH: 8.0-8.8 m SITE: A



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GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

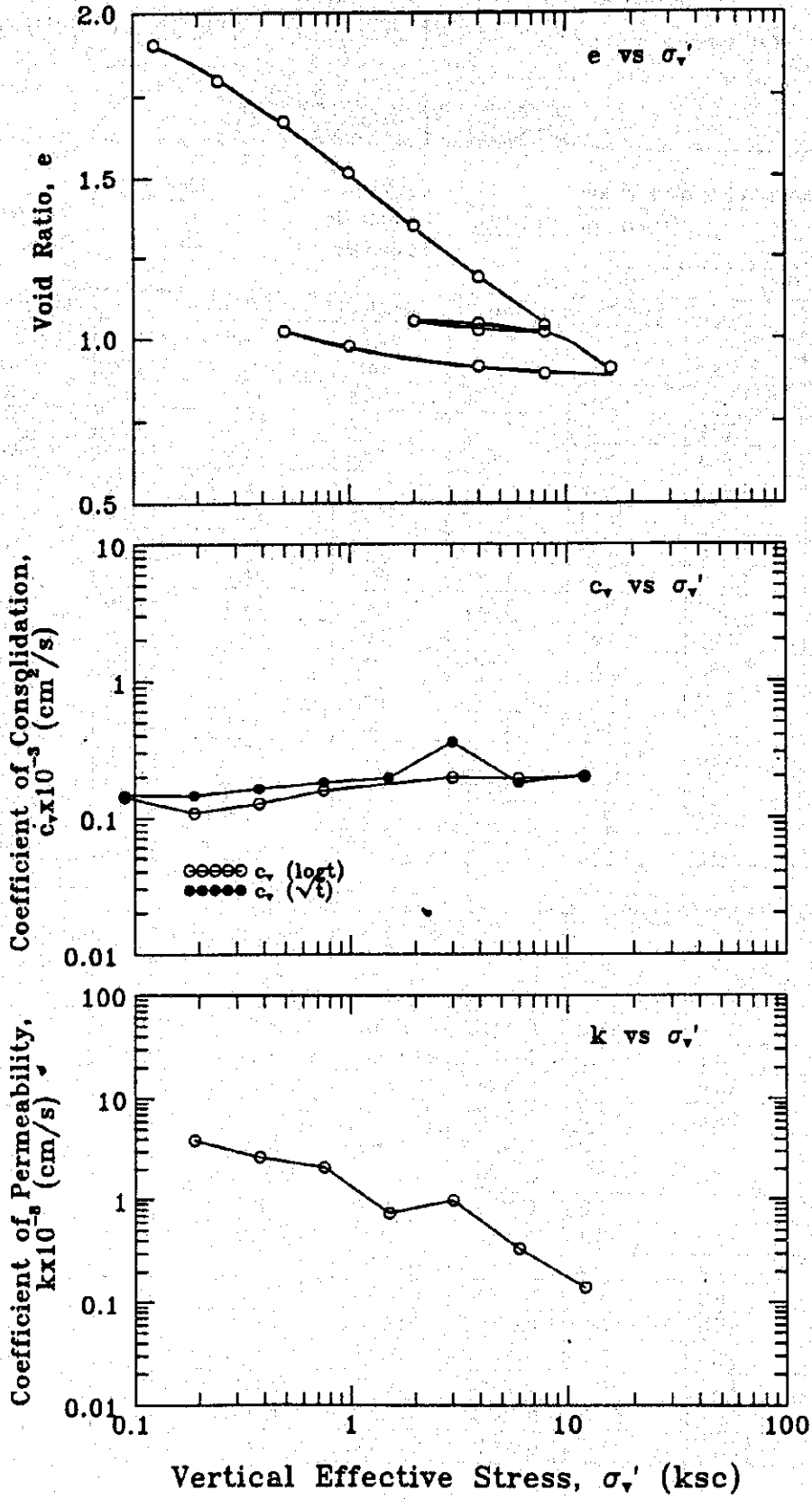
CONSOLIDATION

Project Subsidence in Bangkok Vicinity Location: Minburi
 Borehole No.: A Depth (m) 10.0-10.8 Sample No.: _____ Test No.: OS-8
 Soil Description: _____ Tested By: SIH Date: 18-2-1993
 Height of Solids (Hs) : 0.6145 cm

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.125	1.817	1.785	1.765	6.1	7.1	1.957	1.905	1.872
2	0.25	1.741	1.718	1.694	9.6	10.8	1.833	1.796	1.757
3	0.50	1.668	1.642	1.627	13.6	14.4	1.714	1.672	1.648
4	1.00	1.585	1.545	1.527	18.7	19.6	1.579	1.514	1.485
5	2.00	1.484	1.443	1.424	24.1	25.1	1.415	1.348	1.317
6	4.00	1.385	1.345	1.330	29.2	30.0	1.254	1.189	1.164
7	8.00	1.292	1.254	1.240	34.0	34.7	1.103	1.041	1.018
8	4.00	1.247	1.245	1.247	34.5	34.4	1.029	1.026	1.029
9	2.00	1.256	1.262	1.264	33.6	33.5	1.044	1.054	1.057
10	4.00	1.262	1.258	1.256	33.8	33.9	1.054	1.047	1.044
11	8.00	1.242	1.241	1.232	34.7	35.2	1.021	1.020	1.005
12	16.00	1.201	1.173	1.157	38.3	39.1	0.954	0.909	0.883
13	8.00	1.160	1.163	1.165	38.8	38.7	0.888	0.893	0.896
14	4.00	1.171	1.177	1.179	38.1	37.9	0.906	0.915	0.919
15	1.00	1.197	1.215	1.219	36.1	35.8	0.948	0.977	0.984
16	0.50	1.231	1.243	1.246	34.6	34.4	1.003	1.023	1.028

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _v x 10 ⁻⁸ cm/s	CR (%)
		t ₅₀	t ₉₀	\bar{c}_v	log t	Average		
1	0.125	79.1	19.0	0.00015	0.00014	0.00015		
2	0.25	73.5	23.0	0.00015	0.00011	0.00013	3.88	11.7
3	0.50	60.1	18.0	0.00016	0.00013	0.00015	2.63	13.3
4	1.00	48.9	13.0	0.00018	0.00016	0.00017	2.07	17.0
5	2.00	39.8	98.0	0.00020	0.00002	0.00011	0.73	17.8
6	4.00	19.1	8.0	0.00035	0.00020	0.00028	0.97	17.1
7	8.00	32.8	7.1	0.00018	0.00019	0.00019	0.33	15.9
8	4.00	7.2	1.3	0.00076	0.00098	0.00087	0.09	0.9
9	2.00	17.8	5.3	0.00031	0.00024	0.00028	0.19	3.0
10	4.00	6.4	1.3	0.00088	0.00101	0.00094	0.15	0.7
11	8.00	8.8	1.8	0.00062	0.00070	0.00066	0.22	3.0
12	16.00	25.0	5.9	0.00020	0.00020	0.00020	0.14	11.9
13	8.00	10.0	5.0	0.00048	0.00022	0.00035	0.02	1.0
14	4.00	16.2	5.1	0.00030	0.00022	0.00026	0.08	2.4
15	1.00	63.7	24.0	0.00008	0.00005	0.00006	0.07	3.3
16	0.50	172.3	61.0	0.00003	0.00002	0.00003	0.12	4.9

STANDARD OEDOMETER TEST NO. OS-8
 DEPTH: 10.0-10.8 m SITE: A



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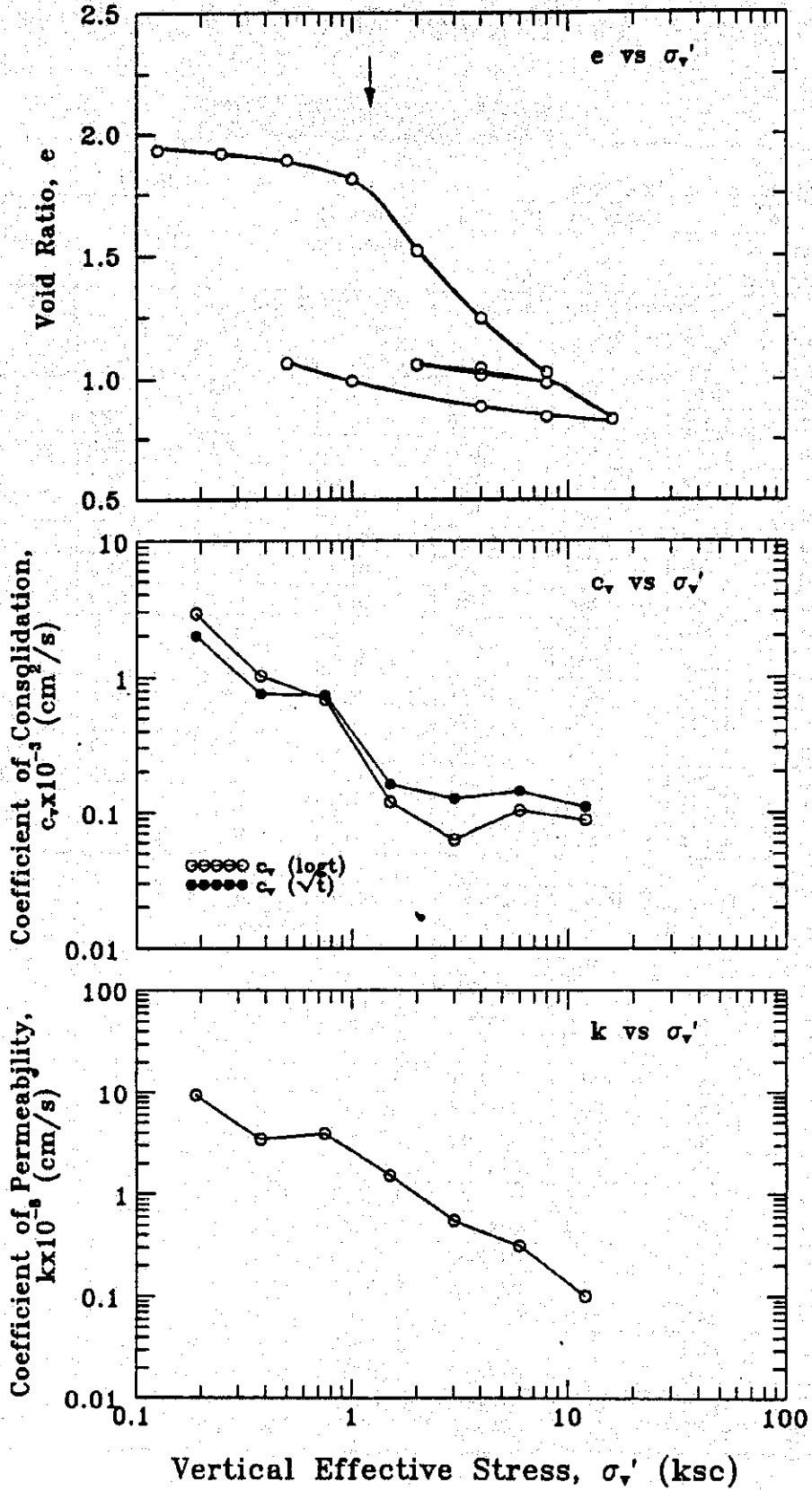
Project Subsidence in Bangkok Vicinity
Borehole No.: A Depth (m) 12.0-12.8
Soil Description: _____
Height of Solids (Hs) : 0.6443 cm

Location: MINBURI
Sample No.: _____ Test No.: OS-9
Tested By: SIH Date: 18-2-1993

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₉₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₉₀	e ₁₀₀	e _f
1	0.125	1.892	1.889	1.888	0.6	0.6	1.937	1.932	1.930
2	0.25	1.883	1.880	1.875	1.1	1.3	1.923	1.918	1.910
3	0.50	1.869	1.862	1.856	2.0	2.3	1.901	1.890	1.881
4	1.00	1.834	1.812	1.787	4.6	5.9	1.847	1.812	1.774
5	2.00	1.706	1.625	1.591	14.5	16.3	1.648	1.522	1.469
6	4.00	1.519	1.447	1.423	23.8	25.1	1.358	1.246	1.209
7	8.00	1.370	1.307	1.289	31.2	32.2	1.126	1.029	1.001
8	4.00	1.295	1.301	1.303	31.5	31.4	1.010	1.019	1.022
9	2.00	1.310	1.327	1.330	30.2	30.0	1.033	1.060	1.064
10	4.00	1.324	1.318	1.315	30.6	30.8	1.055	1.046	1.041
11	8.00	1.296	1.279	1.270	32.7	33.2	1.011	0.985	0.971
12	16.00	1.228	1.183	1.173	37.7	38.3	0.906	0.836	0.821
13	8.00	1.183	1.190	1.191	37.4	37.3	0.836	0.847	0.849
14	4.00	1.205	1.217	1.221	35.9	35.7	0.870	0.889	0.895
15	1.00	1.254	1.285	1.295	32.4	31.8	0.946	0.994	1.010
16	0.50	1.314	1.330	1.333	30.0	29.8	1.039	1.064	1.069

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _v × 10 ⁻⁸ cm/s	CR (%)
		t ₉₀	t ₅₀	\sqrt{t}	log t	Average		
1	0.125	3.8	1.2	0.00336	0.00245	0.00291		
2	0.25	6.3	1.0	0.00200	0.00291	0.00246	9.39	1.6
3	0.50	16.2	2.8	0.00076	0.00102	0.00089	3.43	3.1
4	1.00	16.0	4.0	0.00074	0.00069	0.00072	3.90	8.7
5	2.00	64.0	20.0	0.00016	0.00012	0.00014	1.52	32.7
6	4.00	64.5	30.0	0.00013	0.00006	0.00009	0.55	31.1
7	8.00	46.2	15.0	0.00014	0.00010	0.00012	0.31	24.5
8	4.00	14.1	4.0	0.00042	0.00034	0.00038	0.09	2.1
9	2.00	39.1	3.4	0.00016	0.00041	0.00028	0.28	4.5
10	4.00	14.4	4.3	0.00043	0.00033	0.00038	0.13	1.6
11	8.00	25.0	5.5	0.00024	0.00025	0.00024	0.18	6.8
12	16.00	49.0	14.0	0.00011	0.00009	0.00010	0.10	16.8
13	8.00	11.6	5.0	0.00043	0.00023	0.00033	0.02	1.2
14	4.00	29.9	13.0	0.00017	0.00009	0.00013	0.07	4.7
15	1.00	110.3	34.0	0.00005	0.00004	0.00004	0.08	5.9
16	0.50	342.3	600.0	0.00002		0.00001	0.06	7.9

STANDARD OEDOMETER TEST NO. OS-9
 DEPTH: 12.0-12.8 m SITE: A



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CONSOLIDATION

Project Subsidence in Bangkok Vicinity

Location: Minburi

Borehole No.: A Depth (m) 14.0-15.0

Sample No.:

Test No.: OS-10

Soil Description:

Tested By:

SIH

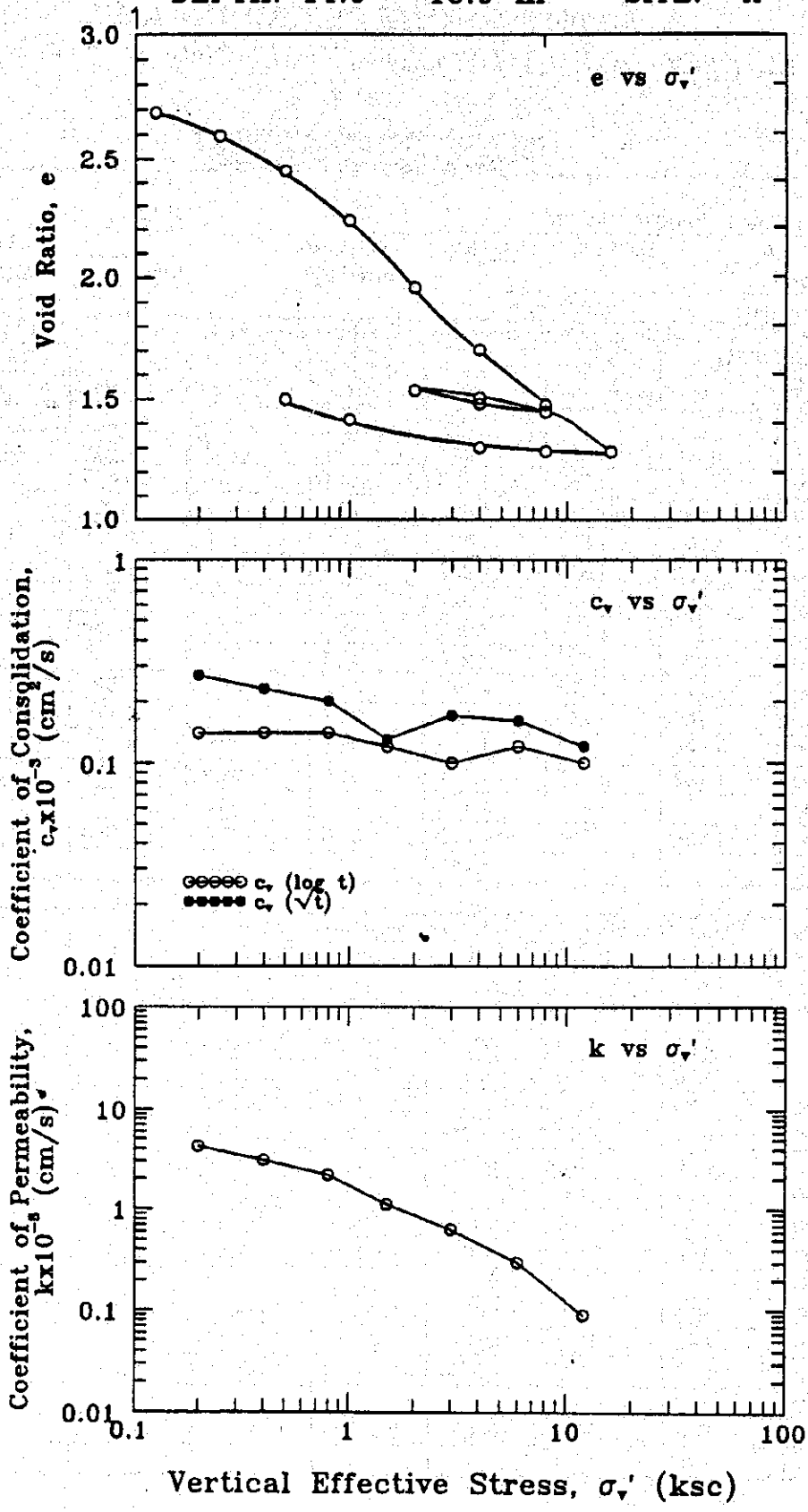
Date: 28-2-92

Height of Solids (Hs) : 0.507 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.125			1.870		1.6			2.688
2	0.25	1.845	1.822	1.811	4.1	4.7	2.639	2.594	2.572
3	0.50	1.780	1.747	1.738	8.1	8.5	2.510	2.446	2.427
4	1.00	1.686	1.639	1.625	13.7	14.5	2.325	2.233	2.205
5	2.00	1.562	1.500	1.482	21.1	22.0	2.081	1.959	1.922
6	4.00	1.426	1.370	1.355	27.9	28.7	1.813	1.702	1.672
7	8.00	1.305	1.255	1.243	33.9	34.6	1.574	1.475	1.452
8	4.00	1.247	1.258	1.259	33.8	33.7	1.460	1.481	1.484
9	2.00	1.270	1.285	1.288	32.4	32.2	1.505	1.535	1.540
10	4.00	1.279	1.270	1.271	33.2	33.1	1.523	1.505	1.507
11	8.00	1.256	1.240	1.232	34.7	35.2	1.477	1.446	1.430
12	16.00	1.194	1.158	1.147	39.1	39.6	1.355	1.284	1.262
13	8.00	1.153	1.159	1.161	39.0	38.9	1.274	1.286	1.289
14	4.00			1.166		38.6			1.301
15	1.00	1.195	1.224	1.230	35.6	35.3	1.356	1.415	1.425
16	0.50			1.267		33.3			1.498

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻³ cm/s	CR (%)
		t ₅₀	t ₉₀	\sqrt{t}	log t	Average		
1	0.125							
2	0.25	44.9	20.0	0.00027	0.00014	0.00020	4.24	13.6
3	0.50	49.0	19.0	0.00023	0.00014	0.00018	3.07	13.1
4	1.00	49.0	17.0	0.00020	0.00014	0.00017	2.18	18.9
5	2.00	64.0	17.0	0.00013	0.00012	0.00013	1.12	24.3
6	4.00	41.5	16.0	0.00017	0.00010	0.00014	0.63	22.7
7	8.00	38.4	12.0	0.00016	0.00012	0.00014	0.30	20.1
8	4.00	16.5	5.0	0.00033	0.00026	0.00029	0.09	2.6
9	2.00	38.5	9.0	0.00015	0.00015	0.00015	0.16	4.7
10	4.00							
11	8.00	30.3	5.4	0.00018	0.00024	0.00021	0.13	5.2
12	16.00	42.7	12.0	0.00012	0.00010	0.00011	0.09	14.3
13	8.00	19.4	6.0	0.00024	0.00018	0.00021	0.03	2.1
14	4.00							
15	1.00	77.4	34.0	0.00007	0.00003	0.00005	3.32	5.1
16	0.50							

STANDARD OEDOMETER TEST NO. OS-10
 DEPTH: 14.0 - 15.0 m SITE: A



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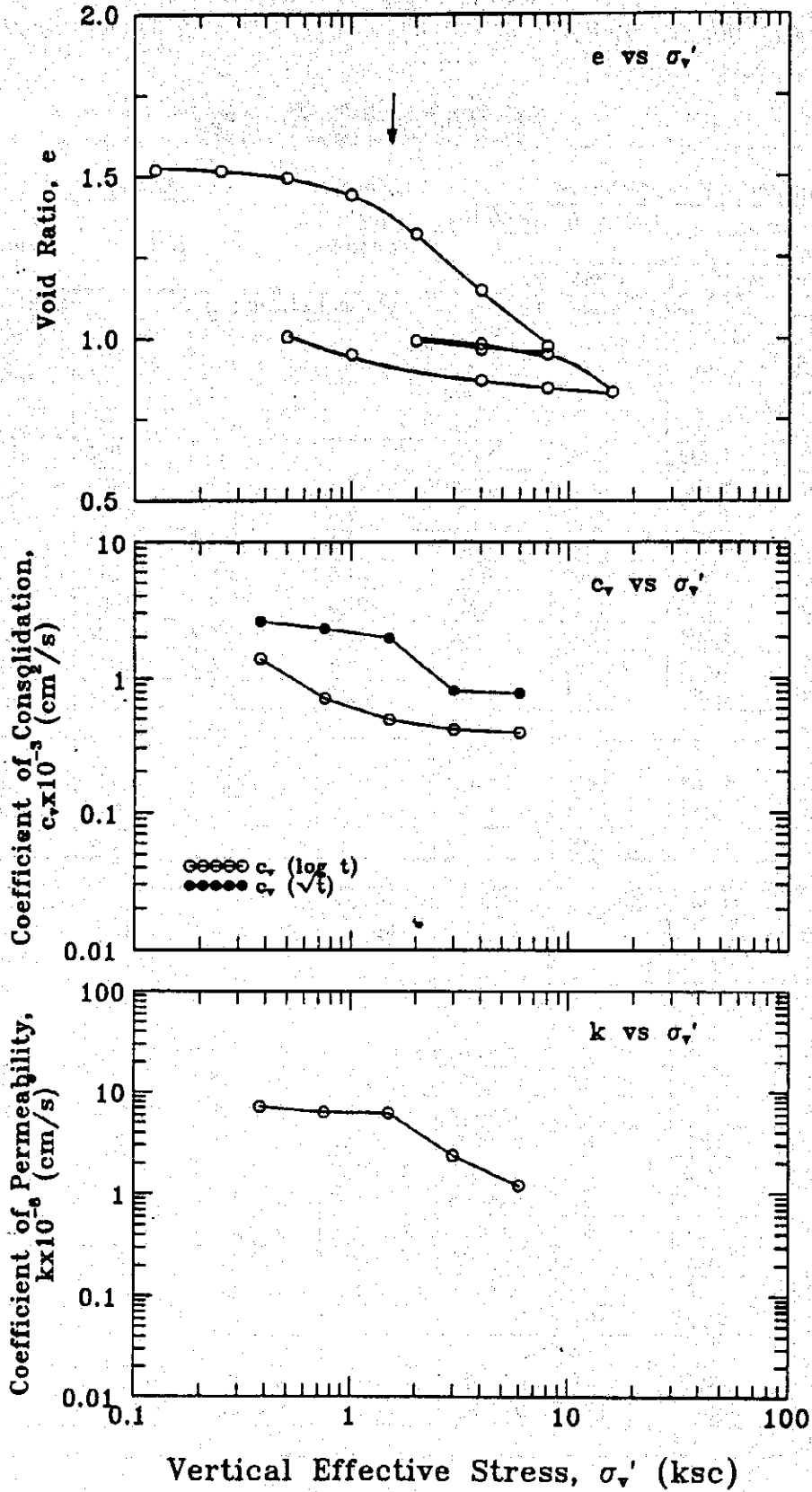
Project Subsidence in Bangkok Vicinity
Borehole No.: A Depth (m) 16.00-16.8
Soil Description: _____
Height of Solids (H_s): 0.7536 cm

Location: Minburi
Sample No.: _____
Tested By: SIH Test No.: OS-19
Date: 18-2-1993

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₈₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₈₀	e ₁₀₀	e _f
1	0.125			1.899		0.1			1.520
2	0.25			1.897		0.2			1.517
3	0.50	1.886	1.880	1.876	1.1	1.3	1.503	1.495	1.489
4	1.00	1.857	1.841	1.834	3.1	3.5	1.464	1.443	1.434
5	2.00	1.791	1.750	1.741	7.9	8.4	1.377	1.322	1.310
6	4.00	1.677	1.619	1.600	14.8	15.8	1.225	1.148	1.123
7	8.00	1.540	1.490	1.470	21.6	22.6	1.044	0.977	0.951
8	4.00	1.477	1.483	1.483	21.9	21.9	0.960	0.968	0.968
9	2.00	1.494	1.503	1.505	20.9	20.8	0.982	0.994	0.997
10	4.00	1.500	1.495	1.493	21.3	21.4	0.990	0.984	0.981
11	8.00	1.482	1.471	1.465	22.6	22.9	0.967	0.952	0.944
12	16.00			1.383		27.2			0.835
13	8.00			1.393		26.7			0.848
14	4.00	1.403	1.411	1.414	25.7	25.6	0.862	0.872	0.876
15	1.00	1.443	1.471	1.477	22.6	22.3	0.915	0.952	0.960
16	0.50	1.900	1.900	1.512		20.4	1.521		1.006

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁸ cm/s	CR (%)
		t ₈₀	t ₉₀	\sqrt{t}	log t	Average		
1	0.125							
2	0.25							0.3
3	0.50	4.8	2.1	0.00260	0.00139	0.00199	7.18	3.0
4	1.00	5.3	4.0	0.00230	0.00071	0.00150	6.30	6.8
5	2.00	5.8	5.4	0.00197	0.00049	0.00123	6.22	15.9
6	4.00	12.3	5.6	0.00081	0.00041	0.00061	2.37	22.9
7	8.00	10.9	5.0	0.00077	0.00039	0.00058	1.20	22.6
8	4.00	11.7	0.9	0.00066	0.00199	0.00132	0.29	2.3
9	2.00	10.9	5.2	0.00072	0.00035	0.00054	0.36	3.5
10	4.00	16.2	2.4	0.00049	0.00077	0.00063	0.17	1.4
11	8.00	6.9	2.3	0.00113	0.00078	0.00096	0.39	4.2
12	16.00	22.3	9.0					14.3
13	8.00	5.7	1.6					1.7
14	4.00	20.4	3.6	0.00034	0.00045	0.00040	0.13	3.7
15	1.00	30.7	13.5	0.00024	0.00013	0.00018	0.25	5.5
16	0.50							

STANDARD OEDOMETER TEST NO. OS-19
 DEPTH: 16.0 - 16.8 m SITE: A



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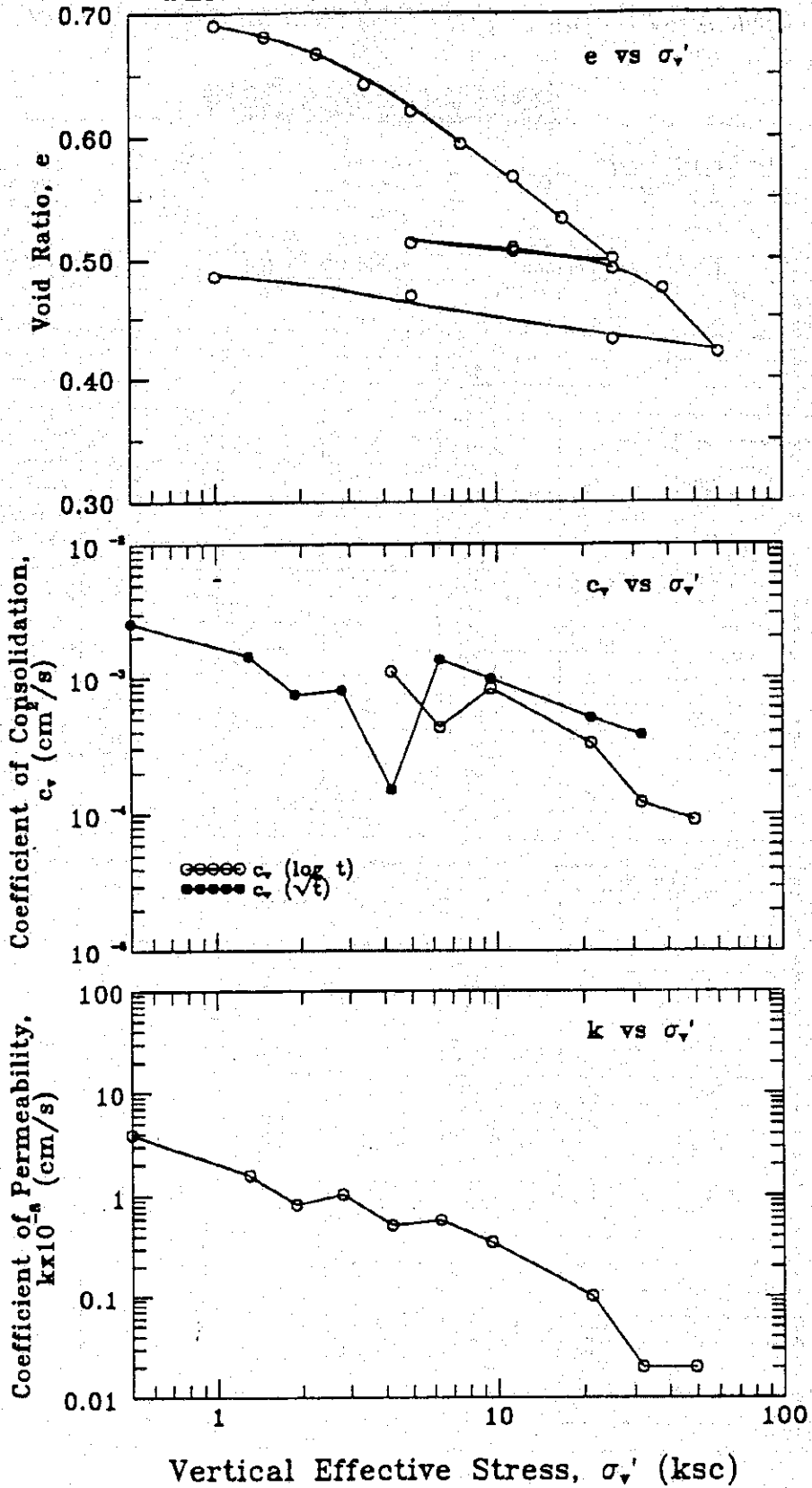
Project: Subsidence in Bangkok Vicinity
 Borehole No.: A Depth (m) 31-32
 Soil Description: _____
 Height of Solids (Hs) : 1.105 cm

Location: Minburi
 Sample No.: _____ Test No.: OH-19
 Tested By: SIH Date: 5-93
 Height of Sample (Hi) : 1.900 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	S			1.896		0.2			0.716
2	1.0			1.868		1.7			0.690
3	1.5			1.857		2.2			0.681
4	2.3			1.842		3.1			0.667
5	3.4			1.815		4.5			0.643
6	5.0	1.798	1.791	1.790	5.7	5.8	0.627	0.621	0.620
7	7.5	1.766	1.761	1.758	7.3	7.5	0.598	0.594	0.591
8	11.5	1.743	1.731	1.728	8.9	9.1	0.577	0.567	0.564
9	17.0			1.695		10.8			0.534
10	25.6	1.673	1.659	1.654	12.7	12.9	0.514	0.501	0.497
11	11.5			1.669		12.2			0.510
12	5.0		1.673	1.670	11.9	12.1		0.514	0.512
13	11.5			1.665		12.4			0.507
14	25.6		1.649	1.648	13.2	13.3		0.492	0.491
15	38.5	1.635	1.630	1.628	14.2	14.3	0.479	0.475	0.473
16	60.0	1.595	1.570	1.565	17.4	17.6	0.443	0.421	0.416
17	25.6			1.582		16.7			0.432
18	5.0		1.623	1.624	14.6	14.6		0.469	0.469
19	1.0		1.642	1.643	13.6	13.5		0.486	0.487

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁸ cm/s	CR (%)
		t ₉₀	t ₅₀	t	log t	Average		
1	S							
2	1.0	4.8		0.00257		0.00257	3.90	
3	1.5	8.4		0.00145		0.00145	1.59	3.0
4	2.3	16.0		0.00075		0.00075	0.83	4.6
5	3.4	14.4		0.00081		0.00081	1.04	7.9
6	5.0	74.0	2.4	0.00015	0.00111	0.00063	0.52	7.9
7	7.5	8.1	6.0	0.00136	0.00043	0.00089	0.58	9.0
8	11.5	10.9	3.0	0.00098	0.00083	0.00091	0.35	8.5
9	17.0							10.2
10	25.6	19.4	7.0	0.00051	0.00033	0.00042	0.10	12.1
11	11.5							2.3
12	5.0							0.2
13	11.5							0.8
14	25.6							2.5
15	38.5	25.0	18.0	0.00038	0.00012	0.00025	0.02	5.6
16	60.0		22.0		0.00009	0.00009	0.02	16.4
17	25.6							2.4
18	5.0							3.1
19	1.0							1.5

HIGH STRESS OEDOMETER NO. OH-19
 DEPTH: 31- 32.0 m SITE: A



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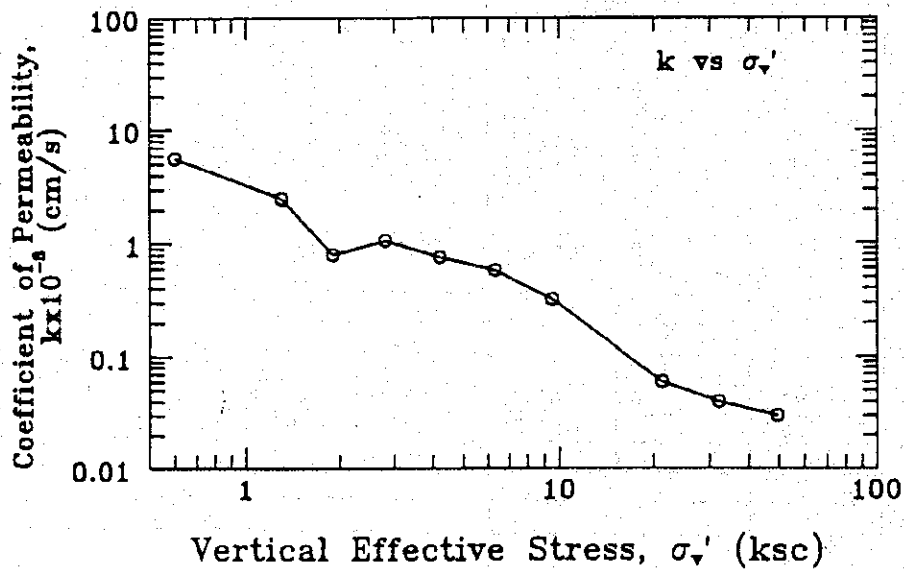
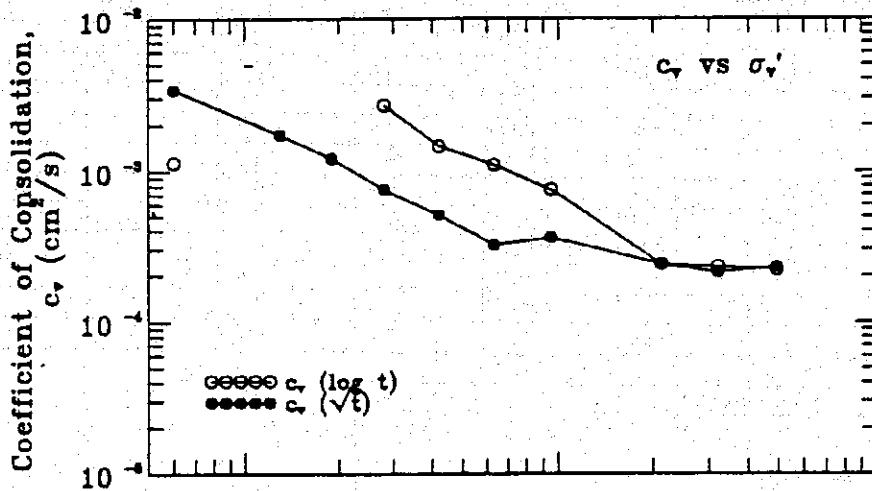
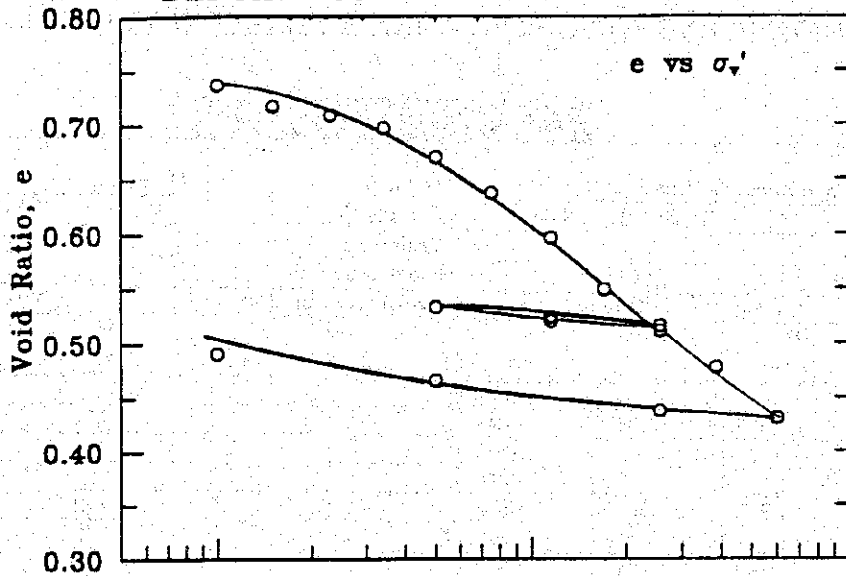
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: Minburi
 Borehole No.: A Depth (m) 33-34 Sample No.: _____ Test No.: OH-20
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (Hs): 1.065 cm Height of Sample (Hi): 1.900 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.892		0.4			0.776
2	1.0	1.865	1.850	1.842	2.6	3.1	0.751	0.737	0.730
3	1.5			1.829		3.7			0.717
4	2.3			1.820		4.2			0.709
5	3.4	1.813	1.807	1.801	4.9	5.2	0.702	0.697	0.691
6	5.0	1.787	1.779	1.779	6.4	6.4	0.678	0.670	0.670
7	7.5	1.755	1.743	1.740	8.3	8.4	0.648	0.637	0.634
8	11.5	1.718	1.700	1.697	10.5	10.7	0.613	0.596	0.593
9	17.0			1.650		13.2			0.549
10	25.6	1.634	1.615	1.612	15.0	15.2	0.534	0.516	0.514
11	11.5			1.623		14.6			0.524
12	5.0		1.633	1.632	14.1	14.1		0.533	0.532
13	11.5			1.619		14.8			0.520
14	25.6		1.609	1.608	15.3	15.4		0.511	0.510
15	38.5	1.589	1.574	1.571	17.1	17.3	0.492	0.478	0.475
16	60.0	1.544	1.524	1.522	19.8	19.9	0.450	0.431	0.429
17	25.6			1.531		19.4			0.438
18	5.0			1.561		17.9			0.466
19	1.0		1.588	1.589	16.4	16.4		0.491	0.492

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁶ cm/s	CR (%)
		t ₉₀	t ₅₀	t _v	log t	Average		
1	0.1							
2	1.0	3.6	2.5	0.00341	0.00114	0.00228	5.63	2.6
3	1.5	6.8		0.00174		0.00174	2.50	3.9
4	2.3	9.6		0.00122		0.00122	0.80	2.7
5	3.4	15.2	1.0	0.00076	0.00270	0.00173	1.06	5.5
6	5.0	22.1	1.8	0.00051	0.00146	0.00098	0.76	8.8
7	7.5	33.6	2.3	0.00032	0.00110	0.00071	0.58	10.7
8	11.5	29.1	3.2	0.00036	0.00076	0.00056	0.32	12.2
9	17.0							14.6
10	25.6	39.1	9.0	0.00024	0.00024	0.00024	0.06	11.2
11	11.5							1.7
12	5.0							1.3
13	11.5							1.9
14	25.6							1.6
15	38.5	43.5	9.0	0.00021	0.00023	0.00022	0.04	10.3
16	60.0	36.0	9.0	0.00023	0.00022	0.00023	0.03	13.7
17	25.6							1.3
18	5.0							2.2
19	1.0							2.1

HIGH STRESS OEDOMETER NO. OH-20
 DEPTH: 33-34 m SITE: A



ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

CONSOLIDATION

Project: Subsidence in Bangkok Vicinity

Location: Minburi

Borehole No.: A Depth (m) 35-36

Sample No.:

Test No.: OH-18

Soil Description:

Tested By: SIH

Date: 5-93

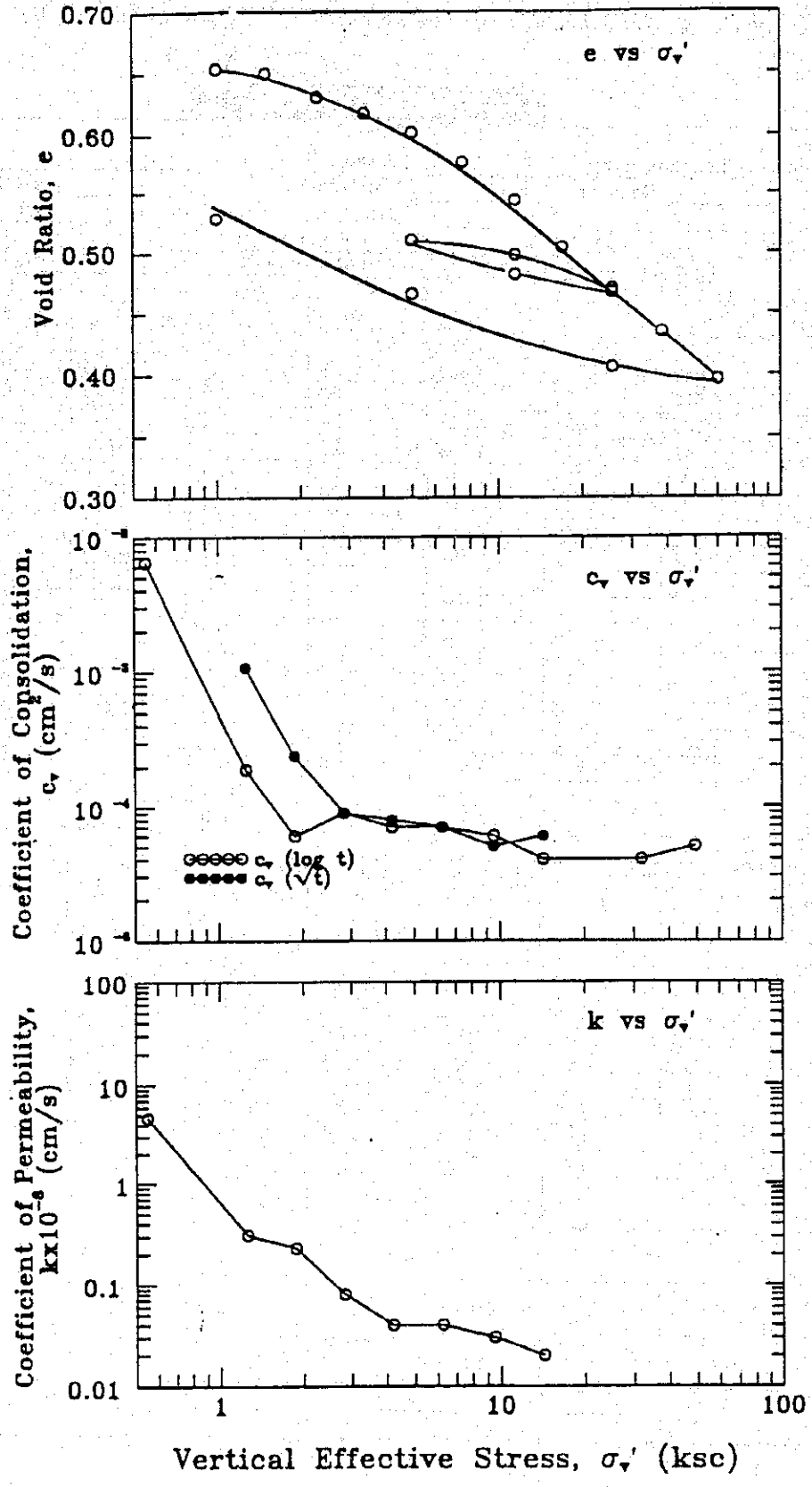
Height of Solids (H_s): 1.137 cm

Height of Sample (H_i): 1.900 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.893		0.4			0.665
2	1.0	1.882	1.880	1.880	1.0	1.0	0.655	0.654	0.654
3	1.5	1.878	1.876	1.875	1.3	1.3	0.652	0.650	0.649
4	2.3	1.866	1.854	1.858	2.4	2.2	0.641	0.631	0.634
5	3.4	1.847	1.840	1.839	3.2	3.2	0.624	0.618	0.617
6	5.0	1.829	1.822	1.818	4.1	4.3	0.609	0.602	0.599
7	7.5	1.804	1.793	1.789	5.7	5.8	0.587	0.577	0.573
8	11.5	1.771	1.755	1.752	7.6	7.8	0.558	0.544	0.541
9	17.0	1.724	1.711	1.709	9.9	10.1	0.516	0.505	0.503
10	25.6			1.672		12.0			0.471
11	11.5		1.687	1.688	11.2	11.2		0.483	0.484
12	5.0		1.718	1.718	9.6	9.6		0.511	0.511
13	11.5		1.704	1.704	10.3	10.3		0.499	0.498
14	25.6		1.669	1.665	12.2	12.4		0.468	0.464
15	38.5	1.644	1.632	1.626	14.1	14.4	0.446	0.435	0.430
16	60.0	1.604	1.587	1.581	16.5	16.8	0.410	0.396	0.391
17	25.6		1.599	1.600	15.8	15.8		0.406	0.407
18	5.0			1.668		12.2			0.467
19	1.0			1.738		8.5			0.529

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁶ cm/s	CR (%)
		t ₉₀	t ₅₀	$\frac{t}{t_0}$	log t	Average		
1	0.1							
2	1.0		0.5		0.00646	0.00646	4.68	0.6
3	1.5	11.6	15.0	0.00107	0.00019	0.00063	0.31	1.4
4	2.3	50.4	50.0	0.00024	0.00006	0.00015	0.23	6.5
5	3.4	128.0	30.0	0.00009	0.00009	0.00009	0.08	4.1
6	5.0	156.0	40.0	0.00008	0.00007	0.00007	0.04	5.8
7	7.5	156.0	40.0	0.00007	0.00007	0.00007	0.04	8.7
8	11.5	205.0	43.0	0.00005	0.00006	0.00006	0.03	10.6
9	17.0	188.0	65.0	0.00006	0.00004	0.00005	0.02	13.6
10	25.6							11.0
11	11.5							2.4
12	5.0							4.4
13	11.5							2.0
14	25.6							5.3
15	38.5		60.0		0.00004	0.00004	0.01	11.0
16	60.0		44.0		0.00005	0.00005	0.01	12.3
17	25.6							2.7
18	5.0							5.0
19	1.0							5.3

HIGH STRESS OEDOMETER NO. OH-18
 DEPTH: 35- 36.0 m SITE: A



ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

CONSOLIDATION

Project: Subsidence in Bangkok Vicinity

Location: Minburi

Borehole No.: A Depth (m) 60-61

Sample No.: _____

Test No.: OH-21

Soil Description: _____

Tested By: _____

SIH

Date: 5-93

Height of Solids (H_s): 1.149 cm

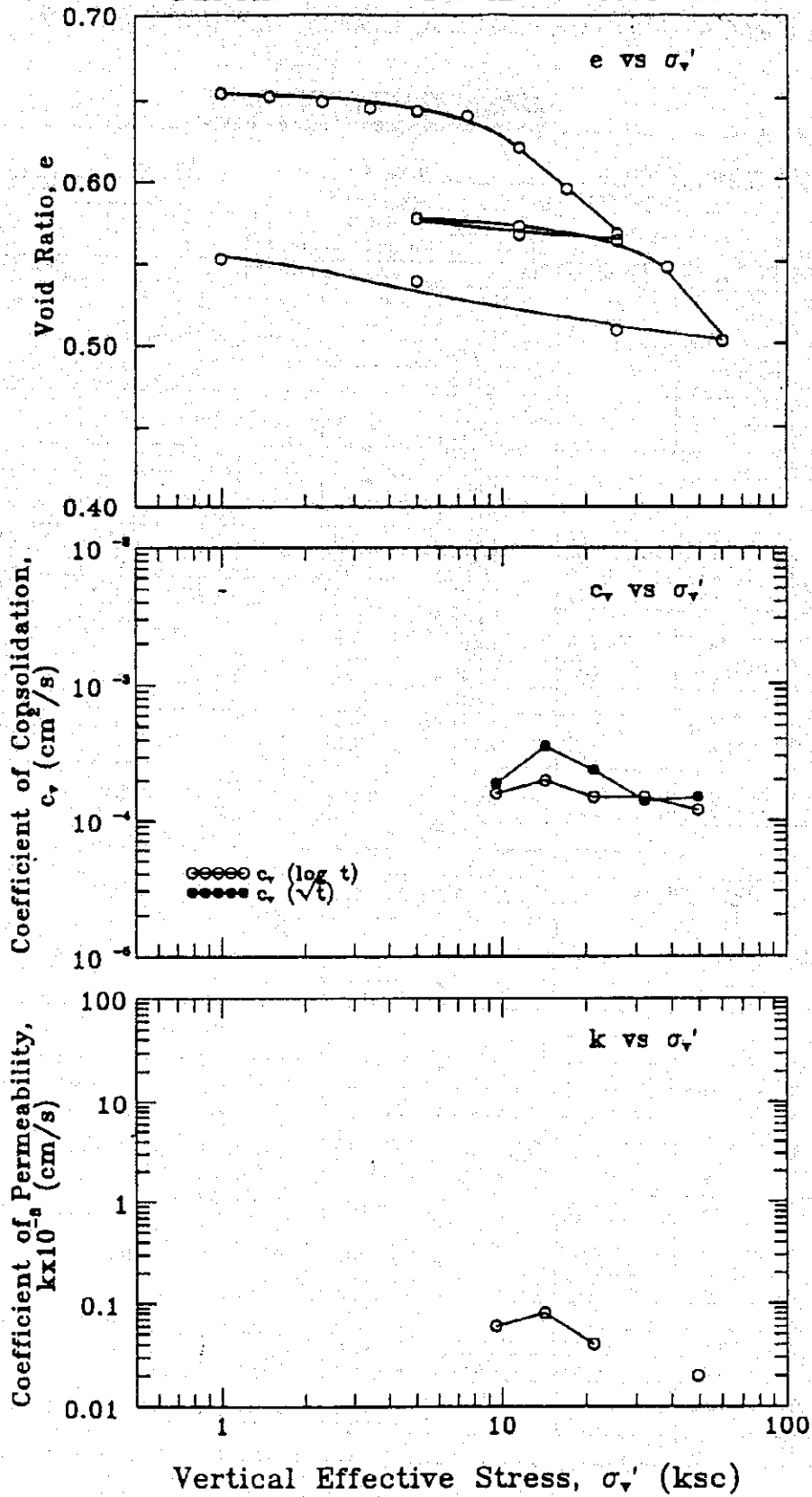
Height of Sample (H_i): _____

1.900 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	S			1.903		-0.2			0.656
2	1.0			1.900					0.654
3	1.5			1.899		0.1			0.652
4	2.3			1.895		0.3			0.649
5	3.4			1.891		0.5			0.645
6	5.0			1.888		0.6			0.643
7	7.5			1.885		0.8			0.640
8	11.5	1.872	1.861	1.861	2.0	2.1	0.629	0.620	0.620
9	17.0	1.845	1.831	1.828	3.6	3.8	0.606	0.594	0.591
10	25.6	1.810	1.796	1.794	5.5	5.6	0.575	0.563	0.561
11	11.5			1.801		5.2			0.567
12	5.0	1.807	1.812	1.814	4.6	4.5	0.572	0.577	0.579
13	11.5	1.809	1.806	1.805	4.9	5.0	0.574	0.572	0.571
14	25.6			1.800		5.3			0.567
15	38.5	1.791	1.778	1.774	6.4	6.6	0.559	0.547	0.544
16	60.0	1.745	1.726	1.720	9.2	9.5	0.519	0.502	0.497
17	25.6			1.734		8.7			0.509
18	5.0	1.761	1.769	1.770	6.9	6.8	0.533	0.539	0.540
19	1.0			1.784		6.1			0.553

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁹ cm/s	CR (%)
		t ₉₀	t ₅₀	$\frac{t}{\log t}$	log t	Average		
1	S							
2	1.0							
3	1.5							0.4
4	2.3							1.0
5	3.4							1.4
6	5.0							0.9
7	7.5							0.9
8	11.5	64.0	18.0	0.00019	0.00016	0.00018	0.06	6.8
9	17.0	33.6	14.0	0.00036	0.00020	0.00028	0.08	9.4
10	25.6	49.0	18.0	0.00024	0.00015	0.00019	0.04	10.5
11	11.5							1.1
12	5.0		9.0		0.00030	0.00030	0.03	1.9
13	11.5		2.2		0.00122	0.00122	0.08	0.8
14	25.6							0.8
15	38.5	81.0	17.0	0.00014	0.00015	0.00015	0.01	7.7
16	60.0	72.2	20.0	0.00015	0.00012	0.00014	0.02	14.2
17	25.6							2.0
18	5.0		30		0.00008	0.00008	0.01	2.7
19	1.0							1.1

HIGH STRESS OEDOMETER NO. OH-21
 DEPTH: 60-61.0 m SITE: A



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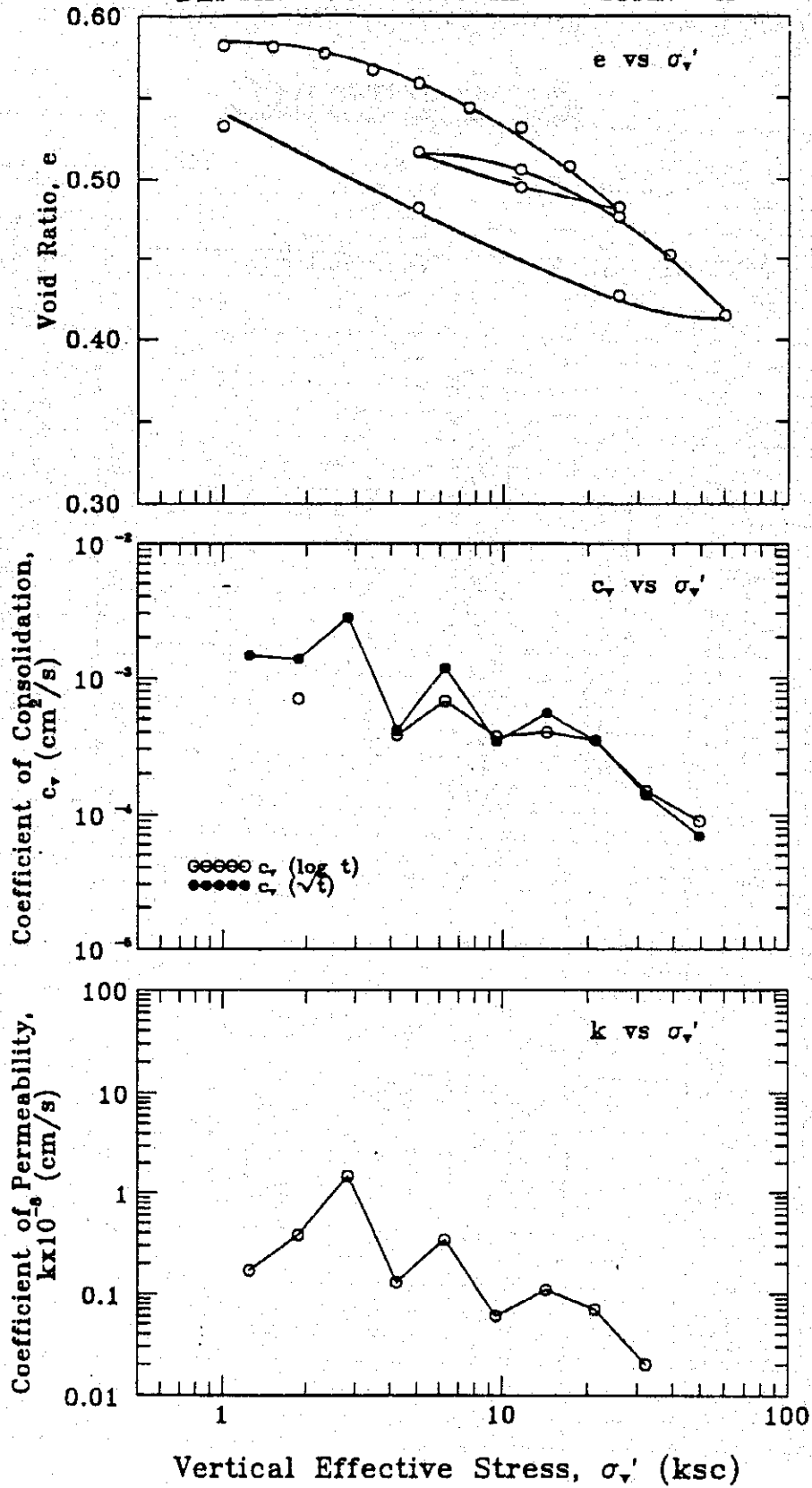
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: Minburi
 Borehole No.: A Depth (m) 78-79 Sample No.: _____ Test No.: OH-22
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.307 cm Height of Sample (H_i): 2.070 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	S								
2	1.0			2.068		0.1			0.582
3	1.5			2.067		0.2			0.581
4	2.3	2.063	2.061	2.061	0.4	0.4	0.578	0.577	0.577
5	3.4			2.049		1.0			0.567
6	5.0	2.041	2.038	2.037	1.6	1.6	0.562	0.559	0.559
7	7.5	2.023	2.019	2.018	2.5	2.5	0.548	0.544	0.544
8	11.5	2.003	2.003	1.997	3.2	3.5	0.533	0.532	0.528
9	17.0	1.979	1.971	1.969	4.8	4.9	0.514	0.508	0.507
10	25.6	1.949	1.938	1.936	6.4	6.5	0.491	0.482	0.481
11	11.5	1.950	1.954	1.955	5.6	5.5	0.492	0.495	0.496
12	5.0	1.976	1.983	1.986	4.2	4.1	0.512	0.517	0.520
13	11.5	1.974	1.968	1.967	4.9	5.0	0.510	0.506	0.505
14	25.6	1.945	1.930	1.926	6.8	7.0	0.488	0.476	0.474
15	38.5	1.913	1.898	1.897	8.3	8.4	0.463	0.452	0.451
16	60.0	1.871	1.850	1.845	10.7	10.9	0.431	0.415	0.412
17	25.6	1.8588	1.865	1.866	9.9	9.9	0.422	0.427	0.428
18	5.0			1.937		6.4			0.482
19	1.0	1.941	2.004	2.010	3.2	2.9	0.485	0.533	0.538

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁸ cm/s	CR (%)
		t ₉₀	t ₅₀	Δt	log t	Average		
1	S							
2	1.0							
3	1.5	10.2		0.00147		0.00147	0.17	0.3
4	2.3	10.9	5.0	0.00138	0.00070	0.00104	0.38	1.6
5	3.4	5.3		0.00280		0.00280	1.47	3.3
6	5.0	36.0	9.0	0.00041	0.00038	0.00039	0.13	3.3
7	7.5	12.3	5.0	0.00118	0.00067	0.00093	0.34	5.3
8	11.5	42.3	9.0	0.00034	0.00037	0.00035	0.06	4.1
9	17.0	25.0	8.0	0.00055	0.00040	0.00048	0.11	9.0
10	25.6	38.4	9.0	0.00035	0.00035	0.00035	0.07	9.1
11	11.5							2.7
12	5.0							4.1
13	11.5							2.0
14	25.6							5.4
15	38.5	94.7	20.0	0.00014	0.00015	0.00014	0.02	8.6
16	60.0	169.0	32.0	0.00007	0.00009	0.00008	0.01	12.2
17	25.6							2.7
18	5.0							4.8
19	1.0							5.1

HIGH STRESS OEDOMETER NO. OH-22
 DEPTH: 78- 79.0 m SITE: A



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GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

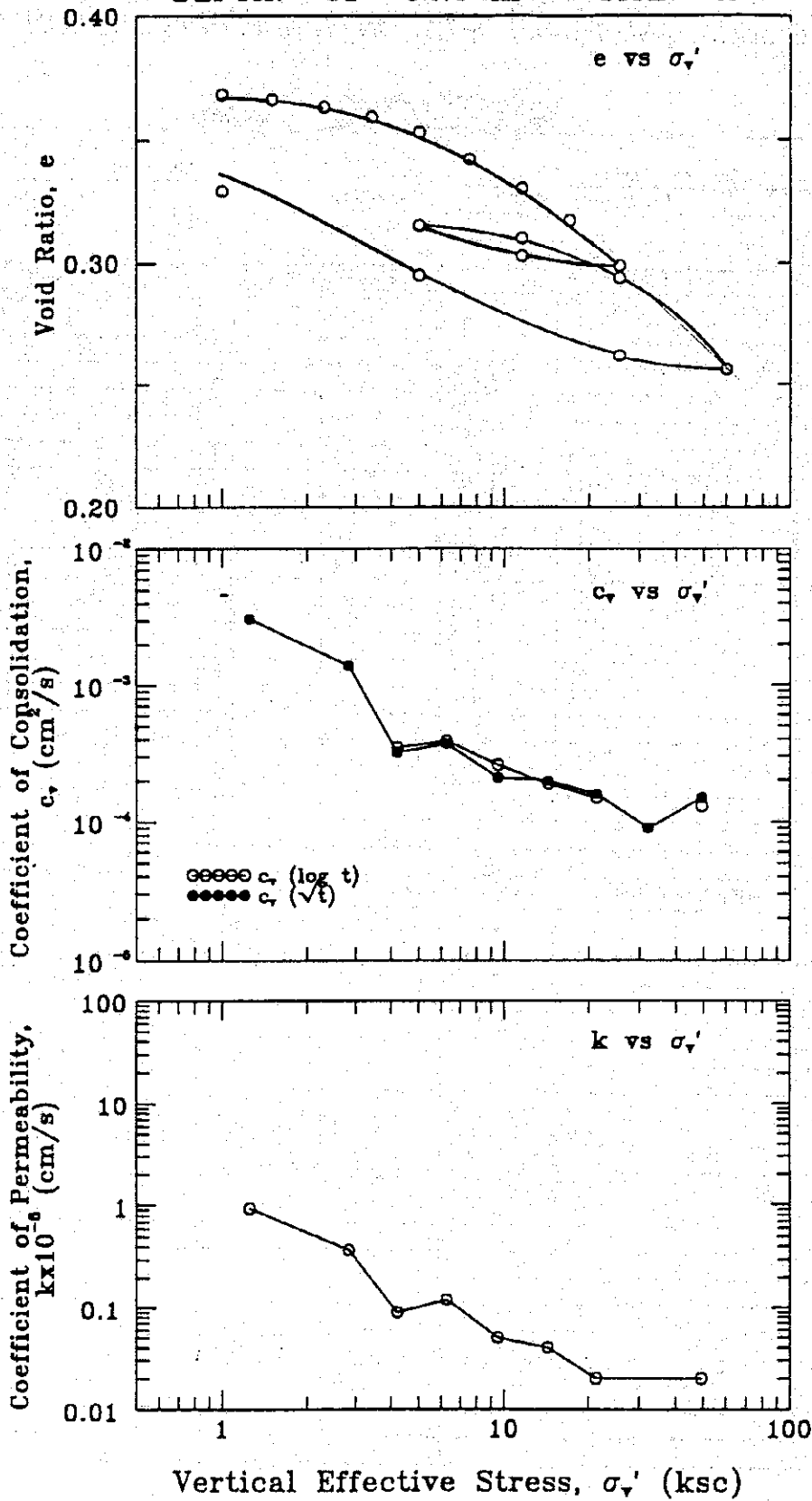
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 81-82 Sample No.: _____ Test No.: OH-23
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.452 cm Height of Sample (H_i): 2.000 cm

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	ε ₁₀₀	ε _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.992		0.4			0.372
2	1.0			1.986		0.7			0.368
3	1.5			1.983		0.8			0.366
4	2.3			1.979		1.0			0.363
5	3.4	1.975	1.973	1.972	1.3	1.4	0.360	0.359	0.358
6	5.0	1.967	1.964	1.964	1.8	1.8	0.355	0.353	0.353
7	7.5	1.952	1.949	1.949	2.5	2.5	0.344	0.342	0.342
8	11.5	1.938	1.931	1.931	3.4	3.4	0.335	0.330	0.330
9	17.0	1.918	1.912	1.911	4.4	4.4	0.321	0.317	0.316
10	25.6	1.895	1.886	1.884	5.7	5.8	0.305	0.299	0.298
11	11.5		1.892	1.893	5.4	5.4		0.303	0.304
12	5.0		1.909	1.912	4.5	4.4		0.315	0.317
13	11.5		1.902	1.904	4.9	4.8		0.310	0.311
14	25.6		1.879	1.885	6.1	5.8		0.294	0.298
15	38.5			1.877		6.2			0.293
16	60.0	1.835	1.824	1.823	8.8	8.9	0.264	0.256	0.256
17	25.6			1.833		8.4			0.262
18	5.0			1.880		6.0			0.295
19	1.0			1.930		3.5			0.329

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 ⁻⁸ cm/s	CR (%)
		t ₉₀	t ₅₀	√t	log t	Average		
1	0.1							
2	1.0							0.2
3	1.5	4.5		0.00309		0.00309	0.93	0.9
4	2.3							1.1
5	3.4	9.9		0.00139		0.00139	0.37	2.0
6	5.0	42.3	9.0	0.00032	0.00035	0.00034	0.09	2.7
7	7.5	36.0	8.0	0.00037	0.00039	0.00038	0.12	4.3
8	11.5	64.0	12.0	0.00021	0.00026	0.00023	0.05	4.8
9	17.0	64.0	16.0	0.00020	0.00019	0.00020	0.04	5.6
10	25.6	81.0	20.0	0.00016	0.00015	0.00015	0.02	7.3
11	11.5							1.3
12	5.0							2.6
13	11.5							1.0
14	25.6							3.3
15	38.5	132.0		0.00009		0.00009	0.00	2.3
16	60.0	81.0	22.0	0.00015	0.00013	0.00014	0.02	14.0
17	25.6							1.4
18	5.0							3.3
19	1.0							3.6

HIGH STRESS OEDOMETER NO. OH-23
 DEPTH: 81-82.0 m SITE: A



ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

CONSOLIDATION

Project: Subsidence in Bangkok Vicinity
 Borehole No.: A Depth (m) 84-85
 Soil Description: _____
 Height of Solids (Hs) : 1.35 cm

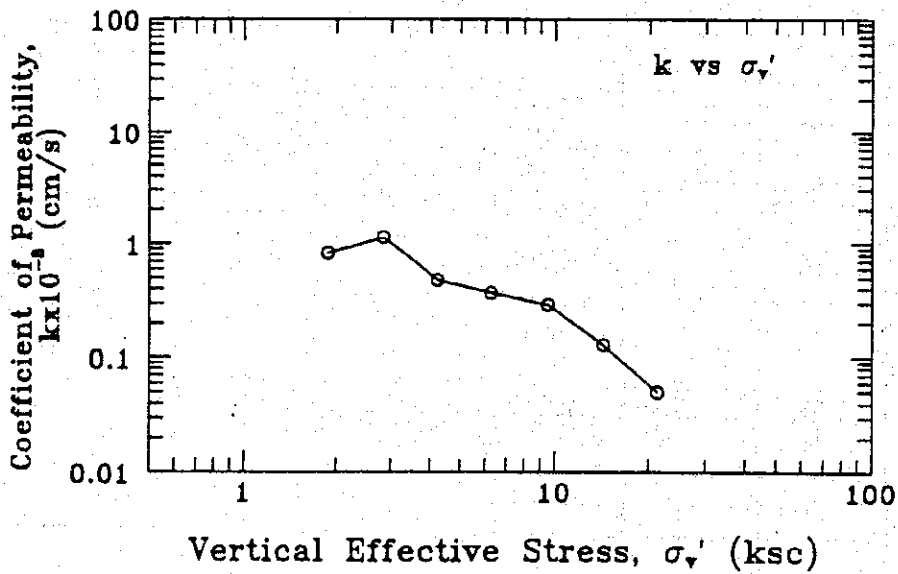
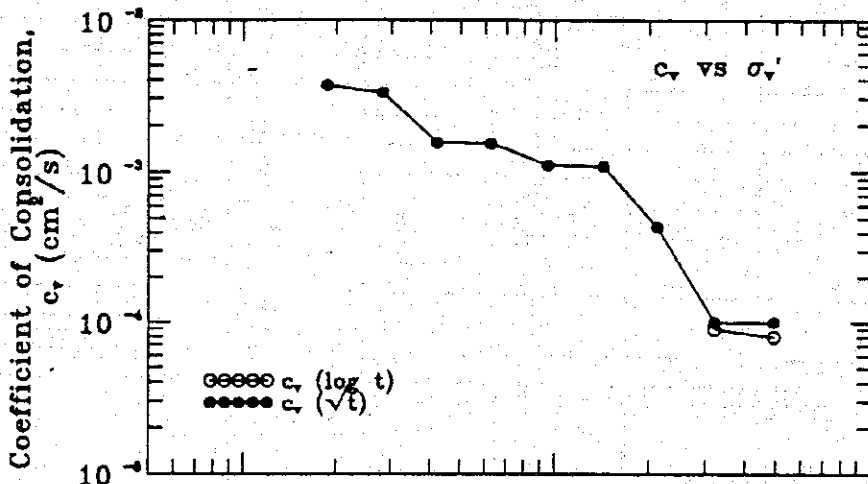
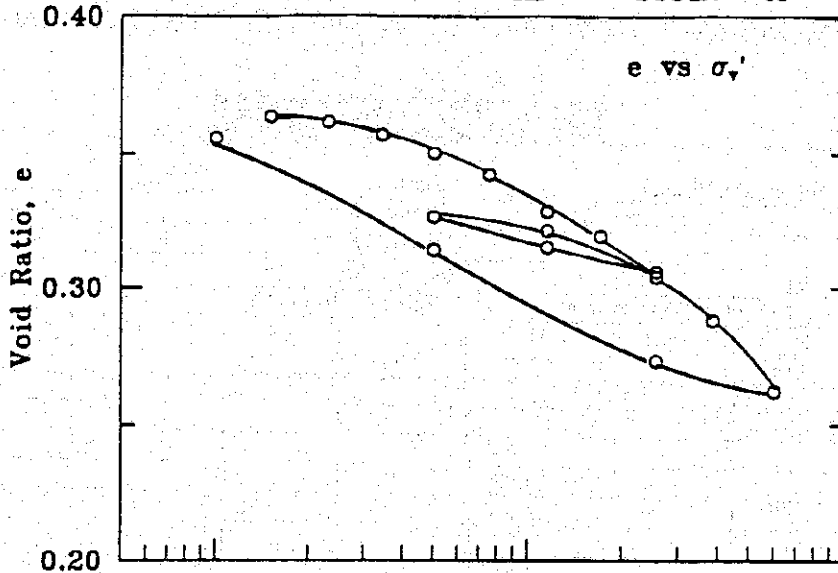
Location: Minburi
 Sample No.: _____
 Tested By: SIH
 Height of Sample (Hi) : 1.900 cm

Test No.: OH-24
 Date: 5-93

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	S								
2	1.0								
3	1.5			1.842		3.1			0.364
4	2.3			1.839		3.2			0.362
5	3.4			1.832		3.6			0.357
6	5.0			1.823		4.1			0.350
7	7.5			1.812		4.7			0.342
8	11.5			1.793		5.6			0.328
9	17.0			1.781		6.2			0.319
10	25.6			1.763		7.2			0.306
11	11.5			1.776		6.5			0.315
12	5.0			1.791		5.8			0.326
13	11.5			1.784		6.1			0.321
14	25.6			1.761		7.3			0.304
15	38.5	1.748	1.739	1.736	8.5	8.6	0.294	0.288	0.286
16	60.0	1.721	1.704	1.705	10.3	10.3	0.275	0.262	0.263
17	25.6			1.719		9.5			0.273
18	5.0			1.775		6.6			0.314
19	1.0			1.830		3.7			0.356

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁶ cm/s	CR (%)
		t ₉₀	t ₅₀	Δt	log t	Average		
1	S							
2	1.0							
3	1.5							
4	2.3	3.2		0.00369		0.00369	0.83	0.9
5	3.4	3.6		0.00328		0.00328	1.14	2.1
6	5.0	7.6		0.00155		0.00155	0.48	2.8
7	7.5	7.6		0.00153		0.00153	0.37	3.3
8	11.5	10.2		0.00111		0.00111	0.29	5.3
9	17.0	10.2		0.00109		0.00109	0.13	3.6
10	25.6	25.0		0.00044		0.00044	0.05	5.5
11	11.5							2.0
12	5.0							2.1
13	11.5							1.0
14	25.6							3.5
15	38.5	110.0	29.0	0.00010	0.00009	0.00009	0.01	7.4
16	60.0	105.0	32.0	0.00010	0.00008	0.00009	0.01	9.4
17	25.6							2.0
18	5.0							4.1
19	1.0							4.2

HIGH STRESS OEDOMETER NO. OH-24
 DEPTH: 84- 85.0 m SITE: A



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GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

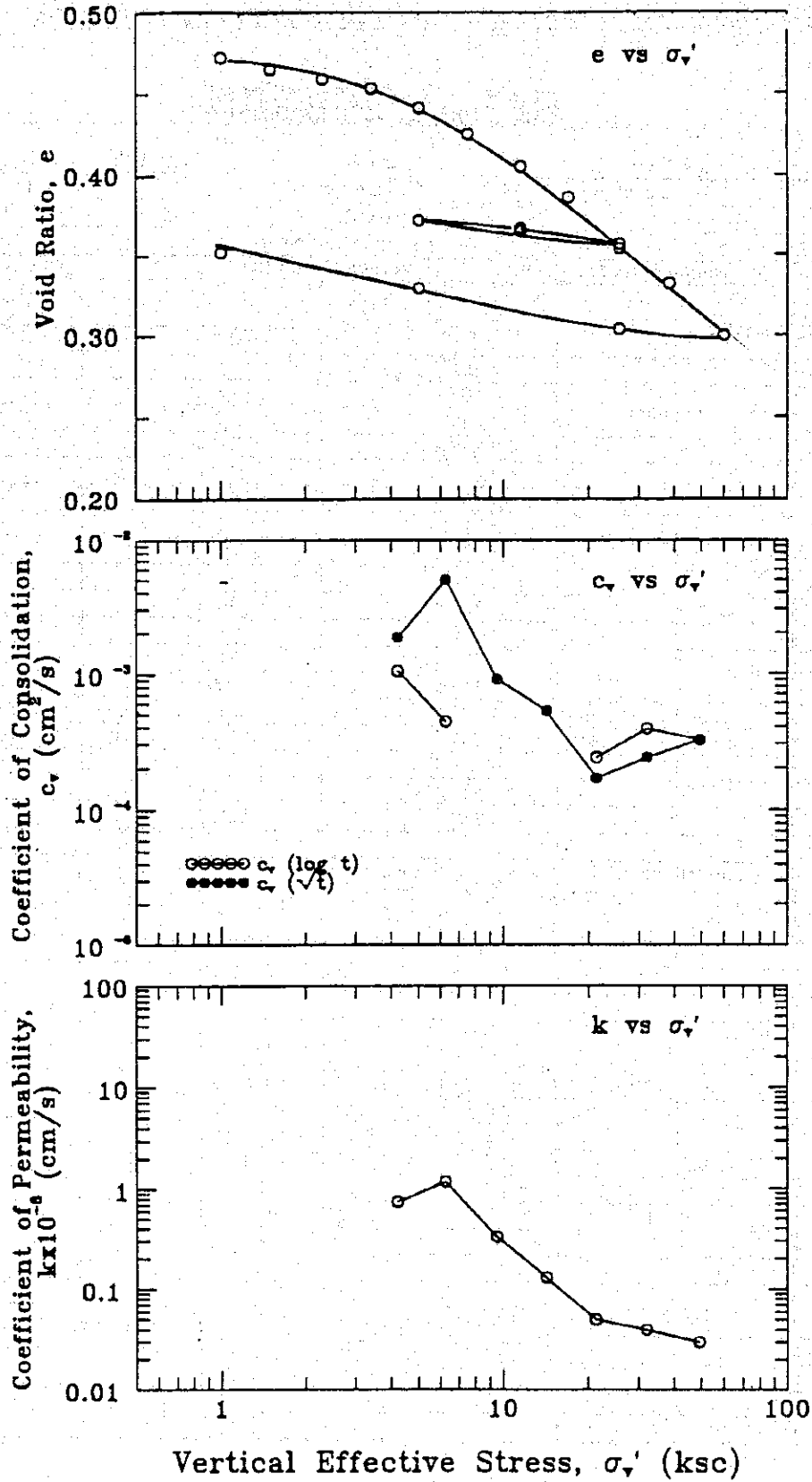
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 85-86 Sample No.: _____ Test No.: OH-25
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.265 cm Height of Sample (H_i): 1.900 cm

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.891		0.5			0.495
2	1.0			1.862		2.0			0.472
3	1.5			1.853		2.5			0.465
4	2.3			1.846		2.8			0.459
5	3.4			1.838		3.3			0.453
6	5.0			1.823		4.1			0.441
7	7.5			1.803		5.1			0.425
8	11.5			1.777		6.5			0.405
9	17.0			1.753		7.7			0.386
10	25.6			1.717		9.6			0.357
11	11.5			1.727		9.1			0.365
12	5.0			1.736		8.6			0.372
13	11.5			1.729		9.0			0.367
14	25.6			1.713		9.8			0.354
15	38.5	1.694	1.685	1.682	11.3	11.5	0.339	0.332	0.330
16	60.0	1.658	1.645	1.638	13.4	13.8	0.311	0.300	0.295
17	25.6			1.649		13.2			0.304
18	5.0			1.681		11.5			0.329
19	1.0			1.710		10.0			0.352

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	Δt	log t	Average		
1	0.1							
2	1.0							1.2
3	1.5							2.7
4	2.3							2.1
5	3.4							2.3
6	5.0	6.3	2.6	0.00186	0.00105	0.00146	0.75	4.7
7	7.5	2.3	6.0	0.00499	0.00044	0.00272	1.20	6.0
8	11.5	12.3		0.00091		0.00091	0.33	7.4
9	17.0	20.5		0.00053		0.00053	0.13	7.4
10	25.6	60.8	10.0	0.00017	0.00024	0.00021	0.05	10.7
11	11.5							1.5
12	5.0							1.3
13	11.5							1.0
14	25.6							2.4
15	38.5	42.3	6.0	0.00024	0.00039	0.00032	0.04	9.2
16	60.0	30.1	7.0	0.00032	0.00032	0.00032	0.03	10.9
17	25.6							1.6
18	5.0							2.4
19	1.0							2.2

HIGH STRESS OEDOMETER NO. OH-25
 DEPTH: 85-86.0 m SITE: A



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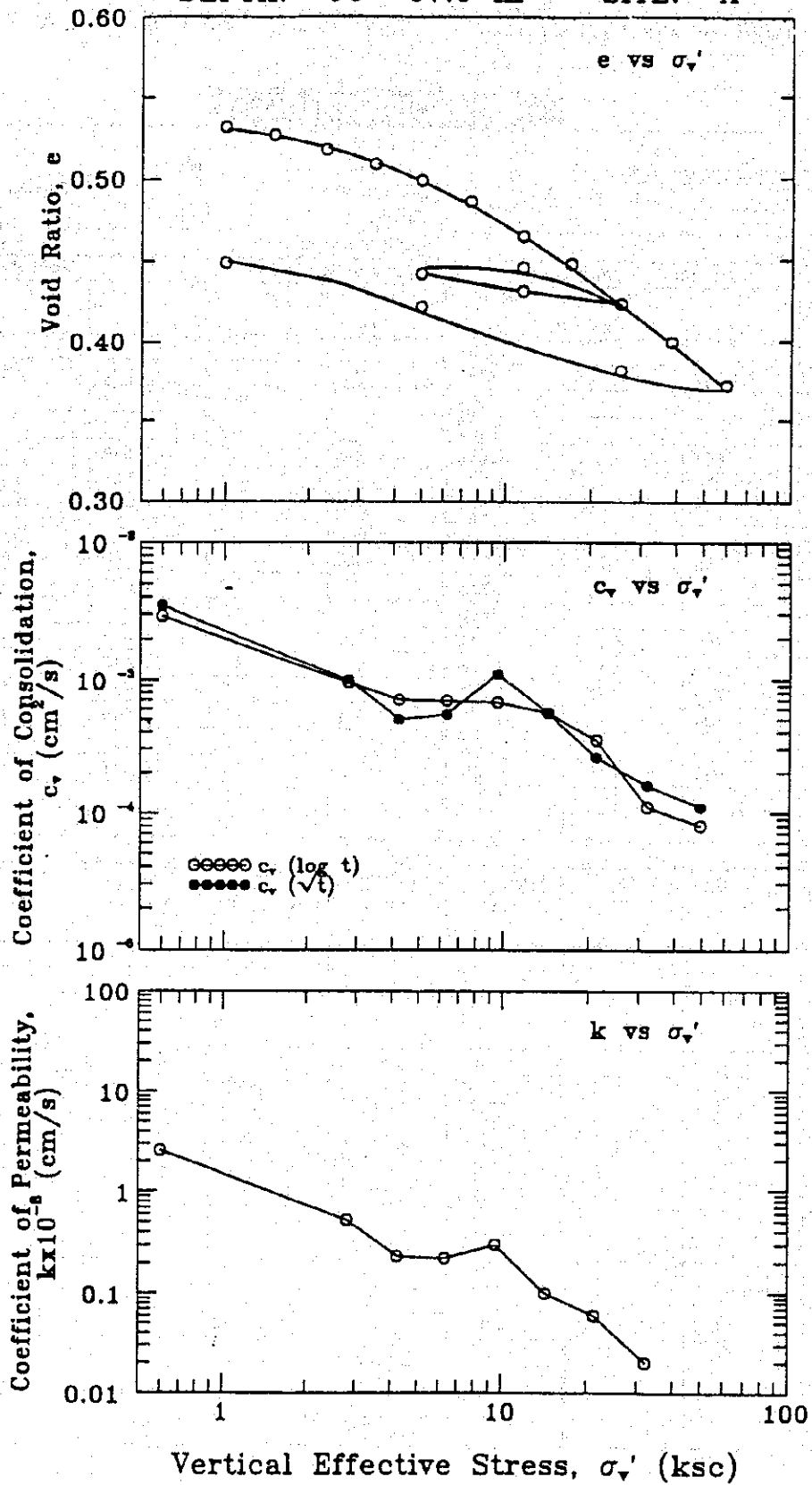
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: Minburi
 Borehole No.: A Depth (m) 96-97 Sample No.: _____ Test No.: OH-26
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.231 cm Height of Sample (H_i): 1.900 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.899		0.1			0.543
2	1.0	1.887	1.885	1.885	0.8	0.8	0.533	0.532	0.531
3	1.5			1.880		1.1			0.527
4	2.3			1.869		1.6			0.518
5	3.4	1.861	1.857	1.857	2.2	2.3	0.512	0.509	0.508
6	5.0	1.849	1.846	1.845	2.9	2.9	0.502	0.499	0.499
7	7.5	1.838	1.829	1.827	3.7	3.8	0.493	0.486	0.484
8	11.5	1.808	1.803	1.801	5.1	5.2	0.469	0.465	0.463
9	17.0	1.789	1.782	1.781	6.2	6.3	0.453	0.448	0.447
10	25.6	1.761	1.753	1.751	7.7	7.9	0.431	0.424	0.422
11	11.5			1.763		7.2			0.432
12	5.0	1.769	1.775	1.779	6.6	6.4	0.437	0.442	0.445
13	11.5	1.779	1.780	1.775	6.3	6.6	0.445	0.446	0.442
14	25.6	1.760	1.753	1.751	7.7	7.9	0.430	0.424	0.422
15	38.5	1.734	1.724	1.723	9.3	9.3	0.409	0.400	0.399
16	60.0	1.702	1.689	1.686	11.1	11.3	0.383	0.372	0.370
17	25.6	1.695	1.704	1.702	10.3	10.4	0.377	0.384	0.382
18	5.0			1.750		7.9			0.422
19	1.0			1.784		6.1			0.449

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁸ cm/s	CR (%)
		t ₉₀	t ₅₀	$\frac{t}{\log t}$	log t	Average		
1	0.1							
2	1.0	3.6	1.0	0.00350	0.00292	0.00321	2.56	0.7
3	1.5							1.6
4	2.3							3.2
5	3.4	12.3	3.0	0.00100	0.00095	0.00097	0.52	3.5
6	5.0	24.1	4.0	0.00050	0.00070	0.00060	0.23	3.7
7	7.5	22.1	4.0	0.00054	0.00069	0.00062	0.22	5.1
8	11.5	10.5	4.0	0.00110	0.00067	0.00089	0.30	7.4
9	17.0	20.2	4.7	0.00056	0.00056	0.00056	0.10	6.4
10	25.6	42.3	7.2	0.00026	0.00035	0.00031	0.06	8.6
11	11.5							1.9
12	5.0							2.3
13	11.5							0.5
14	25.6							4.0
15	38.5	68.1	22.0	0.00016	0.00011	0.00013	0.02	8.7
16	60.0	90.3	29.0	0.00011	0.00008	0.00010	0.01	9.6
17	25.6							2.2
18	5.0							3.6
19	1.0		60		0.00004	0.00004	0.02	2.6

HIGH STRESS OEDOMETER NO. OH-26
 DEPTH: 96-97.0 m SITE: A



ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

CONSOLIDATION

Project: Subsidence in Bangkok Vicinity

Location: MINBURI

Borehole No.: A Depth (m) 102.0-102.6

Sample No.:

Test No.: OH-5

Soil Description:

Tested By:

SIH Date: 5-93

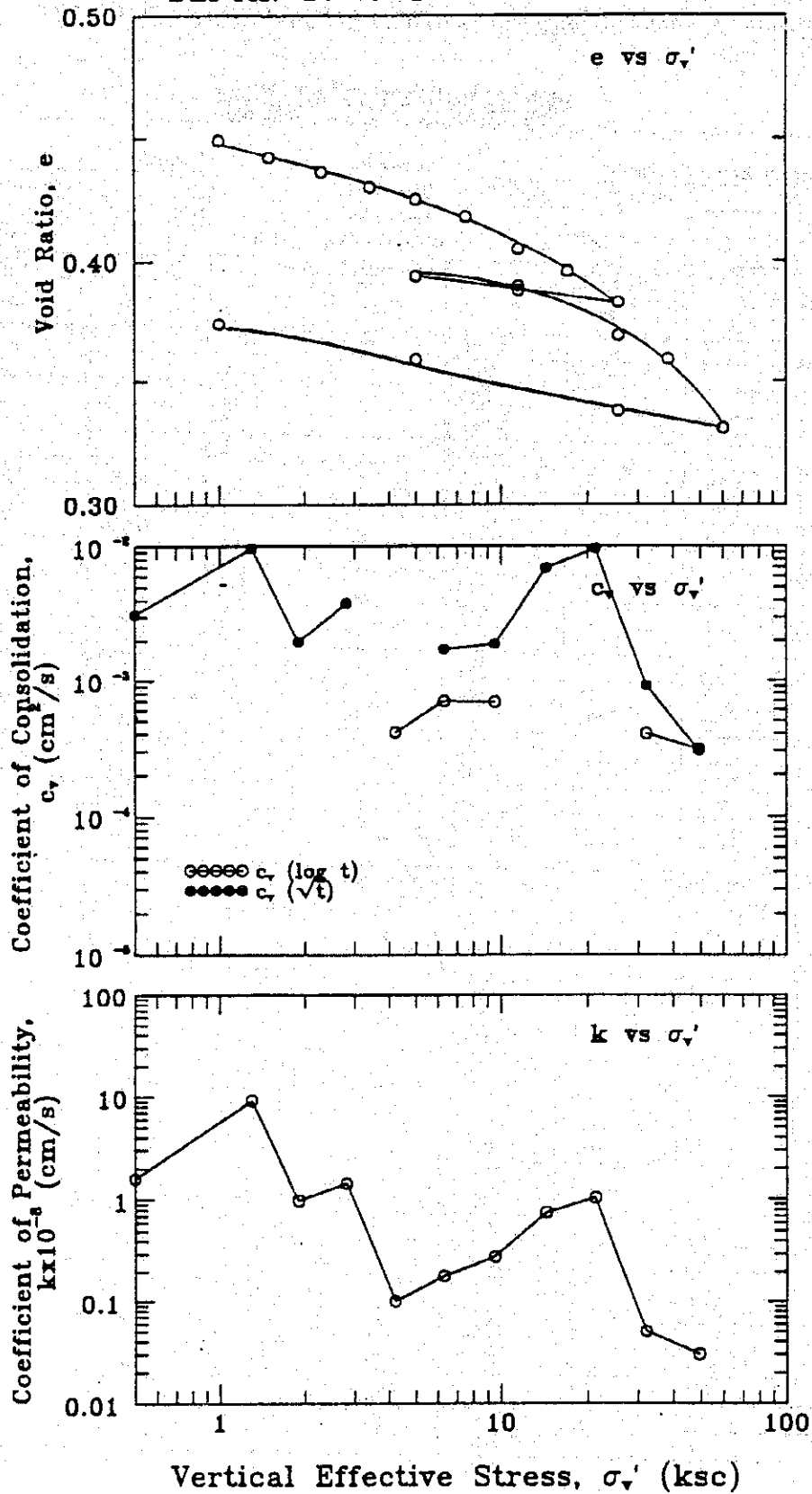
Height of Solids (H_s): 1.304 cm

Height of Sample (H_i): 1.900 cm

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.898		0.1			0.456
2	1.0			1.889		0.6			0.449
3	1.5			1.880		1.1			0.442
4	2.3			1.873		1.4			0.436
5	3.4			1.865		1.8			0.430
6	5.0	1.861	1.858	1.856	2.2	2.3	0.427	0.425	0.423
7	7.5	1.853	1.849	1.848	2.7	2.7	0.421	0.418	0.417
8	11.5	1.837	1.832	1.831	3.6	3.6	0.409	0.405	0.404
9	17.0			1.820		4.2			0.396
10	25.6			1.803		5.1			0.383
11	11.5			1.812		4.6			0.390
12	5.0	1.815	1.818	1.819	4.3	4.3	0.392	0.394	0.395
13	11.5	1.812	1.810	1.809	4.7	4.8	0.390	0.388	0.387
14	25.6	1.795	1.785	1.788	6.1	5.9	0.377	0.369	0.371
15	38.5	1.780	1.772	1.770	6.7	6.8	0.365	0.359	0.357
16	60.0	1.748	1.736	1.734	8.6	8.7	0.340	0.331	0.330
17	25.6	1.739	1.745	1.747	8.2	8.1	0.334	0.338	0.340
18	5.0	1.76	1.772	1.773	6.7	6.7	0.350	0.359	0.360
19	1.0	1.783	1.792	1.792	5.7	5.7	0.367	0.374	0.374

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _{av} x 10 cm/s	CR (%)
		t ₅₀	t ₁₀₀	t	log t	Average		
1	0.1							
2	1.0	4.0		0.00315		0.00315	1.59	0.4
3	1.5	1.3		0.00961		0.00961	9.18	2.7
4	2.3	6.3		0.00197		0.00197	0.98	2.1
5	3.4	3.2		0.00384		0.00384	1.43	2.3
6	5.0		7.0		0.00041	0.00041	0.10	2.8
7	7.5	7.0	4.0	0.00173	0.00070	0.00122	0.18	2.7
8	11.5	6.3	4.0	0.00189	0.00069	0.00129	0.28	4.8
9	17.0	1.7		0.00688		0.00688	0.75	3.4
10	25.6	1.2		0.00957		0.00957	1.04	5.0
11	11.5	13.0		0.00089		0.00089	0.03	1.4
12	5.0	3.2	2.4	0.00364	0.00113	0.00238	0.12	1.0
13	11.5	8.0	0.2	0.00145	0.01348	0.00746	0.57	1.2
14	25.6	25.0	0.4	0.00046	0.00661	0.00353	0.33	3.8
15	38.5	12.3	6.5	0.00091	0.00040	0.00066	0.05	3.9
16	60.0	36.0	8.0	0.00030	0.00031	0.00031	0.03	9.8
17	25.6	1.7	0.5	0.00629	0.00496	0.00563	0.10	1.8
18	5.0	1	6.2	0.01094	0.00041	0.00568	0.39	1.9
19	1.0	1.7	6.1	0.00661	0.00043	0.00352	0.94	1.4

HIGH STRESS OEDOMETER NO. OH-5
 DEPTH: 102.0-102.6 m SITE: A



ASIAN INSTITUTE OF TECHNOLOGY
GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

CONSOLIDATION

Project: Subsidence in Bangkok Vicinity

Location: MINBURI

Borehole No.: A Depth (m) 118-119

Sample No.:

Test No.: OH-6

Soil Description:

Tested By: SIH

Date: 5-93

Height of Solids (H_s): 1.157 cm

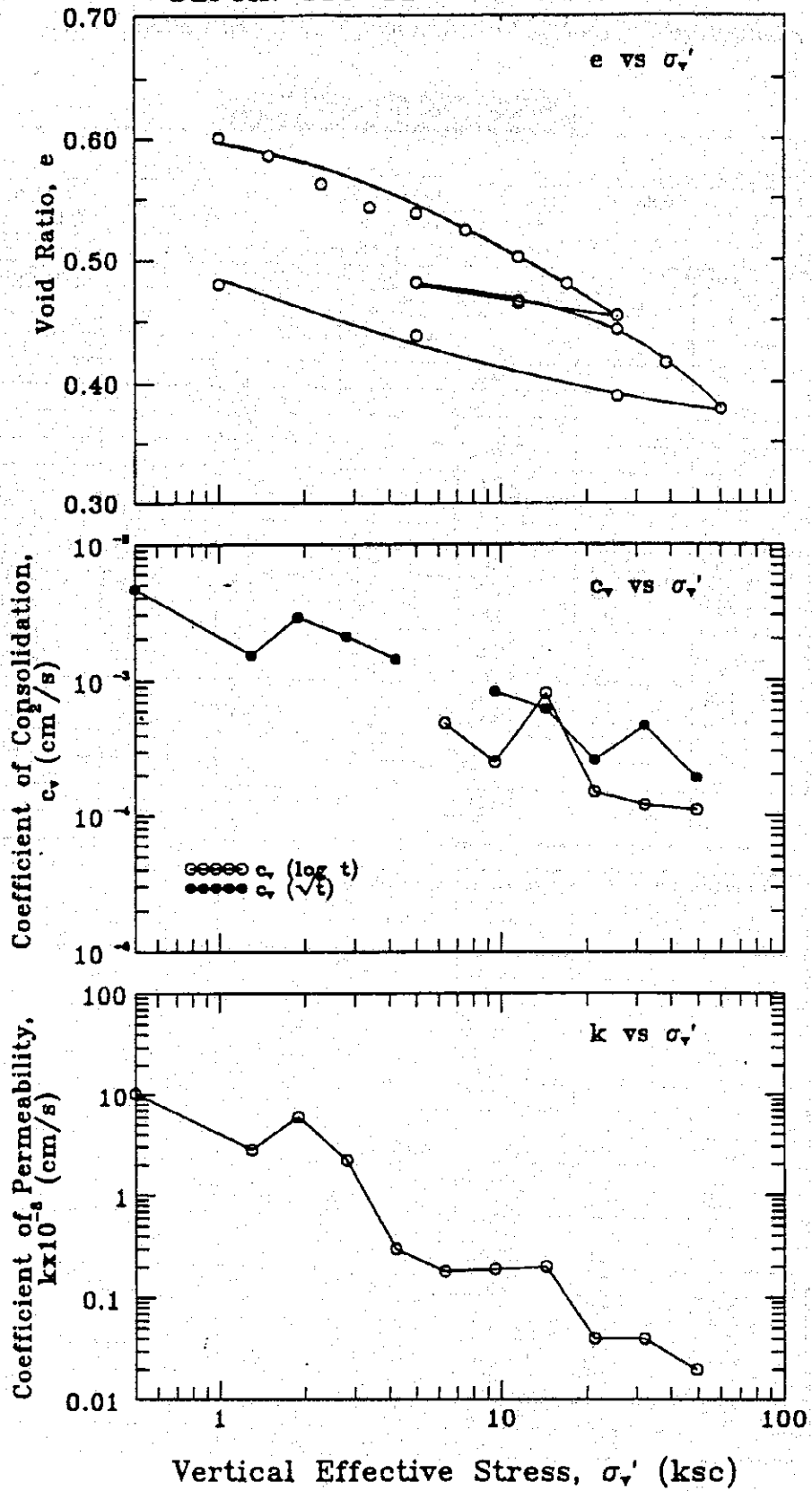
Height of Sample (H_i):

1.900 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _i	e ₁₀₀	e _i	e ₅₀	e ₁₀₀	e _i
1	0.1			1.891		0.5			0.634
2	1.0			1.853		2.5			0.601
3	1.5			1.836		3.4			0.586
4	2.3			1.807		4.9			0.562
5	3.4			1.785		6.1			0.543
6	5.0			1.779		6.4			0.538
7	7.5	1.769	1.763	1.762	7.2	7.3	0.529	0.524	0.523
8	11.5	1.747	1.738	1.738	8.5	8.5	0.510	0.502	0.502
9	17.0	1.722	1.712	1.709	9.9	10.1	0.488	0.480	0.477
10	25.6	1.693	1.682	1.678	11.5	11.7	0.463	0.454	0.450
11	11.5	1.686	1.694	1.694	10.8	10.8	0.457	0.464	0.464
12	5.0	1.704	1.713	1.714	9.8	9.8	0.472	0.481	0.481
13	11.5	1.705	1.696	1.695	10.7	10.8	0.474	0.466	0.465
14	25.6	1.682	1.669	1.667	12.2	12.3	0.454	0.443	0.441
15	38.5	1.650	1.638	1.635	13.8	13.9	0.426	0.416	0.413
16	60.0	1.608	1.594	1.589	16.1	16.4	0.390	0.378	0.373
17	25.6			1.607		15.4			0.389
18	5.0			1.664		12.4			0.438
19	1.0			1.712		9.9			0.480

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k ₋₆ x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	t	log t	Average		
1	0.1	0.4						
2	1.0	2.6		0.00466		0.00466	10.20	1.7
3	1.5	7.8		0.00153		0.00153	2.81	5.1
4	2.3	4.0		0.00288		0.00288	6.02	8.5
5	3.4	5.4		0.00208		0.00208	2.22	6.5
6	5.0	7.9		0.00142		0.00142	0.30	1.9
7	7.5		5.2		0.00049	0.00049	0.18	5.1
8	11.5	13.0	10.0	0.00083	0.00025	0.00054	0.19	7.1
9	17.0	16.8	3.0	0.00062	0.00081	0.00072	0.20	8.1
10	25.6	38.4	16.0	0.00026	0.00015	0.00021	0.04	8.9
11	11.5	10.9	1.5	0.00092	0.00156	0.00124	0.08	2.4
12	5.0	13.7	13.0	0.00075	0.00018	0.00047	0.08	2.9
13	11.5	8.6	6.0	0.00119	0.00040	0.00080	0.13	2.5
14	25.6	20.6	6.3	0.00049	0.00037	0.00043	0.05	4.1
15	38.5	20.3	19.0	0.00047	0.00012	0.00030	0.04	9.2
16	60.0	49.0	20.0	0.00019	0.00011	0.00015	0.02	12.0
17	25.6	1.5	0.4	0.00608	0.00482	0.00545	0.18	2.6
18	5.0	0.5	5.0	0.01957	0.00045	0.01001	1.69	4.2
19	1.0	7.4	65.0	0.00140	0.00004	0.00072	0.51	3.6

HIGH STRESS OEDOMETER NO. OH-6
 DEPTH: 118-119 m SITE: A



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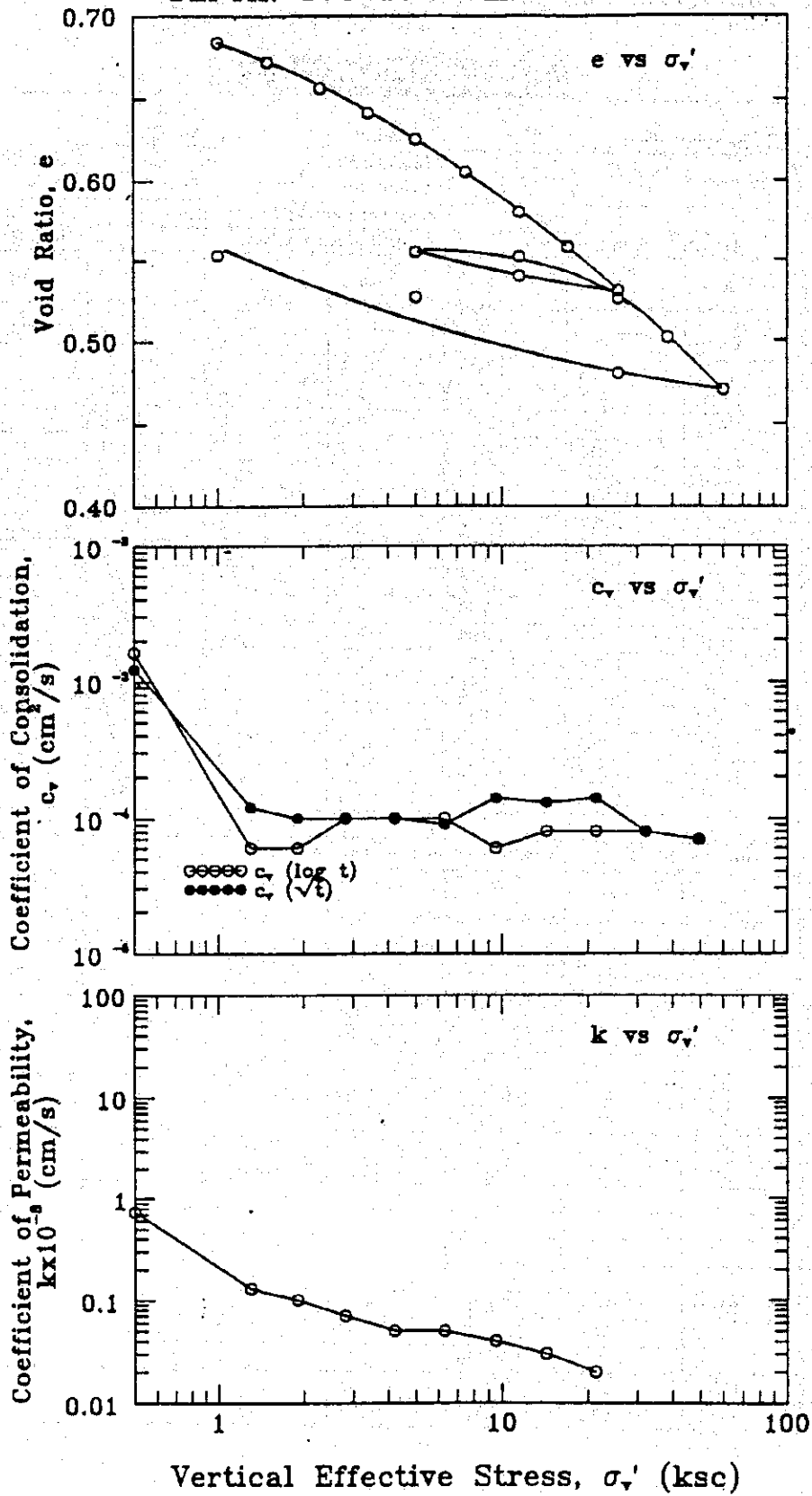
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 154-155 Sample No.:
 Soil Description: Tested By: SIH Test No.: OH-7
 Height of Solids (H_s): 1.118 cm Height of Sample (H_i): 1.900 cm Date: 5-93

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.892		0.4			0.692
2	1.0	1.888	1.883	1.882	0.9	0.9	0.689	0.684	0.683
3	1.5	1.875	1.869	1.868	1.6	1.7	0.677	0.672	0.671
4	2.3	1.860	1.851	1.850	2.6	2.6	0.664	0.656	0.655
5	3.4	1.843	1.835	1.831	3.4	3.6	0.648	0.641	0.638
6	5.0	1.824	1.817	1.816	4.4	4.4	0.631	0.625	0.624
7	7.5	1.805	1.794	1.793	5.6	5.6	0.614	0.605	0.604
8	11.5	1.778	1.766	1.765	7.1	7.1	0.590	0.580	0.579
9	17.0	1.754	1.742	1.741	8.3	8.4	0.569	0.558	0.557
10	25.6	1.725	1.712	1.711	9.9	9.9	0.543	0.531	0.530
11	11.5	1.717	1.722	1.722	9.4	9.4	0.535	0.540	0.540
12	5.0	1.731	1.739	1.740	8.5	8.4	0.548	0.555	0.556
13	11.5	1.738	1.735	1.732	8.7	8.8	0.554	0.552	0.549
14	25.6	1.719	1.706	1.704	10.2	10.3	0.538	0.526	0.524
15	38.5	1.691	1.679	1.675	11.6	11.8	0.513	0.502	0.498
16	60.0	1.658	1.643	1.638	13.5	13.8	0.483	0.470	0.465
17	25.6	1.647	1.655	1.656	12.9	12.8	0.473	0.480	0.481
18	5.0	1.682	1.707	1.708	10.2	10.1	0.504	0.527	0.528
19	1.0	1.722	1.736	1.737	8.6	8.6	0.540	0.553	0.554

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	t	log t	Average		
1	0.1	2.8	0.4					
2	1.0	10.2	1.8	0.00123	0.00163	0.00143	0.73	0.4
3	1.5	100.0	50.0	0.00012	0.00006	0.00009	0.13	4.2
4	2.3	120.0	50.0	0.00010	0.00006	0.00008	0.10	5.4
5	3.4	120.0	27.0	0.00010	0.00010	0.00010	0.07	4.7
6	5.0	121.0	27.0	0.00010	0.00010	0.00010	0.05	5.7
7	7.5	125.0	28.0	0.00009	0.00010	0.00009	0.05	6.9
8	11.5	78.7	40.0	0.00014	0.00006	0.00010	0.04	7.9
9	17.0	84.6	30.0	0.00013	0.00008	0.00011	0.03	7.4
10	25.6	75.7	30.0	0.00014	0.00008	0.00011	0.02	8.9
11	11.5							1.7
12	5.0							2.6
13	11.5							0.6
14	25.6							4.4
15	38.5	121.0	30.0	0.00008	0.00008	0.00008	0.01	8.0
16	60.0	144.0	34.0	0.00007	0.00007	0.00007	0.01	9.8
17	25.6	1.0	3.0	0.00958	0.00074	0.00516	0.15	2.6
18	5.0	182.3	30.0	0.00005	0.00008	0.00007	0.01	3.9
19	1.0	358.3	82.0	0.00003	0.00003	0.00003	0.01	2.2

HIGH STRESS OEDOMETER NO. OH-7
 DEPTH: 154-155 m SITE: A



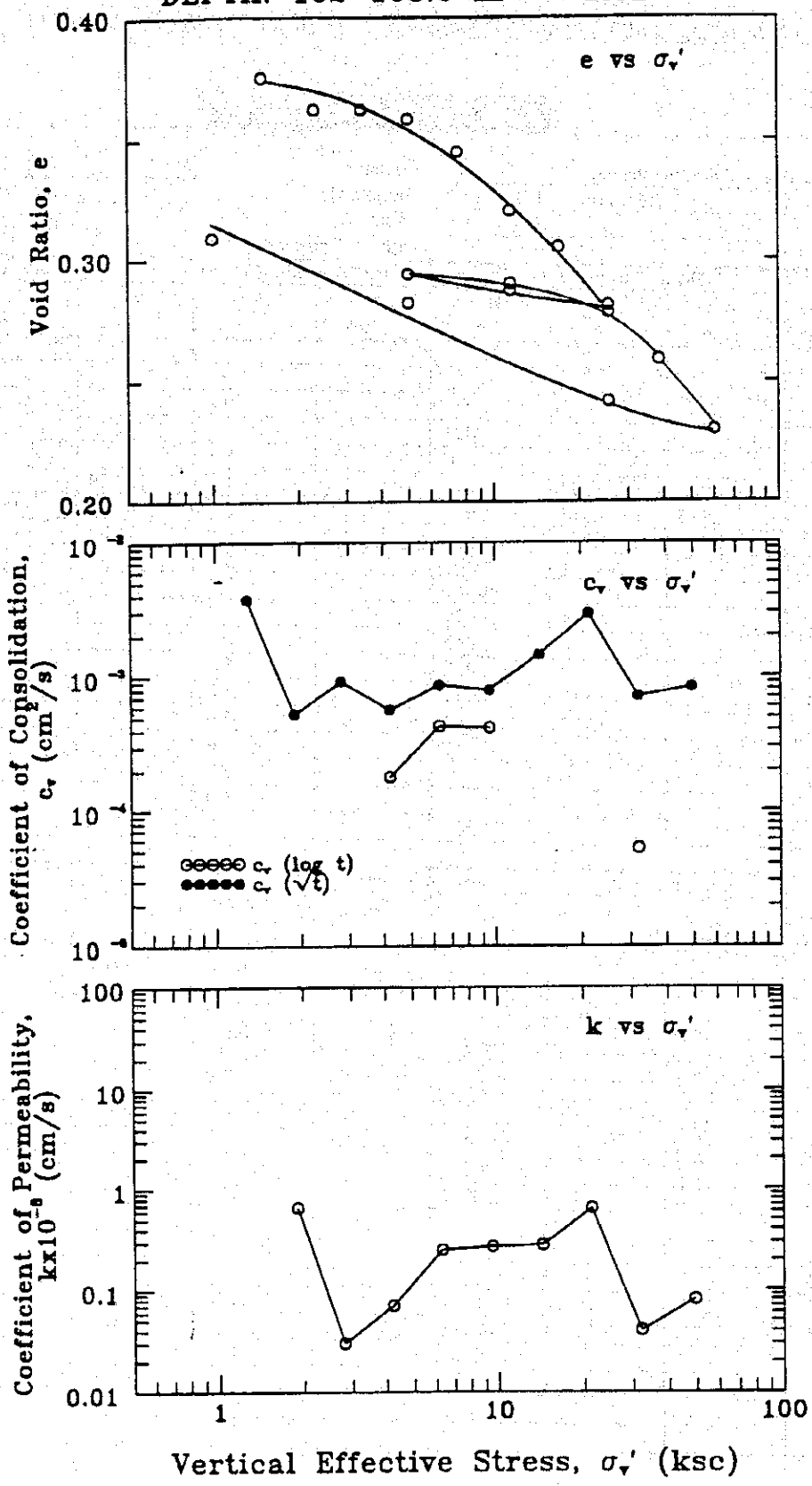
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CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: Minburi
 Borehole No.: A Depth (m) 162.163 Sample No.:
 Soil Description: Tested By: SIH Test No.: OH-17
 Height of Solids (H_s): 1.422 cm Height of Sample (H_i): 1.960 cm Date: 5-93

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1								
2	1.0								
3	1.5			1.957		0.2			0.376
4	2.3			1.939		1.1			0.363
5	3.4			1.938		1.1			0.363
6	5.0	1.933	1.932	1.931	1.4	1.5	0.359	0.359	0.358
7	7.5	1.918	1.913	1.912	2.4	2.4	0.349	0.345	0.345
8	11.5	1.888	1.878	1.876	4.2	4.3	0.328	0.320	0.319
9	17.0			1.856		5.3			0.305
10	25.6			1.821		7.1			0.281
11	11.5		1.834	1.835	6.4	6.4		0.290	0.290
12	5.0			1.840		6.1			0.294
13	11.5			1.830		6.6			0.287
14	25.6		1.818	1.816	7.2	7.3		0.278	0.277
15	38.5		1.790	1.787	8.7	8.8		0.259	0.257
16	60.0			1.749		10.8			0.230
17	25.6			1.767		9.9			0.242
18	5.0			1.823		7.0			0.282
19	1.0			1.861		5.1			0.309

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁸ cm/s	CR (%)
		t ₉₀	t ₅₀	$\frac{t}{A}$	log t	Average		
1	0.1							
2	1.0	6.8						
3	1.5	3.6		0.00376		0.00376		0.9
4	2.3	25.0		0.00053		0.00053	0.66	5.2
5	3.4	14.4		0.00092		0.00092	0.03	0.2
6	5.0	23.0	17.0	0.00057	0.00018	0.00038	0.07	2.2
7	7.5	15.2	7.0	0.00086	0.00043	0.00064	0.25	5.6
8	11.5	16.0	7.0	0.00079	0.00042	0.00060	0.27	9.6
9	17.0	8.4		0.00145		0.00145	0.28	6.0
10	25.6	4.0		0.00293		0.00293	0.65	10.0
11	11.5							2.0
12	5.0							0.7
13	11.5							1.4
14	25.6	21.4	60.0	0.00054	0.00005	0.00029	0.01	2.1
15	38.5	16.0	50.0	0.00071	0.00005	0.00038	0.04	8.1
16	60.0	13.1		0.00083		0.00083	0.08	10.1
17	25.6							2.4
18	5.0							4.1
19	1.0							2.8



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GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

CONSOLIDATION

Project: Subsidence in Bangkok Vicinity
 Borehole No.: A Depth (m) 180-181
 Soil Description:
 Height of Solids (Hs): 1.609 cm

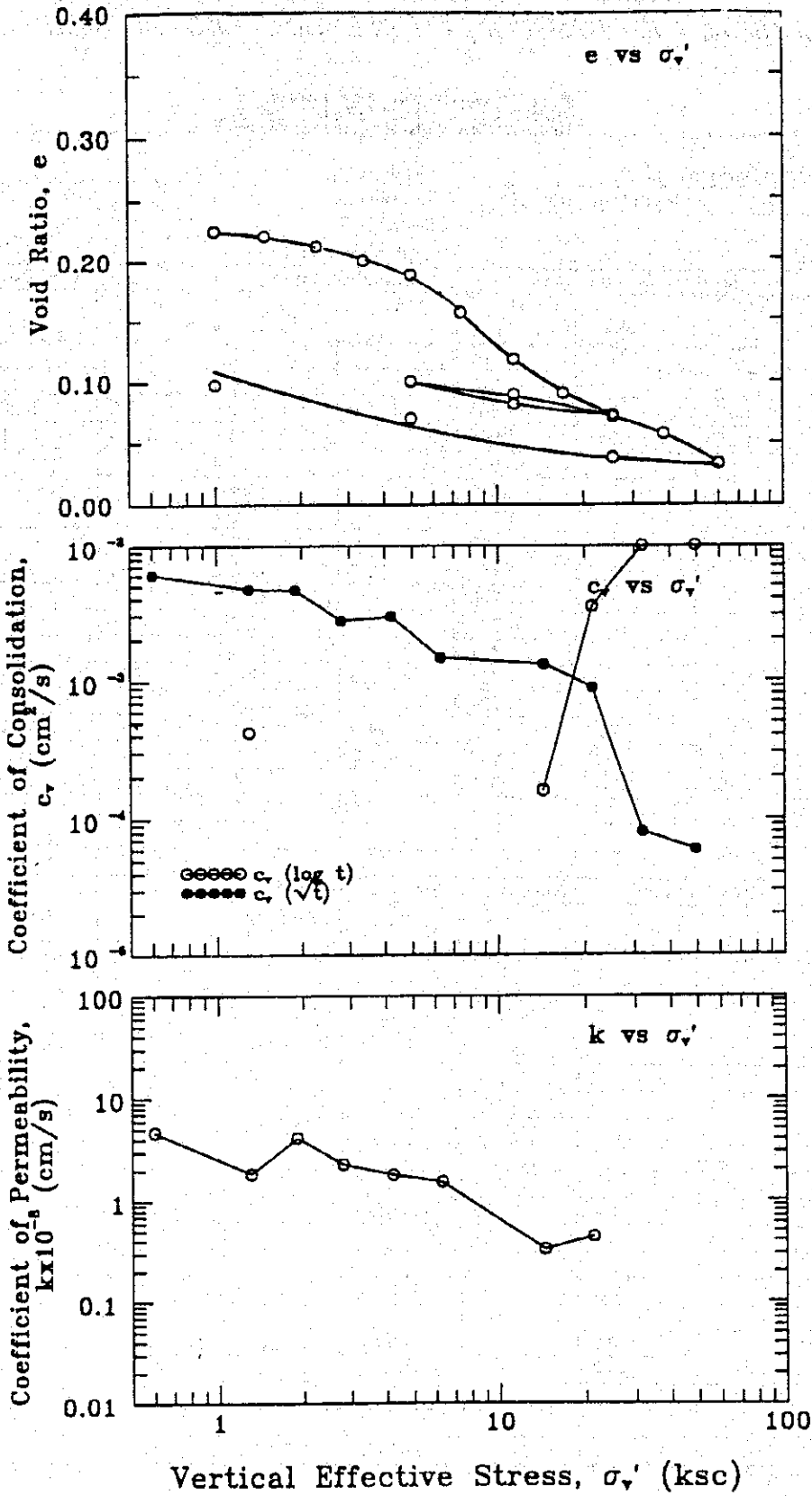
Location: Minburi
 Sample No.:
 Tested By: SIH
 Height of Sample (Hi): 2.000 cm

Test No.: OH-28
 Date: 5-93

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.985		0.7			0.234
2	1.0			1.971		1.4			0.225
3	1.5	1.966	1.964	1.964	1.8	1.8	0.222	0.221	0.220
4	2.3	1.953	1.951	1.949	2.5	2.5	0.214	0.212	0.211
5	3.4			1.930		3.5			0.200
6	5.0			1.911		4.4			0.188
7	7.5			1.861		7.0			0.157
8	11.5			1.800		10.0			0.119
9	17.0	1.763	1.756	1.756	12.2	12.2	0.096	0.091	0.091
10	25.6			1.726		13.7			0.073
11	11.5			1.742		12.9			0.082
12	5.0			1.771		11.5			0.101
13	11.5	1.759	1.755	1.754	12.3	12.3	0.093	0.090	0.090
14	25.6			1.724		13.8			0.071
15	38.5	1.704	1.701	1.698	14.9	15.1	0.059	0.057	0.055
16	60.0	1.675	1.662	1.657	16.9	17.2	0.041	0.033	0.030
17	25.6	1.667	1.671	1.671	16.5	16.4	0.036	0.038	0.039
18	5.0			1.721		13.9			0.070
19	1.0			1.767		11.7			0.098

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁸ cm/s	CR (%)
		t ₉₀	t ₅₀	$\frac{t}{\log t}$	log t	Average		
1	0.1							
2	1.0	2.3		0.00610		0.00610	4.66	0.7
3	1.5	2.9	7.5	0.00471	0.00042	0.00257	1.85	2.2
4	2.3	2.9		0.00465		0.00465	4.15	3.9
5	3.4	4.8		0.00274		0.00274	2.29	5.2
6	5.0	4.4		0.00293		0.00293	1.82	5.7
7	7.5	8.4		0.00146		0.00146	1.55	14.3
8	11.5							16.4
9	17.0	8.4	16.0	0.00131	0.00016	0.00073	0.33	13.0
10	25.6	11.8	0.7	0.00089	0.00349	0.00219	0.44	8.4
11	11.5							2.2
12	5.0							4.1
13	11.5		3.0		0.00085	0.00085	0.12	2.4
14	25.6							4.3
15	38.5		30.0		0.00008	0.00008	0.01	7.3
16	60.0		40.0		0.00006	0.00006	0.01	10.2
17	25.6							1.9
18	5.0							3.5
19	1.0		40		0.00006	0.00006	0.04	3.3

HIGH STRESS OEDOMETER NO. OH-28
 DEPTH: 180-181.0 m SITE: A



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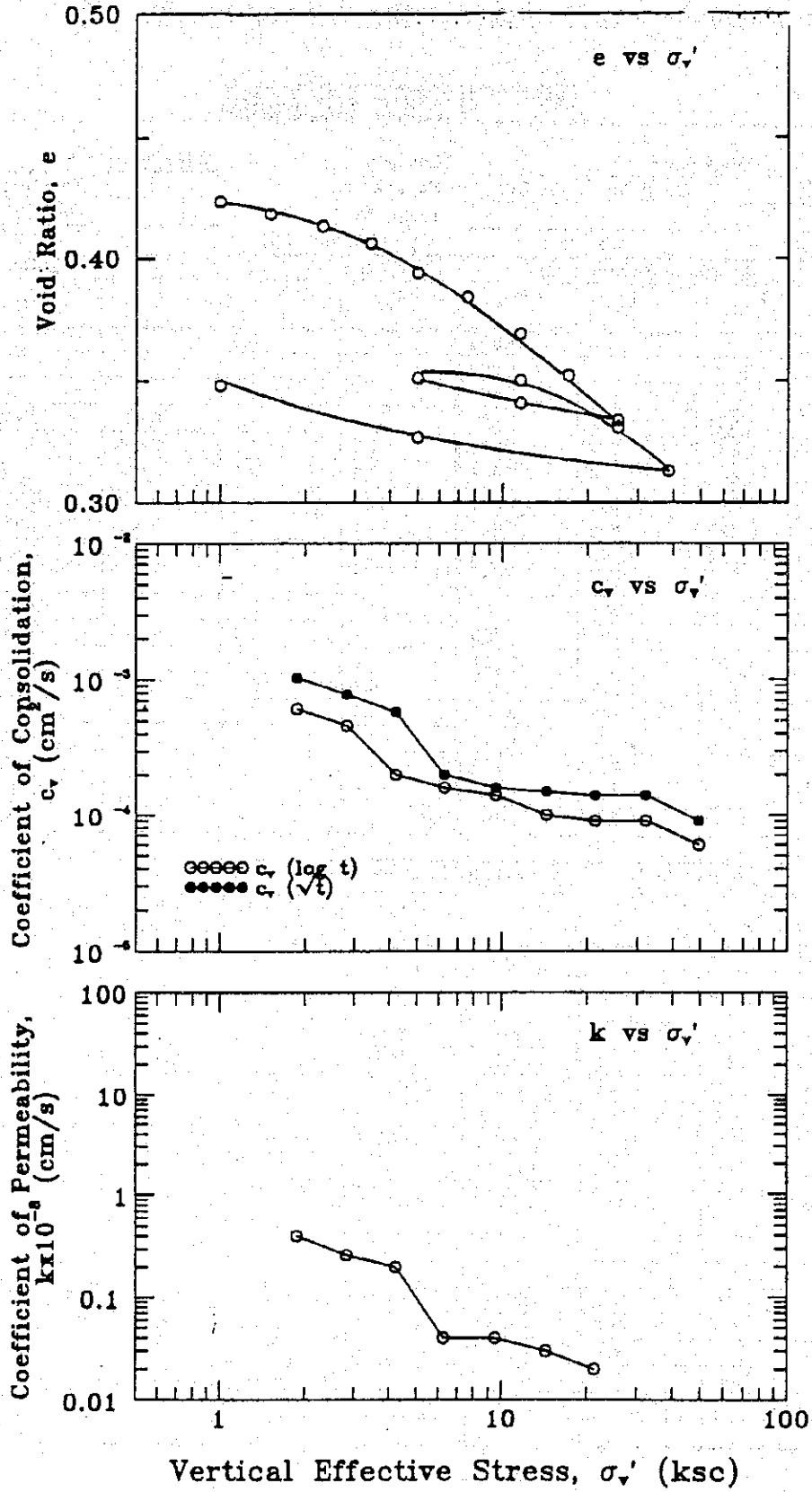
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 235-236 Sample No.: _____ Test No.: OH-60
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.331 cm Height of Sample (H_i): 1.900 cm

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	ε ₁₀₀	ε _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.900		0.0			0.427
2	1.0			1.894		0.3			0.423
3	1.5			1.888		0.6			0.418
4	2.3	1.884	1.881	1.881	1.0	1.0	0.415	0.413	0.413
5	3.4	1.875	1.872	1.871	1.5	1.5	0.409	0.406	0.406
6	5.0	1.861	1.856	1.853	2.3	2.5	0.398	0.394	0.392
7	7.5	1.845	1.842	1.841	3.1	3.1	0.386	0.384	0.383
8	11.5	1.828	1.822	1.820	4.1	4.2	0.373	0.369	0.368
9	17.0	1.783	1.800	1.798	5.3	5.4	0.340	0.352	0.351
10	25.6		1.776	1.774	6.5	6.6		0.334	0.333
11	11.5		1.785	1.785	6.1	6.1		0.341	0.341
12	5.0		1.798	1.799	5.4	5.3		0.351	0.351
13	11.5		1.797	1.791	5.4	5.8		0.350	0.345
14	25.6	1.776	1.772	1.771	6.7	6.8	0.334	0.331	0.330
15	38.5	1.756	1.748	1.746	8.0	8.1	0.319	0.313	0.312
16	60.0	1.727	1.714	1.714	9.8	9.8	0.298	0.288	0.288
17	25.6		1.728	1.728	9.1	9.1		0.298	0.298
18	5.0		1.766	1.768	7.1	6.9		0.327	0.328
19	1.0		1.794	1.794	5.6	5.6		0.348	0.348

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k ₅₀ x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	Δt	log t	Average		
1	0.1							
2	1.0							0.3
3	1.5							1.7
4	2.3	12.3	4.8	0.00102	0.00061	0.00082	0.40	2.1
5	3.4	16.0	6.3	0.00078	0.00046	0.00062	0.26	2.7
6	5.0	21.2	14.0	0.00058	0.00020	0.00039	0.20	5.0
7	7.5	60.0	18.0	0.00020	0.00016	0.00018	0.04	4.2
8	11.5	72.0	20.0	0.00016	0.00014	0.00015	0.04	5.7
9	17.0	74.0	25.0	0.00015	0.00010	0.00013	0.03	6.8
10	25.6	79.2	30.0	0.00014	0.00009	0.00011	0.02	7.1
11	11.5							1.7
12	5.0							2.0
13	11.5							0.1
14	25.6	41.0	18.0	0.00027	0.00014	0.00021	0.02	3.8
15	38.5	79.2	28.0	0.00014	0.00009	0.00011	0.01	7.1
16	60.0	121.0	40.0	0.00009	0.00006	0.00007	0.01	9.2
17	25.6							2.0
18	5.0							3.0
19	1.0							2.0

HIGH STRESS OEDOMETER NO. OH-60
 DEPTH: 235-236.0 m SITE: A



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CONSOLIDATION

Project: Subsidence in Bangkok Vicinity

Location: MINBURI

Borehole No.: A Depth (m) 277-278

Sample No.:

Test No.: OH-39

Soil Description:

Tested By:

SIH

Date: 5-93

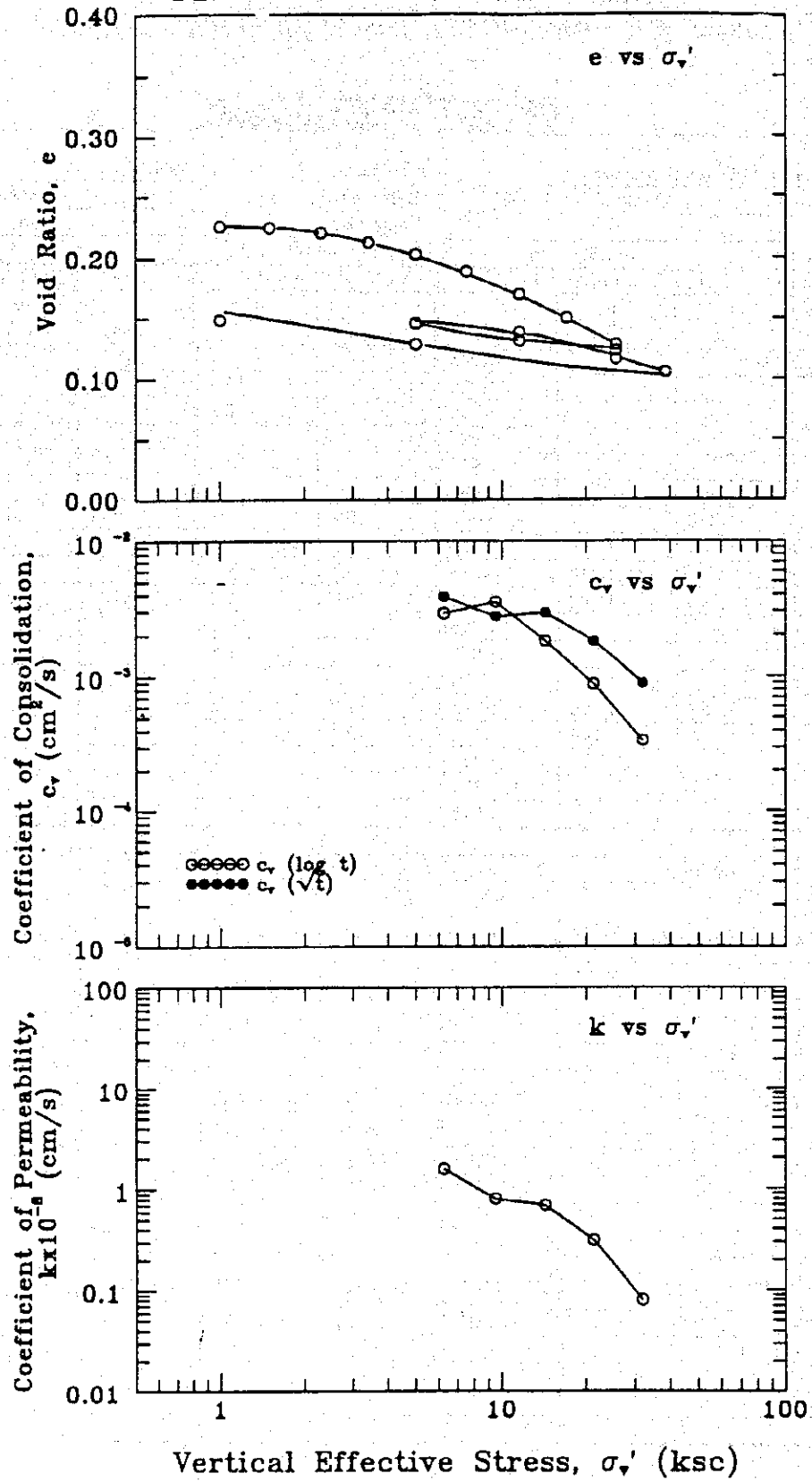
Height of Solids (Hs): 1.579 cm

Height of Sample (Hi): 2.000 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.945		2.7			0.232
2	1.0			1.936		3.2			0.226
3	1.5			1.935		3.3			0.225
4	2.3			1.928		3.6			0.221
5	3.4			1.915		4.2			0.213
6	5.0			1.899		5.1			0.203
7	7.5	1.882	1.877	1.867	6.2	6.7	0.192	0.189	0.182
8	11.5	1.854	1.848	1.847	7.6	7.6	0.174	0.170	0.170
9	17.0	1.825	1.818	1.818	9.1	9.1	0.156	0.151	0.151
10	25.6	1.790	1.782	1.780	10.9	11.0	0.134	0.129	0.127
11	11.5			1.788		10.6			0.132
12	5.0			1.809		9.6			0.146
13	11.5			1.799		10.1			0.139
14	25.6	1.782	1.775	1.775	11.3	11.3	0.129	0.124	0.124
15	38.5	1.754	1.746	1.742	12.7	12.9	0.111	0.106	0.103
17	25.6			1.764		11.8			0.117
18	5.0			1.783		10.9			0.129
19	1.0			1.815		9.3			0.149

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁸ cm/s	CR (%)
		t ₉₀	t ₅₀	t/t	log t	Average		
1	0.1							
2	1.0							0.4
3	1.5							0.5
4	2.3							1.9
5	3.4							3.5
6	5.0							4.9
7	7.5	3.2	1.0	0.00386	0.00291	0.00338	1.56	9.0
8	11.5	4.4	0.8	0.00275	0.00353	0.00314	0.80	7.8
9	17.0	4.0	1.5	0.00294	0.00182	0.00238	0.69	8.8
10	25.6	6.3	3.0	0.00181	0.00088	0.00134	0.31	10.1
11	11.5							1.2
12	5.0							2.9
13	11.5							1.4
14	25.6	9.9	1.8	0.00113	0.00145	0.00129	0.12	3.5
15	38.5	12.3	7.5	0.00089	0.00034	0.00061	0.08	8.2
16	ERR							6.2
17	25.6							1.3
18	5.0							2.3
19	1.0							

HIGH STRESS OEDOMETER NO. OH-39
 DEPTH: 277-278.0 m SITE: A



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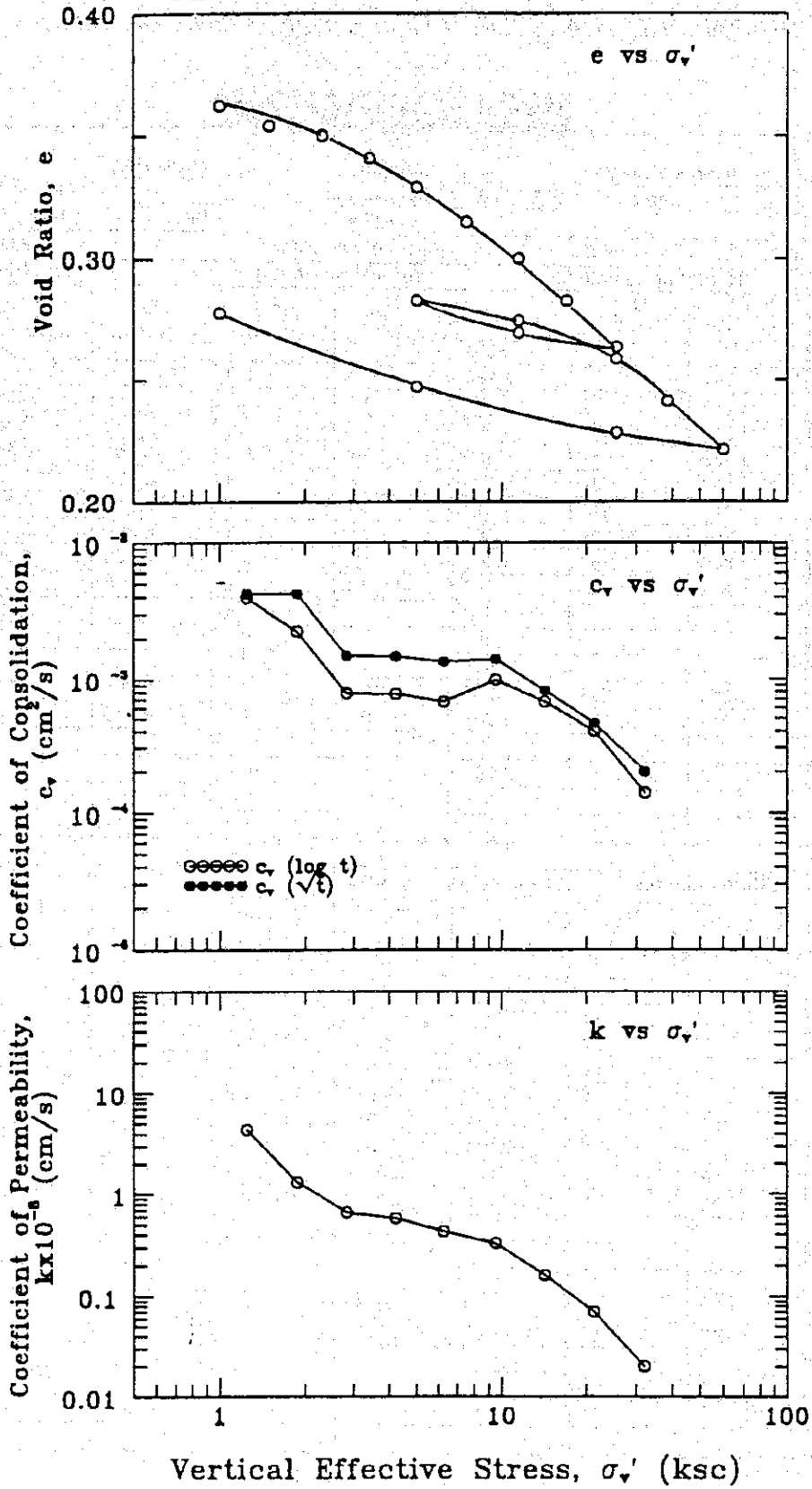
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 287.5-288 Sample No.: _____ Test No.: OH-38
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.455 cm Height of Sample (H): 2.000 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	ε ₁₀₀	ε _f	e ₅₀	e ₁₀₀	e _f
1	0.1			2.002		0.1			0.376
2	1.0			1.981		0.9			0.362
3	1.5	1.972	1.971	1.971	1.5	1.5	0.356	0.354	0.354
4	2.3	1.967	1.965	1.964	1.8	1.8	0.352	0.350	0.350
5	3.4	1.955	1.951	1.950	2.4	2.5	0.344	0.341	0.340
6	5.0	1.939	1.934	1.933	3.3	3.3	0.333	0.329	0.329
7	7.5	1.917	1.913	1.912	4.4	4.4	0.318	0.315	0.314
8	11.5	1.898	1.891	1.889	5.5	5.5	0.304	0.300	0.298
9	17.0	1.875	1.867	1.866	6.7	6.7	0.289	0.283	0.282
10	25.6	1.848	1.839	1.838	8.1	8.1	0.270	0.264	0.263
11	11.5			1.848		7.6			0.270
12	5.0			1.866		6.7			0.283
13	11.5			1.855		7.3			0.275
14	25.6	1.839	1.832	1.832	8.4	8.4	0.264	0.259	0.259
15	38.5	1.816	1.806	1.807	9.7	9.7	0.248	0.241	0.242
16	60.0			1.777		11.2			0.221
17	25.6			1.787		10.7			0.228
18	5.0			1.815		9.3			0.247
19	1.0			1.860		7.0			0.278

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	Δt	log t	Average		
1	0.1							
2	1.0							0.9
3	1.5	3.2	0.8	0.00424	0.00399	0.00412	4.38	3.0
4	2.3	3.2	1.4	0.00422	0.00227	0.00324	1.32	1.7
5	3.4	9.0	4.0	0.00150	0.00078	0.00114	0.66	3.8
6	5.0	9.0	4.0	0.00148	0.00077	0.00112	0.58	5.1
7	7.5	9.6	4.5	0.00135	0.00067	0.00101	0.43	6.0
8	11.5	9.0	3.0	0.00141	0.00099	0.00120	0.33	5.9
9	17.0	15.2	4.3	0.00082	0.00067	0.00074	0.16	7.1
10	25.6	26.0	7.0	0.00046	0.00040	0.00043	0.07	7.9
11	11.5							1.4
12	5.0							2.5
13	11.5							1.6
14	25.6	17.6	4.5	0.00068	0.00062	0.00065	0.06	3.2
15	38.5	59.3	20.0	0.00020	0.00014	0.00017	0.02	7.3
16	60.0							7.8
17	25.6							1.4
18	5.0							2.0
19	1.0							3.2

HIGH STRESS OEDOMETER NO. OH-38
 DEPTH: 287.5-288 m SITE: A



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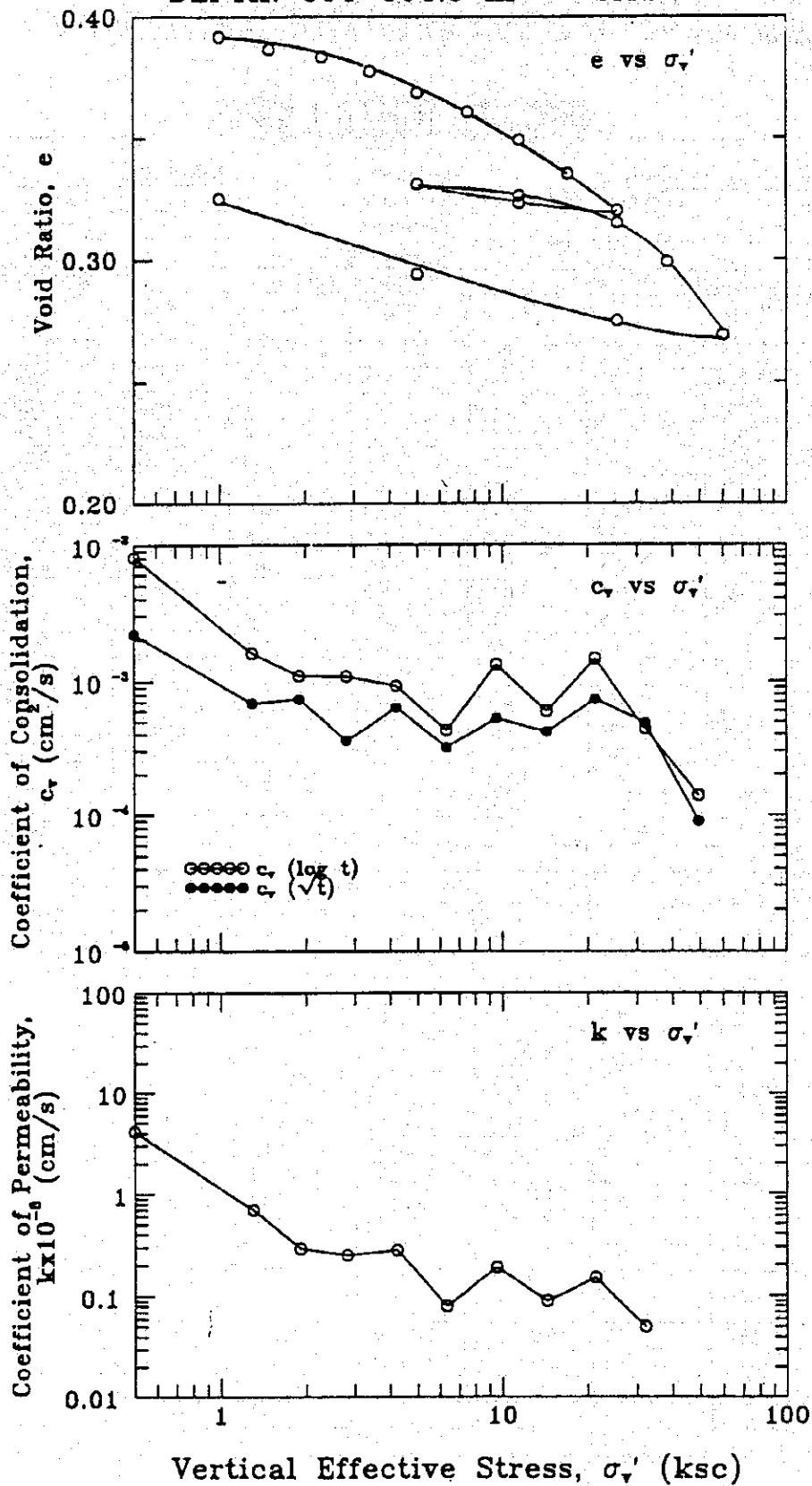
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 304-304.5 Sample No.: _____ Test No.: OH-62
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.426 cm Height of Sample (H_i): 2.000 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.999		0.0			0.402
2	1.0	1.988	1.985	1.985	0.8	0.8	0.394	0.392	0.392
3	1.5	1.981	1.979	1.978	1.1	1.1	0.389	0.387	0.387
4	2.3	1.975	1.974	1.973	1.3	1.4	0.385	0.384	0.383
5	3.4	1.967	1.965	1.964	1.8	1.8	0.379	0.378	0.377
6	5.0	1.966	1.953	1.952	2.4	2.4	0.378	0.369	0.369
7	7.5	1.943	1.941	1.940	3.0	3.0	0.363	0.361	0.361
8	11.5	1.928	1.924	1.923	3.8	3.8	0.352	0.349	0.349
9	17.0	1.910	1.904	1.904	4.8	4.8	0.339	0.335	0.335
10	25.6	1.889	1.882	1.880	5.9	6.0	0.325	0.320	0.318
11	11.5		1.886	1.887	5.7	5.7		0.323	0.323
12	5.0		1.898	1.899	5.1	5.1		0.331	0.331
13	11.5		1.891	1.891	5.4	5.5		0.326	0.326
14	25.6		1.876	1.876	6.2	6.2		0.315	0.315
15	38.5	1.860	1.852	1.848	7.4	7.6	0.304	0.299	0.296
16	60.0	1.825	1.810	1.809	9.5	9.6	0.280	0.269	0.268
17	25.6			1.818		9.1			0.275
18	5.0		1.846	1.850	7.7	7.5		0.294	0.297
19	1.0		1.890	1.893	5.5	5.4		0.325	0.327

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	Δt	log t	Average		
1	0.1							
2	1.0	6.3	0.4	0.00222	0.00811	0.00516	4.11	0.6
3	1.5	20.2	2.0	0.00069	0.00161	0.00115	0.70	1.7
4	2.3	18.7	2.9	0.00074	0.00110	0.00092	0.29	1.4
5	3.4	37.7	2.9	0.00036	0.00109	0.00073	0.25	2.5
6	5.0	21.4	3.4	0.00064	0.00093	0.00078	0.28	3.6
7	7.5	41.1	7.2	0.00032	0.00043	0.00038	0.08	3.4
8	11.5	25.0	2.3	0.00053	0.00133	0.00093	0.19	4.6
9	17.0	30.4	5.0	0.00042	0.00060	0.00051	0.09	5.8
10	25.6	17.1	2.0	0.00074	0.00147	0.00110	0.15	6.2
11	11.5							1.0
12	5.0							1.6
13	11.5							1.0
14	25.6							2.2
15	38.5	25.0	6.5	0.00049	0.00044	0.00046	0.05	6.7
16	60.0	135.8	19.0	0.00009	0.00014	0.00012	0.01	11.0
17	25.6							1.2
18	5.0							2.3
19	1.0							3.0

HIGH STRESS OEDOMETER NO. OH-62
 DEPTH: 304-304.5 m SITE: A



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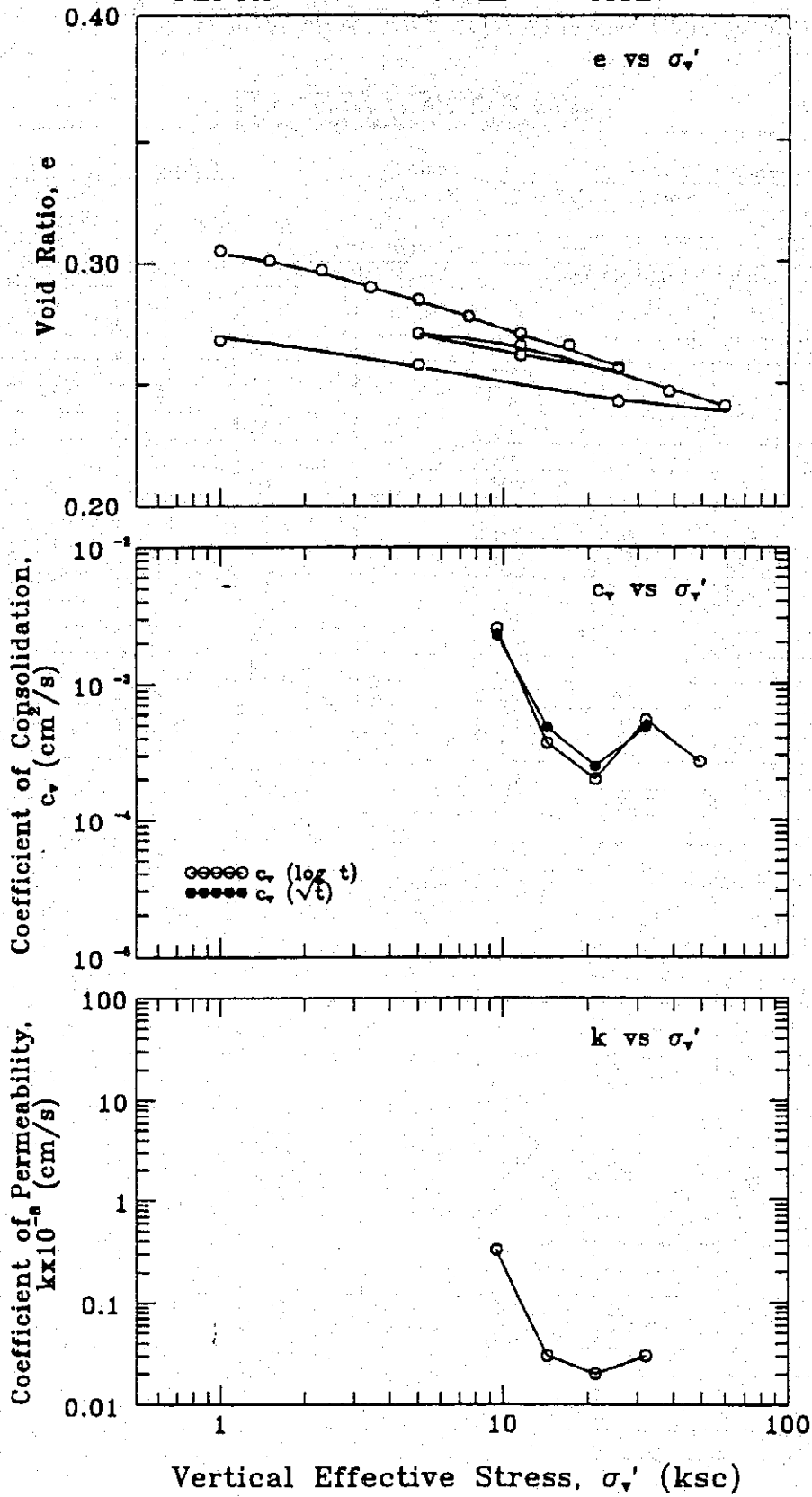
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 325.2-325 Sample No.: _____ Test No.: OH-57
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.452 cm Height of Sample (H_i): 1.900 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.899		0.0			0.308
2	1.0			1.895		0.2			0.305
3	1.5			1.889		0.6			0.301
4	2.3			1.883		0.9			0.297
5	3.4			1.873		1.4			0.290
6	5.0			1.866		1.8			0.285
7	7.5			1.856		2.3			0.278
8	11.5	1.850	1.846	1.846	2.8	2.9	0.274	0.271	0.271
9	17.0	1.839	1.838	1.838	3.3	3.3	0.267	0.266	0.266
10	25.6	1.828	1.825	1.825	3.9	3.9	0.259	0.257	0.257
11	11.5			1.832		3.6			0.262
12	5.0			1.846		2.9			0.271
13	11.5			1.839		3.2			0.266
14	25.6	1.826	1.824	1.823	4.0	4.0	0.257	0.256	0.256
15	38.5	1.814	1.811	1.810	4.7	4.7	0.249	0.247	0.247
16	60.0	1.804	1.801	1.801	5.2	5.2	0.242	0.241	0.240
17	25.6			1.805		5.0			0.243
18	5.0		1.827	1.828	3.8	3.8		0.258	0.259
19	1.0		1.841	1.846	3.1	2.8		0.268	0.271

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _{avg} x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	√t	log t	Average		
1	0.1							
2	1.0							0.2
3	1.5							2.0
4	2.3							1.7
5	3.4							3.0
6	5.0							2.0
7	7.5							3.1
8	11.5	5.3	1.1	0.00228	0.00255	0.00242	0.33	2.9
9	17.0	25.0	7.6	0.00048	0.00037	0.00042	0.03	2.5
10	25.6	47.0	14.0	0.00025	0.00020	0.00022	0.02	3.7
11	11.5							1.0
12	5.0							2.0
13	11.5							1.0
14	25.6	36.0	2.0	0.00033	0.00137	0.00085	0.05	2.3
15	38.5	24.0	5.0	0.00048	0.00054	0.00051	0.03	3.8
16	60.0		10.0		0.00027	0.00027	0.01	2.5
17	25.6							0.6
18	5.0							1.7
19	1.0							1.4

HIGH STRESS OEDOMETER NO. OH-57
 DEPTH: 325.2-325.7m SITE: A



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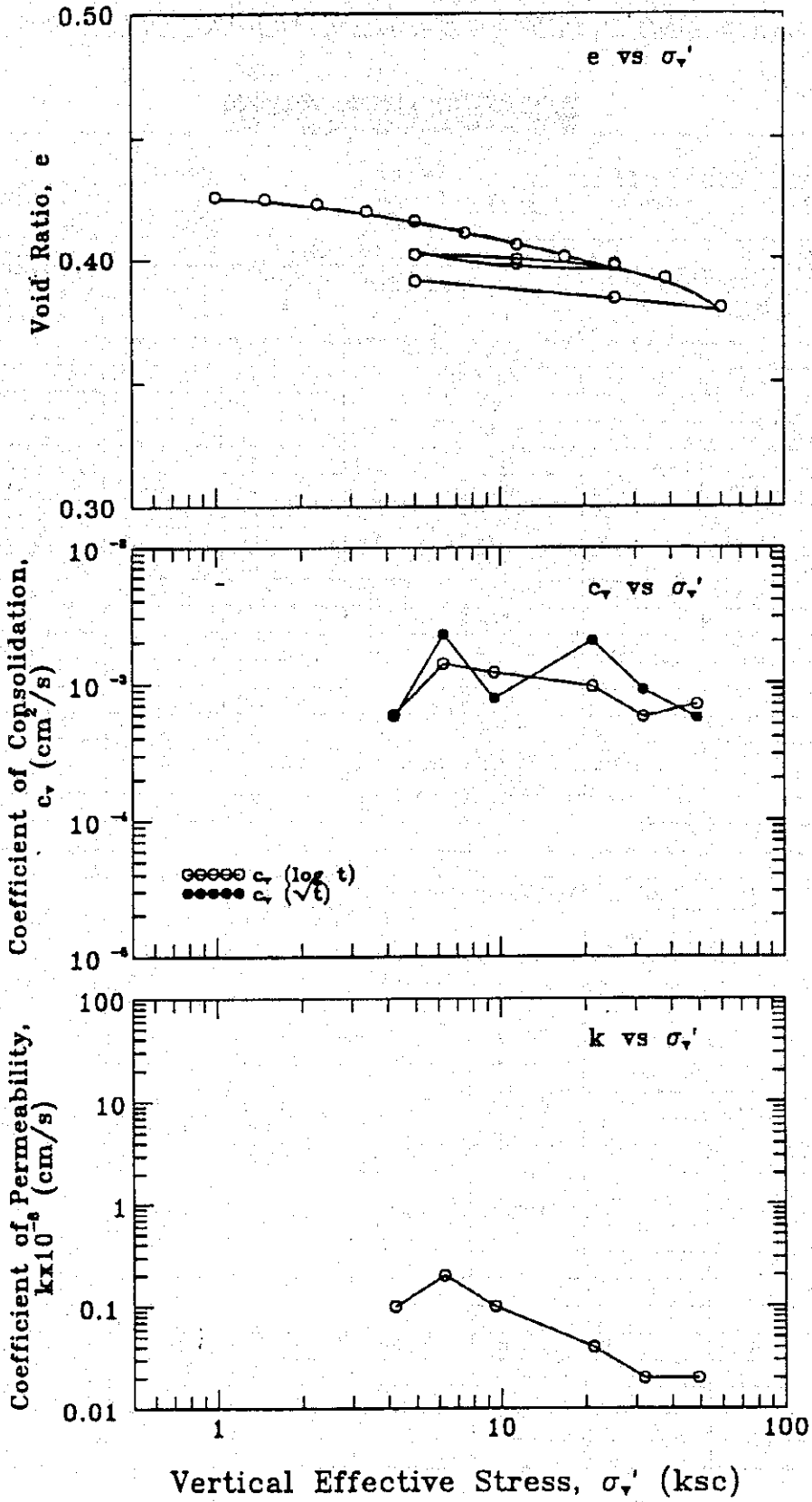
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 347.2-348 Sample No.: _____ Test No.: OH-61
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.333 cm Height of Sample (H_i): 1.900 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.901		0.1			0.426
2	1.0			1.901		0.0			0.426
3	1.5			1.900		0.0			0.425
4	2.3			1.897		0.1			0.423
5	3.4			1.893		0.4			0.420
6	5.0	1.889	1.888	1.887	0.7	0.7	0.417	0.416	0.415
7	7.5	1.882	1.882	1.882	1.0	1.0	0.412	0.411	0.412
8	11.5	1.876	1.874	1.874	1.4	1.4	0.407	0.406	0.406
9	17.0			1.867		1.7			0.401
10	25.6	1.862	1.863	1.861	1.9	2.1	0.397	0.398	0.396
11	11.5			1.864		1.9			0.398
12	5.0		1.868	1.869	1.7	1.7		0.402	0.402
13	11.5			1.866		1.8			0.400
14	25.6			1.862		2.0			0.397
15	38.5	1.857	1.855	1.854	2.4	2.4	0.393	0.392	0.391
16	60.0	1.843	1.839	1.838	3.2	3.3	0.383	0.380	0.379
17	25.6			1.845		2.9			0.384
18	5.0		1.855	1.857	2.4	2.3		0.391	0.393
19	1.0								

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	√t	log t	Average		
1	0.1							
2	1.0							0.0
3	1.5							0.1
4	2.3							0.8
5	3.4							1.3
6	5.0	22.2	5.0	0.00057	0.00059	0.00058	0.10	1.9
7	7.5	5.5	2.1	0.00227	0.00139	0.00183	0.20	1.8
8	11.5	16.0	2.4	0.00078	0.00120	0.00099	0.10	2.1
9	17.0							1.9
10	25.6	6.0	3.0	0.00204	0.00095	0.00150	0.04	2.0
11	11.5							0.4
12	5.0							0.7
13	11.5							0.3
14	25.6							0.7
15	38.5	13.5	5.0	0.00090	0.00057	0.00073	0.02	2.3
16	60.0	21.5	4.0	0.00056	0.00070	0.00063	0.02	4.3
17	25.6							1.0
18	5.0							0.9
19	1.0							3.3

HIGH STRESS OEDOMETER NO. OH-61
 DEPTH: 347.2-348 m SITE: A



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CONSOLIDATION

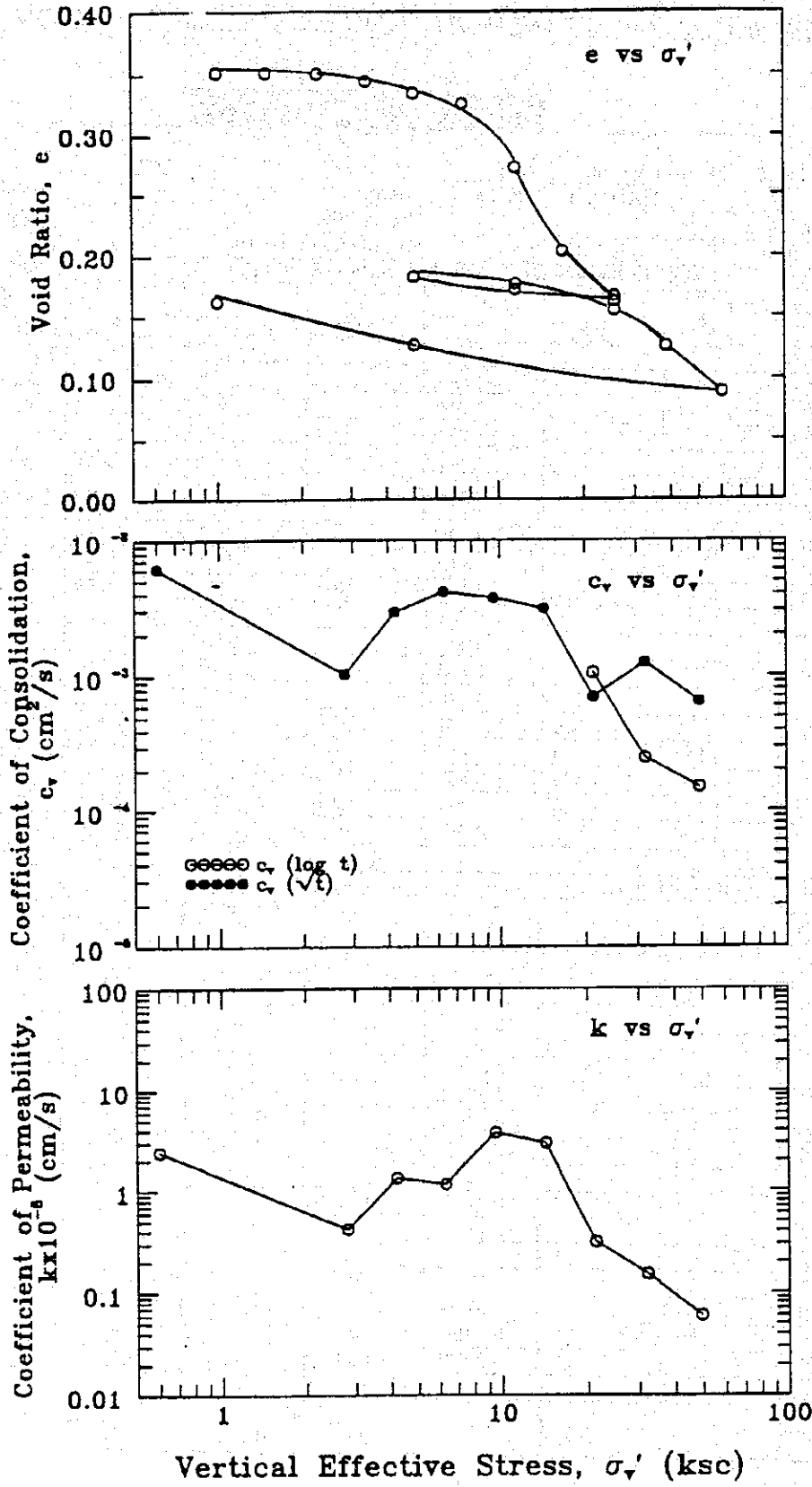
Project: Subsidence in Bangkok Vicinity
 Borehole No.: A Depth (m) 395-396
 Soil Description:
 Height of Solids (H_s): 1.364 cm

Location: Minburi
 Sample No.:
 Tested By: SIH
 Test No.: OH-27
 Date: 5-93
 Height of Sample (H_i): 1.900 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.851		2.6			0.357
2	1.0			1.845		2.9			0.352
3	1.5			1.844		2.9			0.352
4	2.3			1.843		3.0			0.351
5	3.4			1.835		3.4			0.345
6	5.0			1.821		4.2			0.335
7	7.5			1.808		4.8			0.326
8	11.5	1.742	1.736	1.731	8.7	8.9	0.277	0.272	0.269
9	17.0			1.642		13.6			0.204
10	25.6	1.601	1.592	1.590	16.2	16.3	0.174	0.167	0.166
11	11.5			1.599		15.8			0.172
12	5.0			1.613		15.1			0.183
13	11.5			1.605		15.5			0.177
14	25.6			1.576		17.0			0.155
15	38.5	1.546	1.536	1.534	19.2	19.3	0.133	0.126	0.125
16	60.0	1.504	1.485	1.483	21.8	22.0	0.103	0.089	0.087
17	25.6	1.566	1.585	1.493	16.6	21.4	0.148	0.162	0.094
18	5.0	1.526	1.538	1.541	19.1	18.9	0.119	0.127	0.130
19	1.0	1.566	1.585	1.591	16.6	16.3	0.148	0.162	0.166

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k x 10 ⁻⁸ cm/s	CR (%)
		t ₉₀	t ₅₀	$\frac{t}{t}$	log t	Average		
1	0.1							
2	1.0	2.0		0.00613		0.00613	2.43	0.3
3	1.5							0.2
4	2.3							0.2
5	3.4	11.6		0.00103		0.00103	0.42	2.6
6	5.0	4.0		0.00293		0.00293	1.35	4.2
7	7.5	2.8		0.00413		0.00413	1.17	3.9
8	11.5	2.9		0.00371		0.00371	3.80	21.9
9	17.0	3.1		0.00311		0.00311	2.98	27.6
10	25.6	13.0	2.0	0.00070	0.00105	0.00088	0.31	15.3
11	11.5							1.3
12	5.0							2.0
13	11.5	2.9		0.00315		0.00315	0.23	1.1
14	25.6	0.8		0.01084		0.01084	1.41	4.4
15	38.5	6.8	8.0	0.00124	0.00025	0.00074	0.15	12.5
16	60.0	12.3	12.0	0.00065	0.00015	0.00040	0.06	13.9
17	25.6							1.5
18	5.0							3.5
19	1.0		40		0.00005	0.00005	0.04	3.8

HIGH STRESS OEDOMETER NO. OH-27
 DEPTH: 395-396.0 m SITE: A



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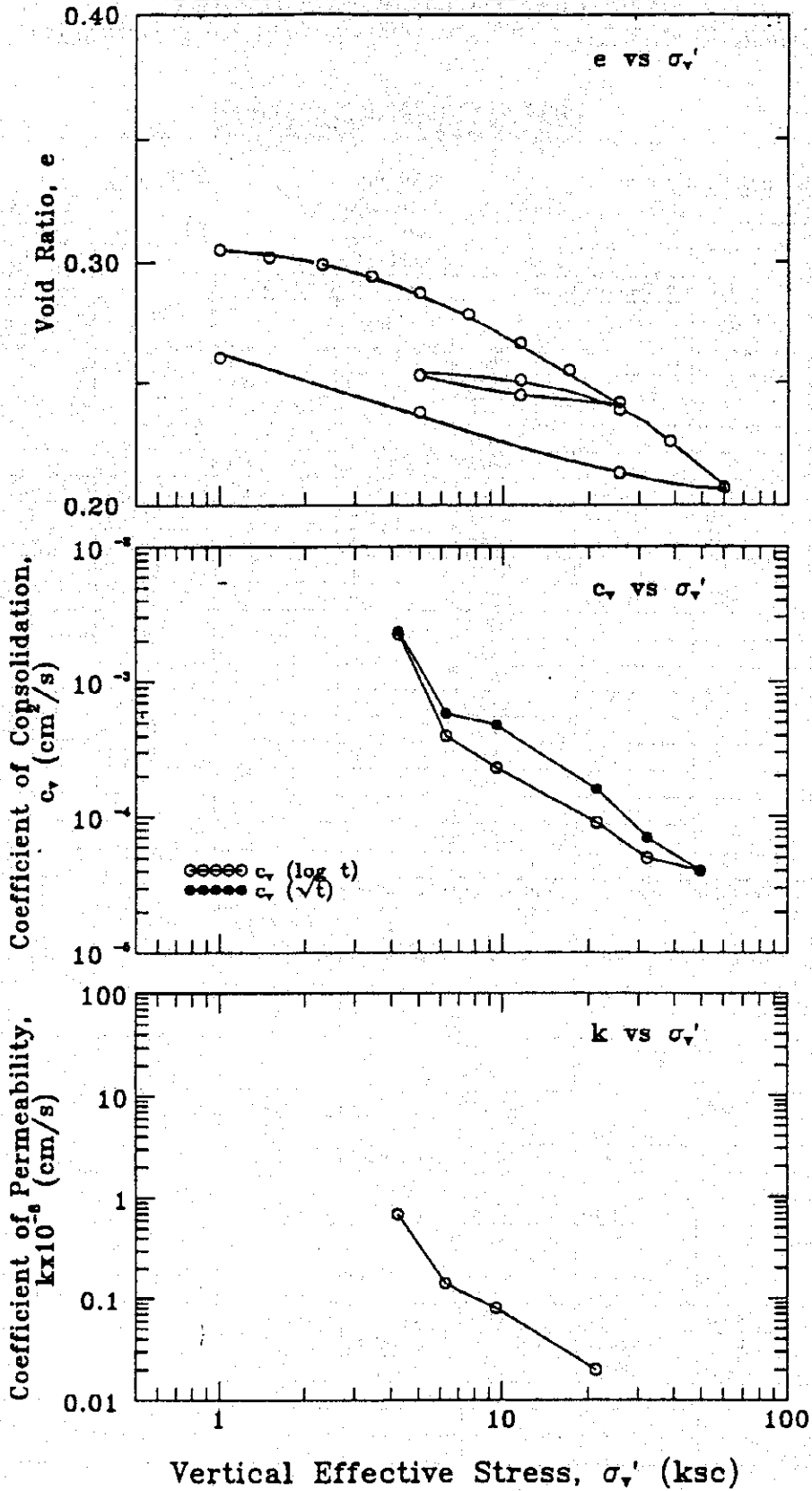
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 418-418.5 Sample No.: _____ Test No.: OH-58
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.448 cm Height of Sample (H_i): 1.900 cm

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.896		0.2			0.309
2	1.0			1.890		0.5			0.305
3	1.5			1.886		0.7			0.302
4	2.3			1.881		1.0			0.299
5	3.4			1.873		1.4			0.294
6	5.0	1.886	1.864	1.864	1.9	1.9	0.302	0.287	0.287
7	7.5	1.854	1.851	1.851	2.6	2.6	0.280	0.278	0.278
8	11.5	1.839	1.833	1.833	3.5	3.5	0.270	0.266	0.266
9	17.0			1.817		4.4			0.255
10	25.6	1.805	1.798	1.797	5.4	5.4	0.247	0.242	0.241
11	11.5			1.803		5.1			0.245
12	5.0			1.815		4.5			0.253
13	11.5			1.812		4.7			0.251
14	25.6	1.798	1.794	1.793	5.6	5.6	0.242	0.239	0.238
15	38.5	1.782	1.775	1.774	6.6	6.6	0.231	0.226	0.225
16	60.0	1.757	1.748	1.746	8.0	8.1	0.213	0.207	0.206
17	25.6			1.757		7.5			0.213
18	5.0			1.793		5.6			0.238
19	1.0			1.824		4.0			0.260

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k ₋₈ x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	-t	log t	Average		
1	0.1							
2	1.0							0.3
3	1.5							1.2
4	2.3							1.5
5	3.4							2.3
6	5.0	5.3	1.3	0.00237	0.00225	0.00231	0.69	2.8
7	7.5	21.1	7.0	0.00058	0.00040	0.00049	0.14	3.9
8	11.5	25.0	12.0	0.00048	0.00023	0.00035	0.08	5.1
9	17.0							5.0
10	25.6	73.0	30.0	0.00016	0.00009	0.00012	0.02	5.9
11	11.5							0.9
12	5.0							1.7
13	11.5							0.5
14	25.6	144.0	45.0	0.00008	0.00006	0.00007	0.00	2.8
15	38.5	169.0	55.0	0.00007	0.00005	0.00006	0.00	5.6
16	60.0	256.0	60.0	0.00004	0.00004	0.00004	0.00	7.4
17	25.6							1.6
18	5.0							2.7
19	1.0							2.3

HIGH STRESS OEDOMETER NO. OH-58
 DEPTH: 418-418.5 m SITE: A



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CONSOLIDATION

Project: Subsidence in Bangkok Vicinity

Location: MINBURI

Borehole No.: A Depth (m) 478-478.6

Sample No.:

Test No.: OH-55

Soil Description:

Tested By:

SIH

Date: 5-93

Height of Solids (H_s): 1.579 cm

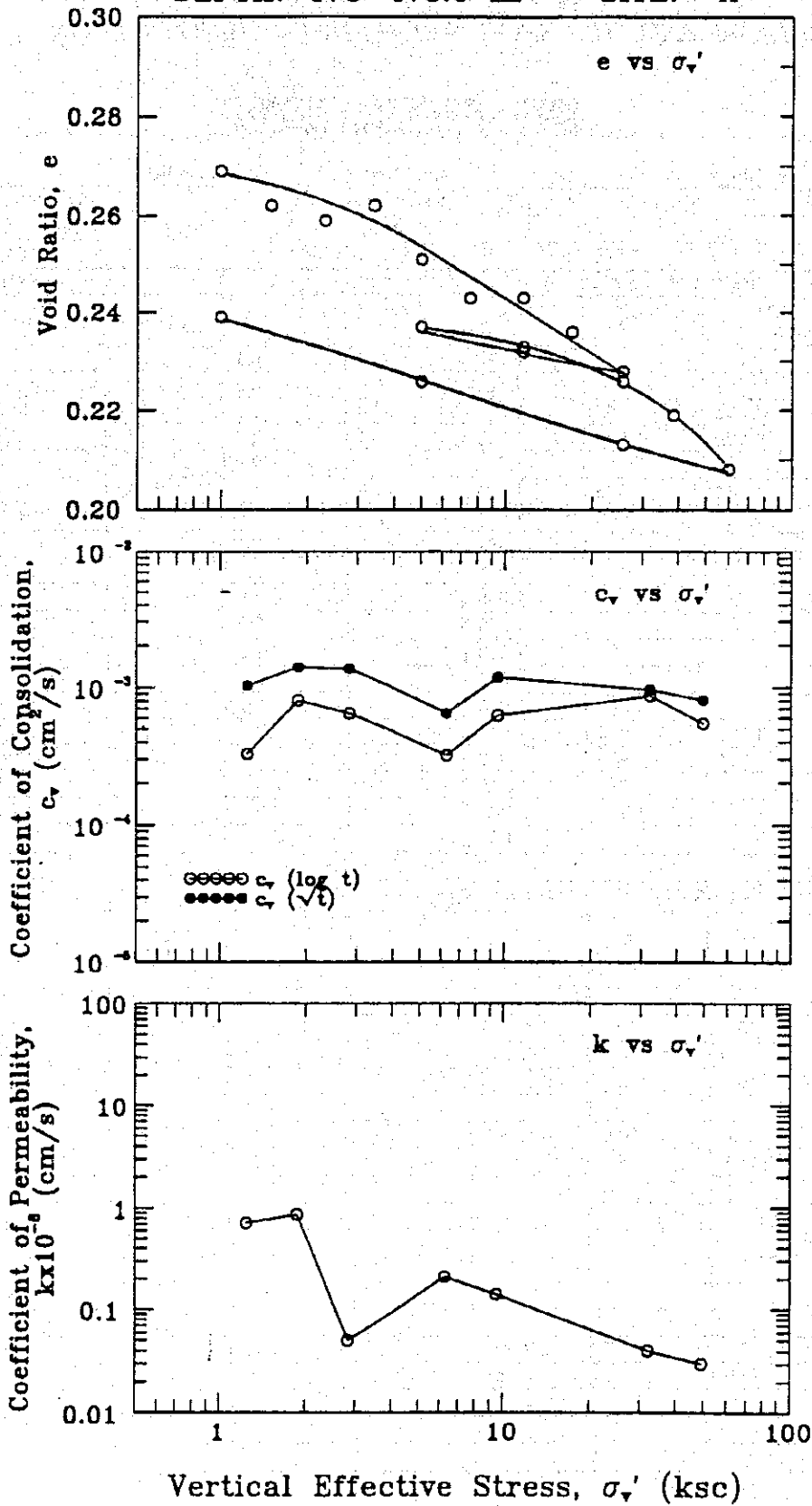
Height of Sample (H_i):

2.010 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			2.013		0.1			0.275
2	1.0			2.004		0.3			0.269
3	1.5	1.995	1.993	2.000	0.8	0.5	0.264	0.262	0.266
4	2.3	1.990	1.988	1.993	1.1	0.8	0.260	0.259	0.262
5	3.4			1.992		0.9			0.262
6	5.0	1.978	1.975	1.985	1.8	1.3	0.252	0.251	0.257
7	7.5	1.966	1.963	1.974	2.3	1.8	0.245	0.243	0.250
8	11.5			1.962		2.4			0.243
9	17.0			1.952		2.9			0.236
10	25.6			1.939		3.5			0.228
11	11.5			1.946		3.2			0.232
12	5.0			1.953		2.8			0.237
13	11.5			1.947		3.1			0.233
14	25.6			1.936		3.7			0.226
15	38.5	1.929	1.925	1.925	4.2	4.3	0.222	0.219	0.219
16	60.0	1.914	1.908	1.908	5.1	5.1	0.212	0.208	0.208
17	25.6		1.915	1.915	4.7	4.7		0.213	0.213
18	5.0		1.937	1.937	3.7	3.6		0.226	0.227
19	1.0			1.957		2.6			0.239

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	Δt	log t	Average		
1	0.1							
2	1.0							0.4
3	1.5	13.7	10.0	0.00103	0.00033	0.00068	0.72	1.2
4	2.3	10.0	4.0	0.00140	0.00081	0.00111	0.87	1.6
5	3.4	10.3	5.0	0.00136	0.00065	0.00101	0.05	0.3
6	5.0							2.3
7	7.5	21.0	10.0	0.00065	0.00032	0.00048	0.21	3.3
8	11.5	11.5	5.0	0.00118	0.00063	0.00091	0.14	3.2
9	17.0							3.1
10	25.6							3.5
11	11.5							1.0
12	5.0							1.0
13	11.5							0.9
14	25.6							1.6
15	38.5	13.7	3.5	0.00096	0.00087	0.00092	0.04	3.2
16	60.0	16.0	5.5	0.00081	0.00055	0.00068	0.03	4.4
17	25.6							0.9
18	5.0							1.6
19	1.0							1.4

HIGH STRESS OEDOMETER NO. OH-55
 DEPTH: 478-478.6 m SITE: A



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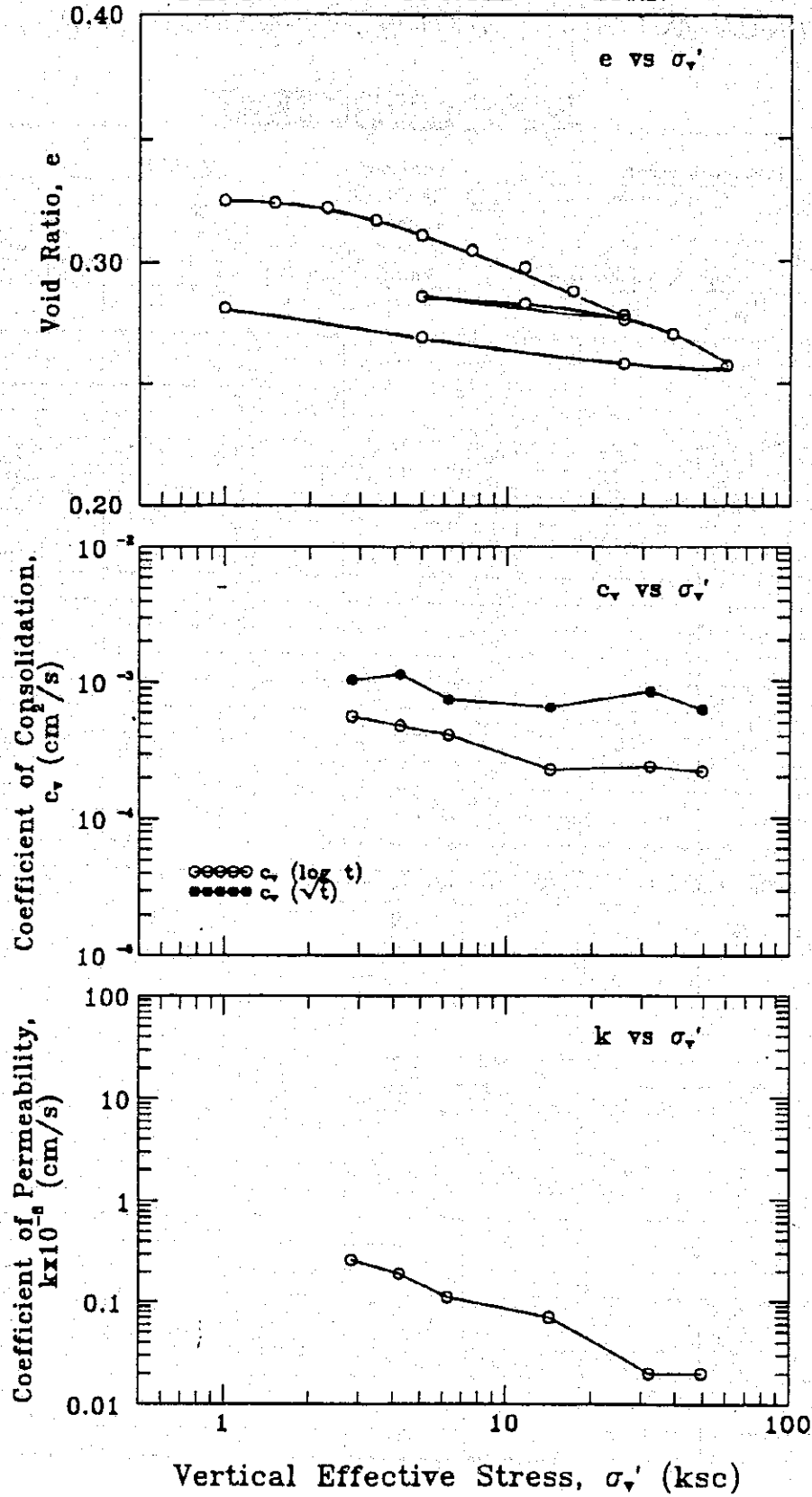
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 492.2-492.8 Sample No.: _____ Test No.: OH-52
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.432 cm Height of Sample (H_i): 1.900 cm

Incrim. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _i	e ₁₀₀	e _i	e ₅₀	e ₁₀₀	e _i
1	0.1			1.900		0.0			0.327
2	1.0			1.897		0.1			0.325
3	1.5			1.896		0.2			0.324
4	2.3			1.893		0.4			0.322
5	3.4	1.887	1.886	1.885	0.8	0.8	0.318	0.317	0.316
6	5.0	1.879	1.878	1.878	1.2	1.2	0.312	0.311	0.311
7	7.5	1.870	1.868	1.867	1.7	1.7	0.306	0.305	0.304
8	11.5			1.859		2.2			0.298
9	17.0	1.847	1.844	1.843	2.9	3.0	0.289	0.288	0.287
10	25.6			1.831		3.7			0.278
11	11.5			1.837		3.3			0.283
12	5.0			1.841		3.1			0.286
13	11.5			1.837		3.3			0.283
14	25.6	1.830	1.828	1.828	3.8	3.8	0.278	0.276	0.276
15	38.5	1.822	1.818	1.818	4.3	4.3	0.272	0.270	0.269
16	60.0	1.806	1.800	1.800	5.3	5.3	0.261	0.257	0.257
17	25.6			1.802		5.2			0.258
18	5.0			1.818		4.3			0.269
19	1.0			1.834		3.5			0.281

Incrim. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /a)			k _s x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	Δt	log t	Average		
1	0.1							
2	1.0							0.1
3	1.5							0.4
4	2.3							1.0
5	3.4	12.3	5.2	0.00103	0.00056	0.00079	0.26	2.3
6	5.0	11.0	6.0	0.00113	0.00048	0.00081	0.19	2.4
7	7.5	16.8	7.0	0.00074	0.00041	0.00057	0.11	2.9
8	11.5							2.2
9	17.0	18.5	12.0	0.00065	0.00023	0.00044	0.07	5.0
10	25.6							3.7
11	11.5							1.0
12	5.0							0.6
13	11.5							0.6
14	25.6	14.4	9.0	0.00082	0.00031	0.00056	0.02	1.5
15	38.5	14.0	11.5	0.00084	0.00024	0.00054	0.02	2.8
16	60.0	18.5	12.0	0.00062	0.00022	0.00042	0.02	4.9
17	25.6							0.3
18	5.0							1.2
19	1.0							1.2

HIGH STRESS OEDOMETER NO. OH-52
 DEPTH: 492.2-492.8m SITE: A



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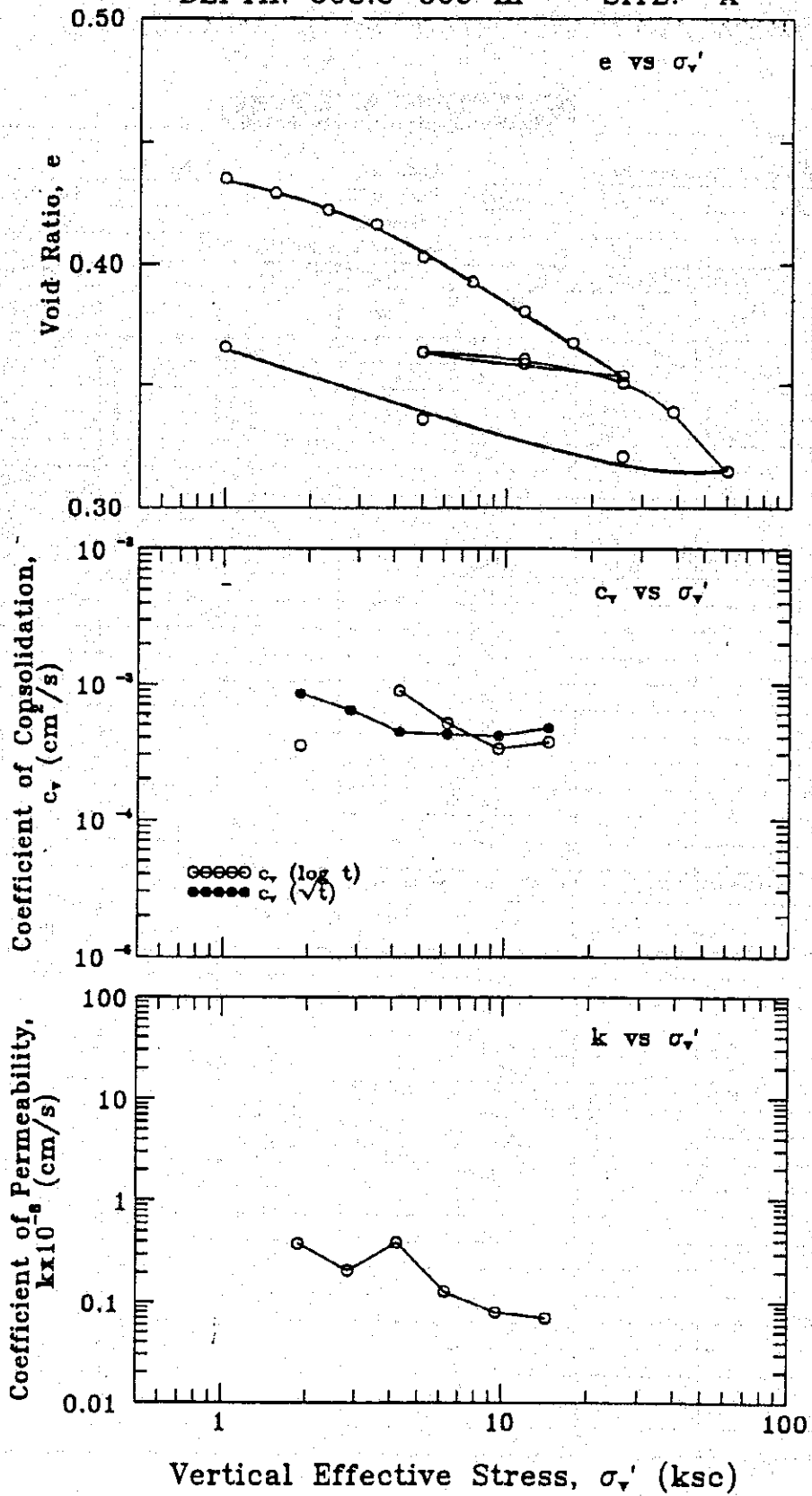
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 508.5-509 Sample No.: _____ Test No.: OH-56
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.381 cm Height of Sample (H): 2.000 cm

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			1.992		0.4			0.443
2	1.0			1.981		0.9			0.435
3	1.5	1.975	1.973	1.973	1.4	1.4	0.430	0.429	0.428
4	2.3	1.965	1.963	1.963	1.8	1.8	0.423	0.422	0.421
5	3.4			1.956		2.2			0.416
6	5.0	1.943	1.937	1.937	3.1	3.2	0.407	0.403	0.402
7	7.5	1.926	1.923	1.923	3.8	3.8	0.394	0.393	0.392
8	11.5	1.910	1.907	1.907	4.6	4.6	0.383	0.381	0.381
9	17.0	1.893	1.890	1.889	5.5	5.5	0.371	0.368	0.368
10	25.6			1.870		6.5			0.354
11	11.5			1.876		6.2			0.359
12	5.0			1.883		5.8			0.364
13	11.5			1.879		6.1			0.361
14	25.6			1.865		6.7			0.351
15	38.5			1.850		7.5			0.339
16	60.0			1.816		9.2			0.315
17	25.6			1.824		8.8			0.321
18	5.0			1.845		7.8			0.336
19	1.0		1.886	1.868	5.7	6.6		0.366	0.352

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _v x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	√t	log t	Average		
1	0.1							
2	1.0							0.5
3	1.5							2.4
4	2.3	16.0	9.0	0.00085	0.00035	0.00060	0.38	2.7
5	3.4	21.0		0.00064		0.00064	0.21	2.1
6	5.0	30.2	3.5	0.00044	0.00089	0.00066	0.39	5.7
7	7.5	31.3	6.0	0.00042	0.00051	0.00046	0.13	3.9
8	11.5	31.4	9.0	0.00041	0.00033	0.00037	0.08	4.3
9	17.0	27.0	8.0	0.00047	0.00037	0.00042	0.07	5.2
10	25.6							5.5
11	11.5							0.9
12	5.0							1.0
13	11.5							0.6
14	25.6							2.0
15	38.5							4.5
16	60.0							8.7
17	25.6							1.1
18	5.0							1.5
19	1.0							1.6

HIGH STRESS OEDOMETER NO. OH-56
 DEPTH: 508.5-509 m SITE: A



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GEOTECHNICAL AND TRANSPORTATION ENGINEERING DIVISION

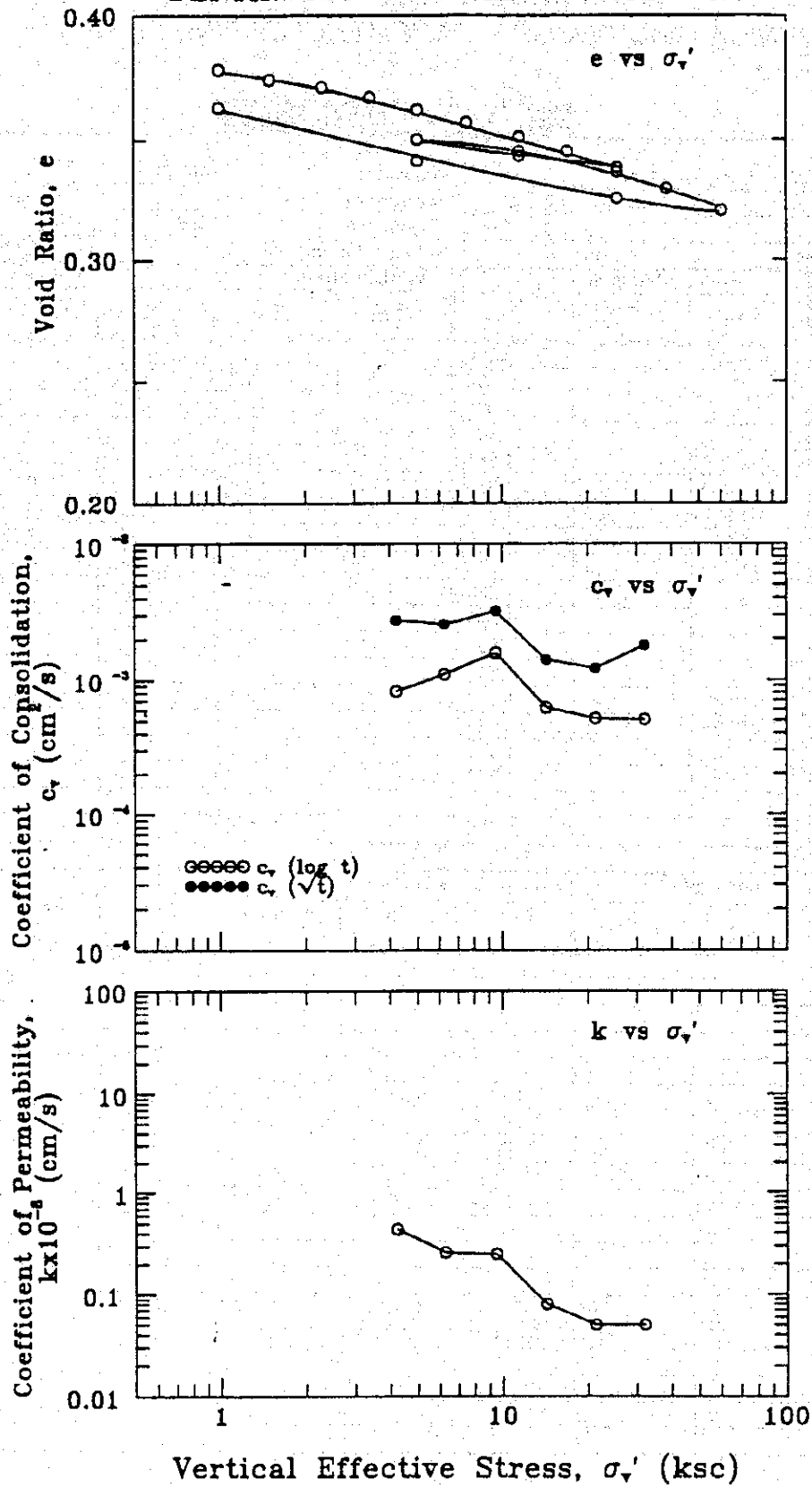
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 525-526 Sample No.: _____ Test No.: OH-54
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.449 cm Height of Sample (H_i): 2.000 cm

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	ε ₁₀₀	ε _f	e ₅₀	e ₁₀₀	e _f
1	0.1			2.000					0.380
2	1.0			1.996		0.2			0.378
3	1.5			1.991		0.4			0.374
4	2.3			1.987		0.7			0.371
5	3.4			1.981		1.0			0.367
6	5.0	1.975	1.973	1.973	1.3	1.4	0.363	0.362	0.362
7	7.5	1.967	1.966	1.966	1.7	1.7	0.358	0.357	0.357
8	11.5	1.959	1.958	1.957	2.1	2.1	0.352	0.351	0.351
9	17.0	1.950	1.949	1.949	2.6	2.6	0.346	0.345	0.345
10	25.6	1.941	1.938	1.938	3.1	3.1	0.339	0.338	0.338
11	11.5			1.946		2.7			0.343
12	5.0			1.957		2.2			0.350
13	11.5			1.949		2.6			0.345
14	25.6	1.938	1.936	1.936	3.2	3.2	0.337	0.336	0.336
15	38.5	1.928	1.926	1.926	3.7	3.7	0.331	0.329	0.329
16	60.0			1.913		4.4			0.320
17	25.6			1.920		4.0			0.325
18	5.0			1.943		2.9			0.341
19	1.0			1.975		1.3			0.363

Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 ⁻⁶ cm/s	CR (%)
		t ₉₀	t ₅₀	Δt	log t	Average		
1	0.1							
2	1.0							0.1
3	1.5							1.5
4	2.3							1.2
5	3.4							1.7
6	5.0	5.0	3.9	0.00276	0.00082	0.00179	0.44	2.3
7	7.5	5.3	2.9	0.00258	0.00110	0.00184	0.26	2.0
8	11.5	4.2	2.0	0.00323	0.00158	0.00240	0.25	2.3
9	17.0	9.6	5.0	0.00140	0.00062	0.00101	0.08	2.6
10	25.6	10.9	6.0	0.00122	0.00052	0.00087	0.05	2.8
11	11.5							1.1
12	5.0							1.5
13	11.5							1.1
14	25.6	10.0	5.0	0.00133	0.00062	0.00097	0.04	1.8
15	38.5	7.3	6.0	0.00180	0.00051	0.00115	0.05	2.9
16	60.0							3.5
17	25.6							1.0
18	5.0							1.6
19	1.0							2.3

HIGH STRESS OEDOMETER NO. OH-54
 DEPTH: 525-526.0 m SITE: A



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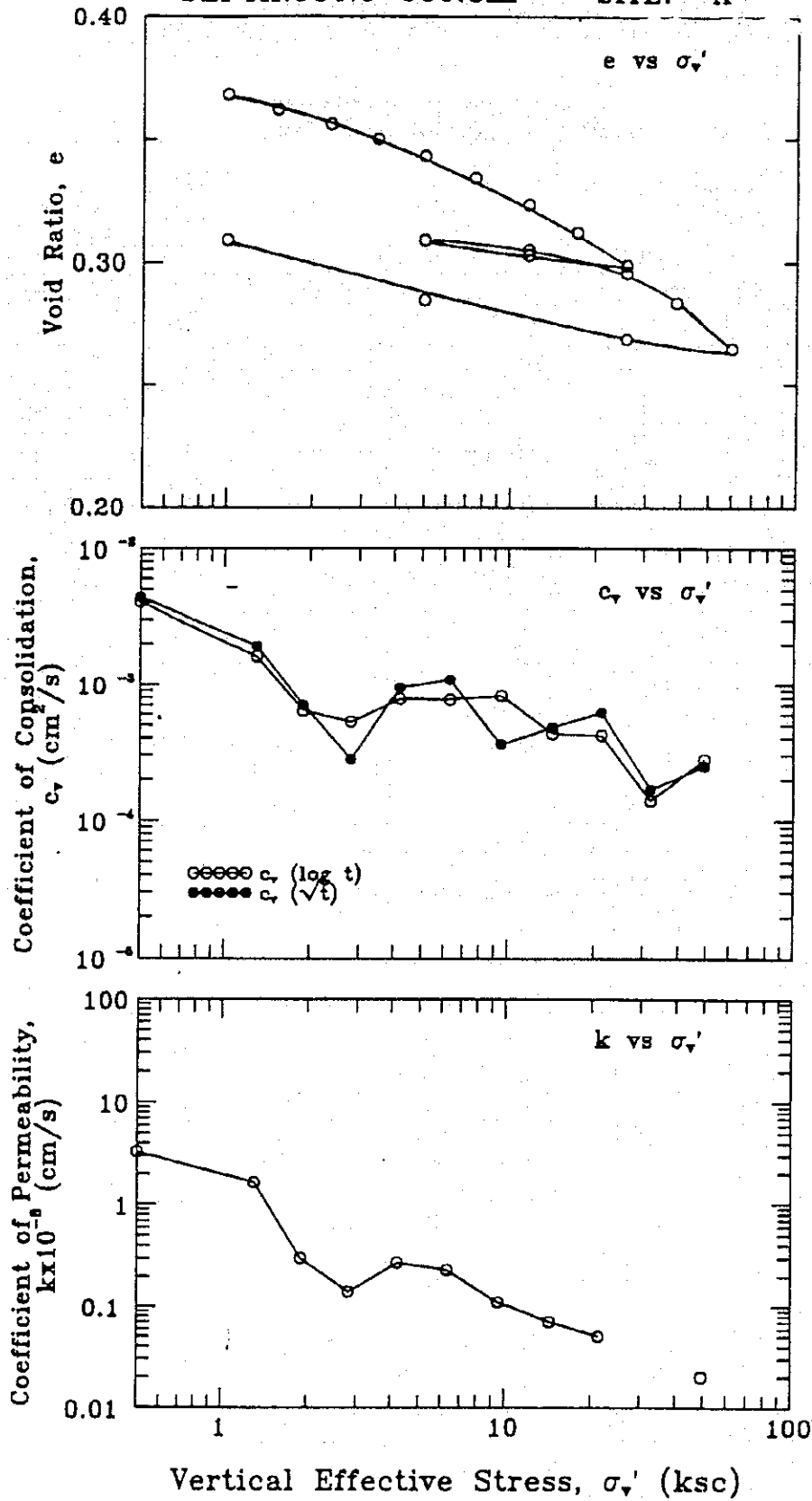
CONSOLIDATION

Project: Subsidence in Bangkok Vicinity Location: MINBURI
 Borehole No.: A Depth (m) 530.3-530 Sample No.: _____ Test No.: OH-63
 Soil Description: _____ Tested By: SIH Date: 5-93
 Height of Solids (H_s): 1.333 cm Height of Sample (H_i): 2.000 cm

Incr. No.	Vert. Stress (kg/cm ²)	Height of Sample (cm)			Vertical Strain (%)		Void Ratio		
		H ₅₀	H ₁₀₀	H _f	e ₁₀₀	e _f	e ₅₀	e ₁₀₀	e _f
1	0.1			2.000		0.0			0.500
2	1.0	1.987	1.985	1.985	0.7	0.7	0.491	0.489	0.489
3	1.5	1.979	1.976	1.975	1.2	1.3	0.484	0.482	0.481
4	2.3	1.970	1.968	1.968	1.6	1.6	0.478	0.477	0.476
5	3.4	1.962	1.960	1.959	2.0	2.1	0.472	0.470	0.469
6	5.0	1.952	1.949	1.947	2.6	2.6	0.464	0.462	0.461
7	7.5	1.939	1.935	1.934	3.2	3.3	0.454	0.452	0.451
8	11.5	1.924	1.920	1.919	4.0	4.0	0.443	0.440	0.440
9	17.0	1.908	1.903	1.902	4.8	4.9	0.431	0.428	0.427
10	25.6	1.891	1.886	1.884	5.7	5.8	0.418	0.414	0.413
11	11.5			1.890		5.5			0.418
12	5.0		1.899	1.899	5.0	5.0		0.425	0.425
13	11.5		1.893	1.893	5.3	5.4		0.420	0.420
14	25.6		1.881	1.881	6.0	6.0		0.411	0.411
15	38.5	1.870	1.864	1.863	6.8	6.9	0.403	0.398	0.398
16	60.0	1.845	1.835	1.834	8.3	8.3	0.384	0.377	0.376
17	25.6		1.842	1.842	7.9	7.9		0.382	0.382
18	5.0		1.865	1.866	6.8	6.7		0.399	0.400
19	1.0		1.899	1.903	5.0	4.9		0.425	0.427

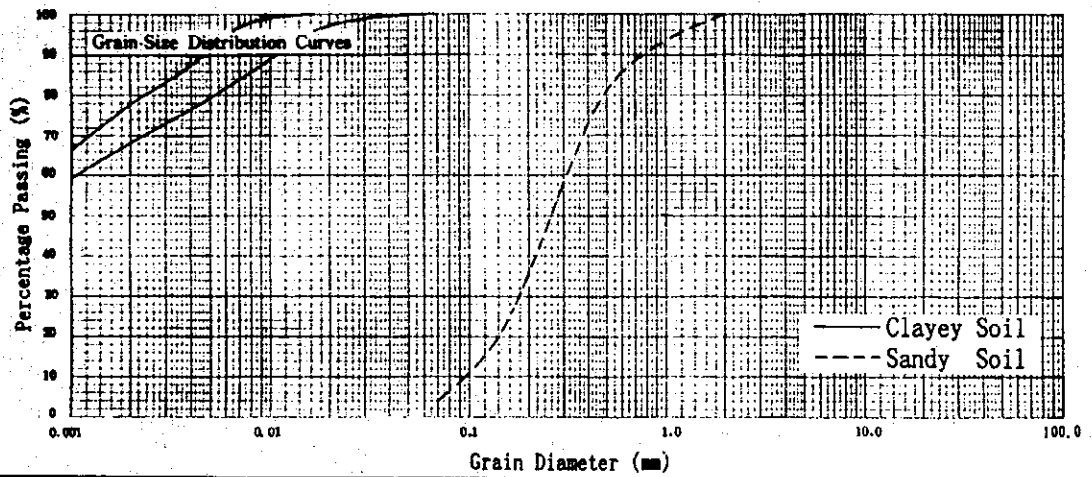
Incr. No.	Vert. Stress (kg/cm ²)	Time (minutes)		Coefficient of Consolidation (cm ² /s)			k _s x 10 cm/s	CR (%)
		t ₉₀	t ₅₀	t/t	log t	Average		
1	0.1							
2	1.0	3.2	0.8	0.00439	0.00405	0.00422	3.27	0.6
3	1.5	7.2	2.0	0.00193	0.00161	0.00177	1.64	2.6
4	2.3	19.5	5.0	0.00070	0.00064	0.00067	0.30	2.2
5	3.4	49.0	6.0	0.00028	0.00053	0.00040	0.14	2.4
6	5.0	14.1	4.0	0.00095	0.00078	0.00087	0.27	3.2
7	7.5	12.3	4.0	0.00108	0.00077	0.00093	0.23	3.9
8	11.5	36.0	3.7	0.00036	0.00082	0.00059	0.11	4.1
9	17.0	27.0	7.0	0.00048	0.00043	0.00045	0.07	4.9
10	25.6	20.3	7.0	0.00062	0.00042	0.00052	0.05	4.9
11	11.5							0.9
12	5.0							1.3
13	11.5							0.8
14	25.6							1.7
15	38.5	72.3	20.0	0.00017	0.00014	0.00016	0.01	4.9
16	60.0	49.0	10.0	0.00025	0.00028	0.00026	0.02	7.4
17	25.6							1.1
18	5.0							1.7
19	1.0							2.6

HIGH STRESS OEDOMETER NO. OH-63
 DEPTH: 530.3-530.8m SITE: A



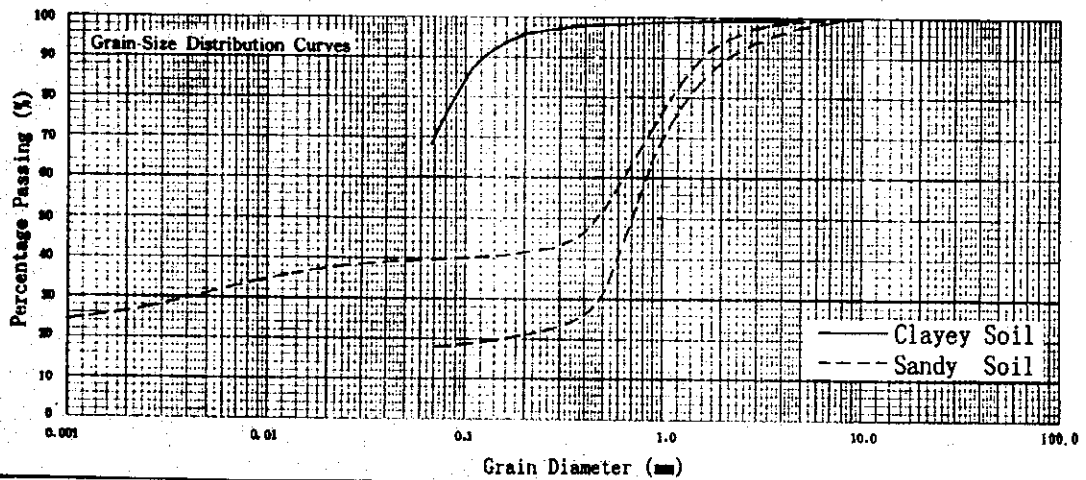
D. SOIL TESTS

D.2 Soil tests result of Site-B



Colloid	Clay	Silt	Sand	Gravel
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[Sf Layer]



Colloid	Clay	Silt	Sand	Gravel
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[Bk Layer]

Grain Size Distribution Curves at Site-B [Sf & Bk]	
THE STUDY ON MANAGEMENT OF GROUNDWATER AND LAND SUBSIDENCE IN THE BANGKOK METROPOLITAN AREA AND ITS VICINITY	
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	KOKUSAI KOGYO CO., LTD