Data Sheet: Consolidation Test of Soils

1. Group No: ……
2. Sample: ……
3. Sample Depth:
4. Ring Dimensions: d= h= A=
5. Initial Height of Specimen h_0=
6. Specific Gravity G_s=

Initial Specimen Data:

Mass of Ring M_1=
Mass of Filter Paper M_2=
Mass of Ring + Paper +Wet Soil M_3=
Mass of Wet Soil= M_3- (M_2 + M_1)
Initial Water Content w_i=

Final Water Content-Determination

Mass of disc M_4=

Mass of ring, M_1=

Mass of disc + Ring + Wet Soil M_5=

Mass of ring +disc + dry Soil M_6=

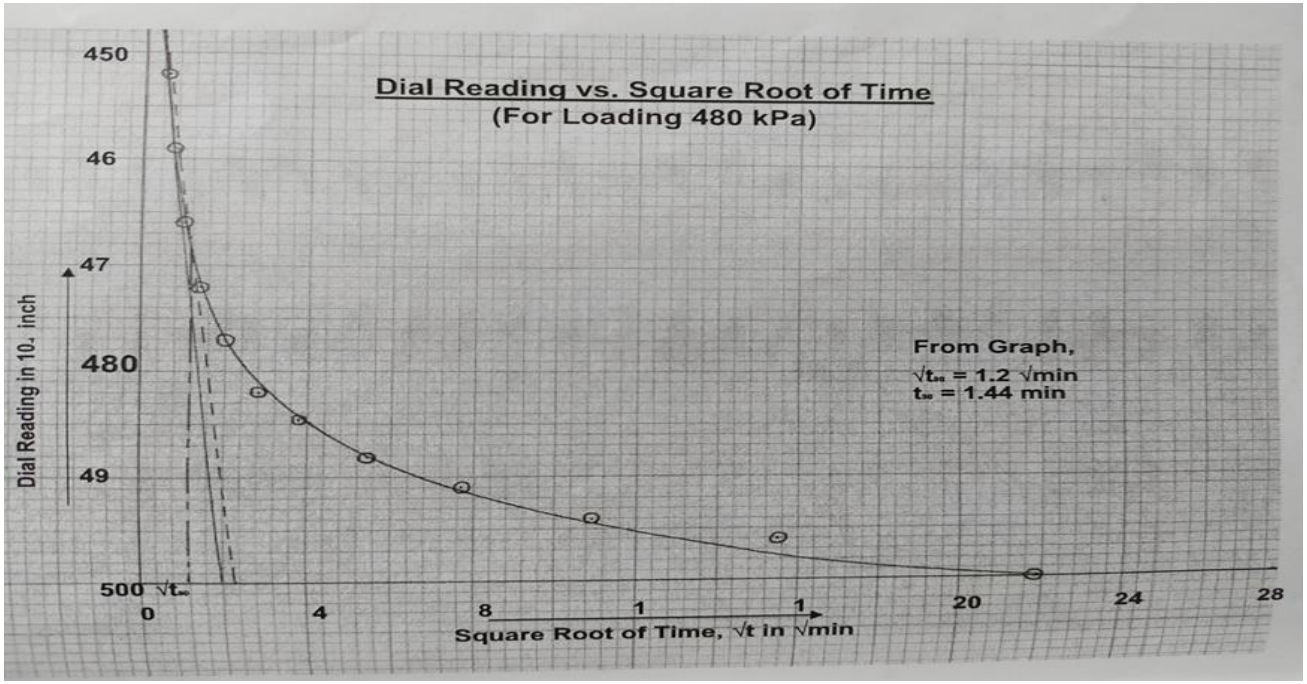
Mass of water in soils $m_w = M_5 - M_6$

Mass of dry soil, $m_s = M_6 - (M_4 + M_1)$

Final water content $w_f = \frac{m_w}{m_s}$ x 100%

Loading Stage - 0

Target Pressure (25 kPa)				
Actual Applied Load (Kg)				
Date	**Time**	**Elapsed Time (min)**	**Square Root of Time (√min)**	**Dial Reading**
		0	0	
		0.1	**0.316**	
		0.25	0.5	
		0.5	0.707	
		1	1	
		2	1.414	
		4	2	
		8	2.828	
		15	3.873	
		30	5.477	
		60	7.746	
		120	10.954	
		240	15.492	
		480	**21.908**	
		1440	37.947	-


Dial Reading vs. Square Root of Time
(For Loading 480 kPa)
450
46
47
480
49
Dial Reading in 10⁻³ inch
From Graph,
√t₅₀ = 1.2 √min
t₅₀ = 1.44 min
500 √t₅₀
0
4
8
1
1
20
24
28
Square Root of Time, √t in √min

Loading Stage –1

Target Pressure (50 kPa)				
Actual Applied Load (Kg)				
Date	**Time**	**Elapsed Time (min)**	**Square Root of Time (√min)**	**Dial Reading**
		0	0	
		0.1	**0.316**	
		0.25	0.5	
		0.5	0.707	
		1	1	
		2	1.414	
		4	2	
		8	2.828	
		15	3.873	
		30	5.477	
		60	7.746	
		120	10.954	
		240	15.492	
		480	**21.908**	
		1440	37.947	-

Loading Stage –2

Target Pressure (100 kPa)				
Actual Applied Load (Kg)				
Date	**Time**	**Elapsed Time (min)**	**Square Root of Time (√min)**	**Dial Reading**
		0	0	
		0.1	**0.316**	
		0.25	0.5	
		0.5	0.707	
		1	1	
		2	1.414	
		4	2	
		8	2.828	
		15	3.873	
		30	5.477	
		60	7.746	
		120	10.954	
		240	15.492	
		480	**21.908**	
		1440	37.947	-

Loading Stage –3

Target Pressure (200 kPa)				
Actual Applied Load (Kg)				
Date	**Time**	**Elapsed Time (min)**	**Square Root of Time (√min)**	**Dial Reading**
		0	0	
		0.1	**0.316**	
		0.25	0.5	
		0.5	0.707	
		1	1	
		2	1.414	
		4	2	
		8	2.828	
		15	3.873	
		30	5.477	
		60	7.746	
		120	10.954	
		240	15.492	
		480	**21.908**	
		1440	37.947	-

Loading Stage –4

Target Pressure (400 kPa)				
Actual Applied Load (Kg)				
Date	**Time**	**Elapsed Time (min)**	**Square Root of Time (√min)**	**Dial Reading**
		0	0	
		0.1	**0.316**	
		0.25	0.5	
		0.5	0.707	
		1	1	
		2	1.414	
		4	2	
		8	2.828	
		15	3.873	
		30	5.477	
		60	7.746	
		120	10.954	
		240	15.492	
		480	**21.908**	
		1440	37.947	-

Loading Stage –5

Target Pressure (800 kPa)				
Actual Applied Load (Kg)				
Date	**Time**	**Elapsed Time (min)**	**Square Root of Time (√min)**	**Dial Reading**
		0	0	
		0.1	**0.316**	
		0.25	0.5	
		0.5	0.707	
		1	1	
		2	1.414	
		4	2	
		8	2.828	
		15	3.873	
		30	5.477	
		60	7.746	
		120	10.954	
		240	15.492	
		480	**21.908**	
		1440	37.947	-

Loading Stage –6

Target Pressure (kPa)				
Actual Applied Load (Kg)				
Date	Time	Elapsed Time (min)	Square Root of Time (√min)	Dial Reading
				-

Loading Stage –7

Target Pressure (kPa)				
Actual Applied Load (Kg)				
Date	Time	Elapsed Time (min)	Square Root of Time (√min)	Dial Reading
				-

Unloading Stage –1

Target Pressure (400 kPa)				
Actual Applied Load (Kg)				
Date	**Time**	**Elapsed Time (min)**	**Square Root of Time (√min)**	**Dial Reading**
		0	0	
		0.1	**0.316**	
		0.25	0.5	
		0.5	0.707	
		1	1	
		2	1.414	
		4	2	
		8	2.828	
		15	3.873	
		30	5.477	
		60	7.746	
		120	10.954	
		240	15.492	
		480	**21.908**	
		1440	37.947	-

Unloading Stage –2

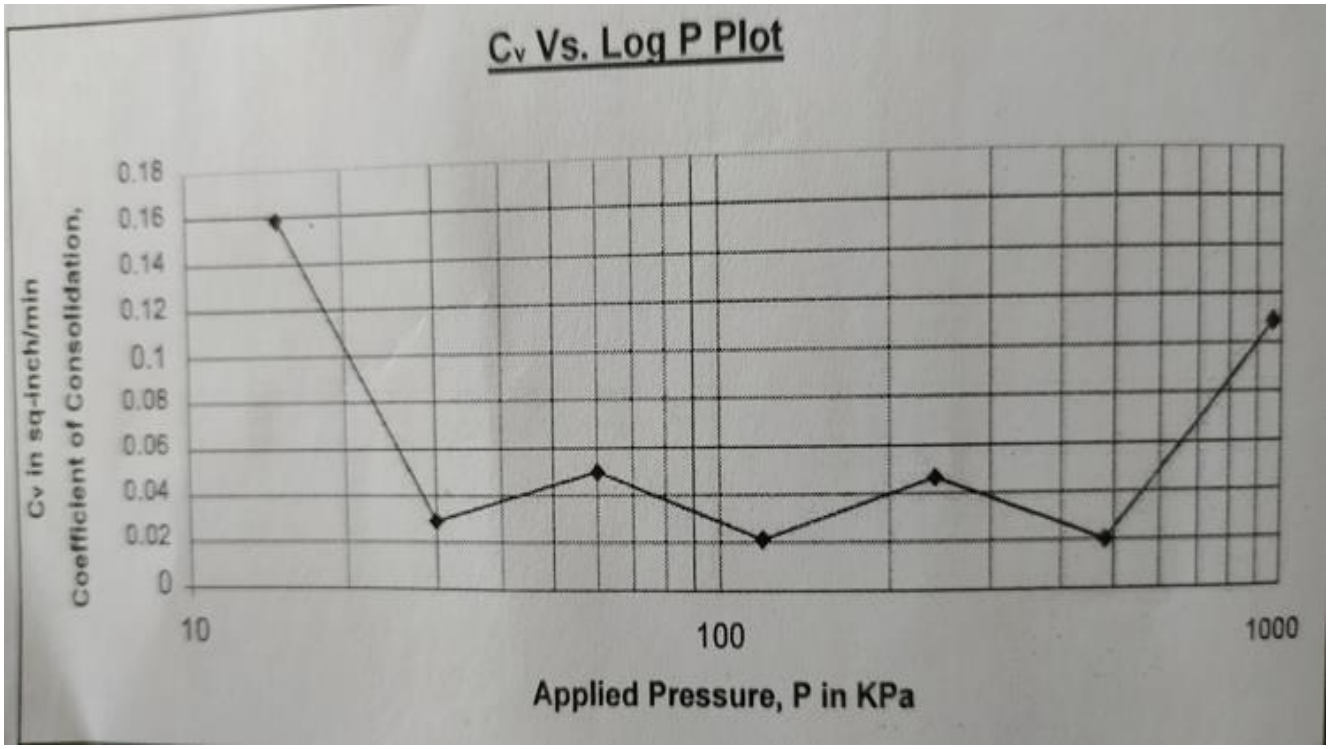
Target Pressure (200 kPa)				
Actual Applied Load (Kg)				
Date	**Time**	**Elapsed Time (min)**	**Square Root of Time (√min)**	**Dial Reading**
		0	0	
		0.1	**0.316**	
		0.25	0.5	
		0.5	0.707	
		1	1	
		2	1.414	
		4	2	
		8	2.828	
		15	3.873	
		30	5.477	
		60	7.746	
		120	10.954	
		240	15.492	
		480	**21.908**	
		1440	37.947	-

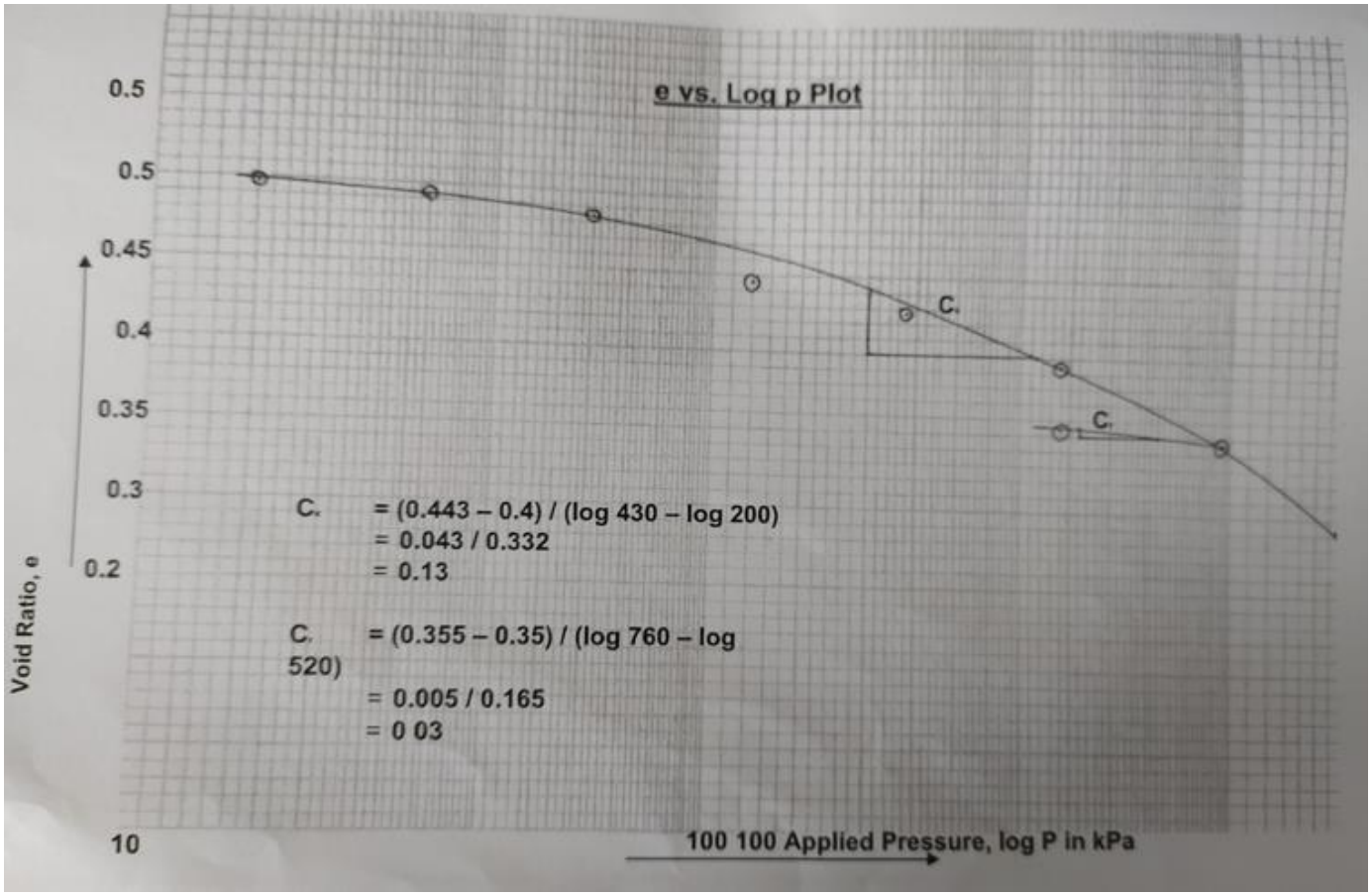
Unloading Stage –3

Target Pressure (50kPa)				
Actual Applied Load (Kg)				
Date	**Time**	**Elapsed Time (min)**	**Square Root of Time (√min)**	**Dial Reading**
		0	0	
		0.1	**0.316**	
		0.25	0.5	
		0.5	0.707	
		1	1	
		2	1.414	
		4	2	
		8	2.828	
		15	3.873	
		30	5.477	
		60	7.746	
		120	10.954	
		240	15.492	
		480	**21.908**	
		1440	37.947	-

Calculation of C_v for All Load Increment

Applied pressure, P (kPa)	Final dial reading (inch)	Change in specimen height (inch	Final Specimen height (inch)	Void height $H_v(inch$	Void Ratio, e	Average height during consolidation (inch)	Fitting time t_{90}	Coefficient of consolidation $C_v(\boldsymbol{in^2/min})$
0								
25								
50								
100								
200								
400								
800								


Cv Vs. Log P Plot
Cv in sq-inch/min
Coefficient of Consolidation,
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
10
100
1000
Applied Pressure, P in KPa


e vs. Log p Plot
0.5
0.5
0.45
0.4
0.35
0.3
0.2
Void Ratio, e
C.
C.
C. = (0.443 – 0.4) / (log 430 – log 200)
= 0.043 / 0.332
= 0.13
C. = (0.355 – 0.35) / (log 760 – log 520)
= 0.005 / 0.165
= 0 03
10
100 100 Applied Pressure, log P in kPa

Sequence of Lab Report Submission:

Name of the Experiment: Consolidation Test of Soils
Objective of the Test:
Significance of the Test:

Reference:

Apparatus:

Contents of the Report:

i. Visual classification of soils
ii. Data Tables includes of:
    (1). Load Increment data (for each load increment)
    (2).Calculation of C_v for all Load Increment)
iii. Plots include of:
    (1). Dial reading vs. $\sqrt{t}$ (min) to determine t_{90} (for each load increment)
    (2). e vs. log σ_z' (pressure in kPa)
    (3). C_v vs. log σ_z' (pressure in kPa)

iv. Followings should be determined:
    (1). C_v for each load increment
    (2). C_c
    (3). C_r from reloading curve and unloading curve
    (4). Pre-consolidation stress, σ_c'

Results:

Plots/Graphs: (Total -11)

- **Dial reading vs. $\sqrt{t_{90}}$ – Total 09 in number**
- **C_v vs. log σ'_z - Total 01 in number**
- **e vs. log σ'_z - Total 01 Number**

Table: (Total -02)

- **Data Sheet**
- **Data Sheet for each load increment and decrement**
- **Calculation of C_v**

Results: From the e vs. log σ'_z Graph, compute the values of $C_{c,}$ $C_{r,}$ σ'_c

Discussion: