SOIL MECHANICS-01
LAB COPY
INSTRUCTER: ENGR HALLEMA ATAULLAH
PREPARED BY:
KAMRAN KHAN

PRACTICLE NO. 01

TITLE:

TO DETERMINE THE MOISRURE CONTENT OF A GIVEN SOIL SAMPLE

APPARARUS:

1) *Pan*
2) *Electric balance*
3) *Electric oven*

MATERIALS:

1) *Soil sample*
2) *Water*

RELATED CONCEPTS:

Soil:

It is an aggregate of particles and voids.

"OR"

Soil is a substance that is formed by the weathering of rocks.
In soil voids there may be air or water or both at the same time, so on the basis of this soil is divided into three classes given below:

1) **Dry soil:** *If only air is present in the voids, then it is called as the dry soil.*
2) **Partially saturated soil:** *If air along with water is present in the voids then it is called as the partially saturated soil.*
3) **Saturated soil:** *If the voids contain only water then it is called as the saturated soil.*

Liquid stage: *When the water just start to flow then it is called as the liquid stage.*

Plastic stage: *When the soil is molded into any stage then it is called as the plastic stage.*

Moisture content:

It is defined as the mass of water divided by the mass of soil solids.
Mathematically it is given as

$M_c = M_w / M_s$

- *The electrical balance used in this experiment has a capacity of 6200 gm.*

PRACTICLE APPLICATIONS:

1) *Moisture content plays an important role in understanding the behavior of soil.*
2) *It shows the degree of compaction of soil in the field.*

PROCEDURE:

1) *I clean the pan and dry it and find out its mass (M_1) with electrical balance.*
2) *I took a quantity of given soil sample and placed it loosely in the pan and find out its mass (M_2).*
3) *I placed the pan having soil in the electric oven and dried it for about 105-110* ***ċ.***
4) *After 24 hours I took out the pan from the oven and allowed it to cool and find out the mass (M_3)*

5) *I find out the moisture content by the following formula:*

$M_c = M_2 - M_3 / M_3 - M_1$

PRECAUTIONS:

1) *The soil sample should be loosely placed in the pan.*
2) *Overheating must be avoided because the crystalline structure will break up.*
3) *Mass should be find carefully.*

OBSREVATIONS & CALCULATIONS

Tested by group 03

Pan # 30

Mass of empty pan = M_1 = 45.9 gm

Mass of pan + wet soil = M_2 = 165.9 gm

Mass of pan + dry soil = M_3 = 152.9 gm

$M_w = M_2 - M_3$

M_w = 13gm

$M_s = M_3 - M_1$

M_s = 107 gm

Now

$M_c = (M_w / M_s) * 100$

M_c = 12.14 %

PRACTICLE NO. 02

TITLE:

TO DETERMINE THE SPECIFIC GRAVITY OF A GIVEN SOIL SAMPLE

APPARATUS:

1) *Sieve # 04*
2) *Electric balance*
3) *Electric oven*
4) *Pychnometer*

RELATED CONCEPTS:

Specific gravity:

It is the ratio of the density of dry soil to the density of equal volume of distilled water.

"OR"

It is the ratio of the weight of given volume of substance to the weight of equal volume of distilled water.

Standard amount of soil for this test is 200 gm.

The pychnometer used in this experiment has a capacity of 1 liter.

RANGES OF SPECIFIC GRAVITY FOR

1) *Sand: 2.65 to 2.67*
2) *Silty sand: 2.67 to 2.7*
3) *Clay: 2.7 to 2.8*

PRACTICAL APPLICATIONS:

1) *The values of specific gravity helps us upto some extent in identification of soil.*
2) *It gives us an idea about the suitability of a given soil as a construction material.*

3) It is used for calculating voids ratio, porosity and degree of saturation if the density or unit weight and water content are known.

PROCEDURE:

1) *I took at least 25gm of soil which has been passed through sieve # 04 or 4.75mm IS sieve and placed it in oven at a fixed temperature of 105-110 ċ for 24 hours to dry it completely.*
2) *I cleaned and dried the pychnomater and find out its mass (M_1).*
3) *I paced the dry soil in pychnometer and find out its mass (M_2).*
4) *I added sufficient amount of water in the pycnometer upto the given mark and find out its mass (M_3).*
5) *I emptied the pycnometer and washed it thoroughly and added water upto the given mark and find out its mass (M_4).*
6) *Determine the specific gravity of the soil sample by the following formula:*

$$S.G = M_2 - M_1 / (M_4 - M_1) - (M_3 - M_2)$$

PRECATIONS:

1) *Pychnometer should be cleaned while pouring the soil.*
2) *All readings should be taken carefully.*
3) *Soil sample should be dry.*
4) *Calculalations should be done carefully.*

OBSERVTIONS AND CALCULATIONS

Tested by group 03

Pan # 30

Mass of empty pychnometer = M_1 = 305.8gm

Mass of pychnometer + soil = M_2 = 343.5gm

Mass of pychnometer + soil + water = M_3 = 1325.9gm

Mass of pychnometer + water = M_4 = 1301.4gm

Now

$$S.G = M_2 - M_1 / (M_4 - M_1) - (M_3 - M_2)$$

$$S.G = 343.5 - 305.8 / (1301.4 - 305.8) - (1325.9 - 343.5)$$

$$\mathbf{S.G = 2.85}$$

COMMENTS:

As the range of specific gravity for clay is from 2.7 to 2.8, so the soil in our experiment is clayey soil.

PRACTICLE NO: 03

TITLE:

COURSE GRAIN SIZE SIEVE ANALYSIS

APPERATUS:

1) *A set of sieves*
2) *Balance*
3) *Soil sample*

RELATED CONCEPTS:

Sieve analysis:

It is the process of obtaining different size particles of a given soil sample by an arrangement of a set of sieves.

For the soil sample whose particles retains on sieve # 200 we do sieve analysis,

While those that pass from sieve # 200 we do sedimentation analysis.

PRACRICLE APPLICATIONS:

1) *It gives an idea regarding the gradation of soil.*
2) *It is used to proportion the selected soils in order to obtain the design soil mix.*
3) *It is also used in parts of the specifications of soil for airfields, roads, earth dams and other soil embankment construction.*

PROCEDURE:

1) *I arranged different sieves one above the other in order of their decreasing size.*
2) *I put a weighed quantity of a soil sample (500gm) in the top most sieve.*
3) *I shaked the sieve arrangement by hand for about 15 minutes.*
4) *I find out the weight retained on each sieve.*
5) *I calculated the %age weight retained on each sieve.*
6) *I calculated the cumulative %age weight retained on each sieve.*
7) *I calculated %age weight of soil passing through each sieve.*
8) *I draw a graph between particle size and the % passing through each sieve.*

PRECATIONS:

1) *During shaking soil sample should not be allowed to spill out.*
2) *All readings should be noted carefully.*

Diagram showing sieves arrangement for this experiment

The top one is sieve # 04 and the bottom one is sieve # 200 resting on a pan.

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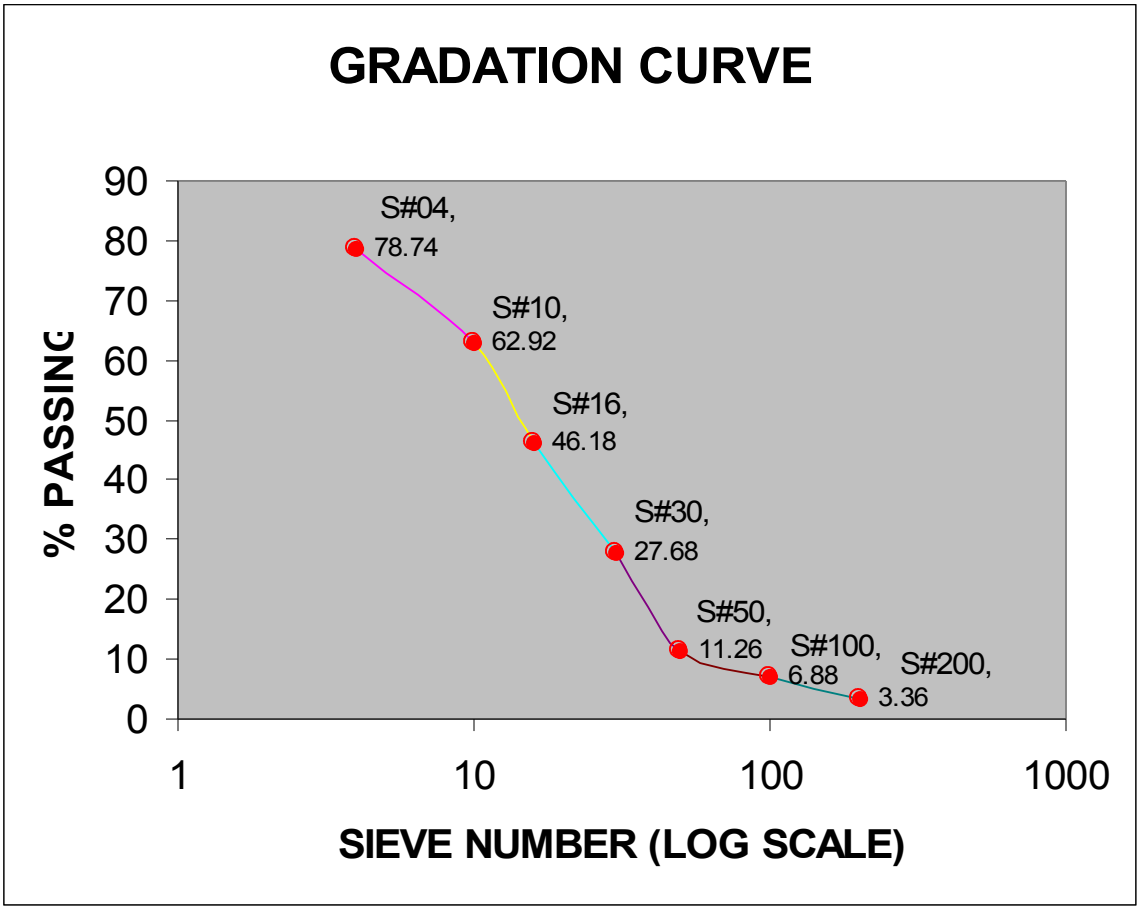
OBSEVATIONS AND CALCULATIONS

S.NO	Sieve number	Wt of soil retained on each sieve (gm)	% Retained on each sieve	Commulative % retained	Commulative % passing
1	# 04	106.3	21.26	21.26	78.74

2	# 10	79.1	15.82	37.08	62.92
3	# 16	83.7	16.74	53.82	46.18
4	# 30	92.5	18.5	72.32	27.68
5	# 50	82.1	16.42	88.74	11.26
6	# 100	21.9	4.38	93.12	6.88
7	# 200	17.6	3.52	96.64	3.36
8	Pan	17.1	3.42	100	0

Graph



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PRACTICLE NO. 04

TITLE:

CLASSIFICATION OF SOIL

On the basis of sieve analysis various types of soils are given below:

1) BOULDERS:

The particles of boulders have diameter greater than 12". They retains on 12" sieve (means each side of square is 12").

2) COBBLES:

The particles of gobbles have diameter less than 12". The particles of gobbles passes through 12" sieve, but they retains on 3" sieve.

3) GRAVELS:

The particles of gravels passes through 3" sieve but they retains on sieve # 04.

There are further 2 classes of gravels given below:

1) **Course gravels:** *The particles of course gravels passes by 3" sieve but retains on ¾" sieve.*
2) **Fine gravels:** *The particles of fine gravels passes by ¾" sieve but retains on*

sieve # 04.

4) SAND:

The particles of sand passes by sieve # 04 but retains on sieve # 200.

There are further 3 classes of sand given below:

a) **Course sand:** *They passes by sieve # 04 and retains on sieve # 10.*
b) **Medium sand:** *They passes by sieve # 10 and retains on sieve # 40.*
c) **Fine sand:** *They passes by sieve # 40 and retains on sieve # 200.*

5) **SILT:** *They passes by sieve # 200.*
6) **CLAY:** *They passes by sieve # 200.*
7) **PEAT:** *They passes by sieve # 200.*

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PRACTICLE NO. 05

TITLE:

TO DETERMINE THE PARTICLE SIZE DISTRIBUTION BY SEDEMENTATION ANALYSIS (HYDROMETER METHOD)

APPARATUS:

1) *Sieve # 200*
2) *Balance*
3) *Stop watch*
4) *Hydrometer*
5) *Sedimentation jar*

MATERIALS:

1) *Soil sample*
2) *Sodium hexametaphosphate*
3) *Water*

MIXTURE:

50 gm of soil + 8 gm of sodium hexametaphosphate + some amount of water

RELATED CONCEPTS:

Sedimentation analysis:

- *It is done for that type of soil which passes by sieve # 200.*
- *In this method we find out the size and %passing of particles by mathematical formulae.*
- *This analysis is based on the Stoke,s law.*

Dispersing agents:

In this method to have proper dispersion of soil we add some dispersing agents also known as Deflocculating agents, mostly in our lab we use sodium hexametaphosphate but also we can add sodium oxalate and sodium silicate for this purpose.

Effective height:

The height at which the particles fall down as called as the effective height.

HYDROMATER:

The hydrometer consists of a bulb and a calibrated tube called stem at one end of the bulb (the other end of the bulb is closed). The readings on the hydrometer stem gives the density of the soil suspension situated at the center of the bulb at any time.

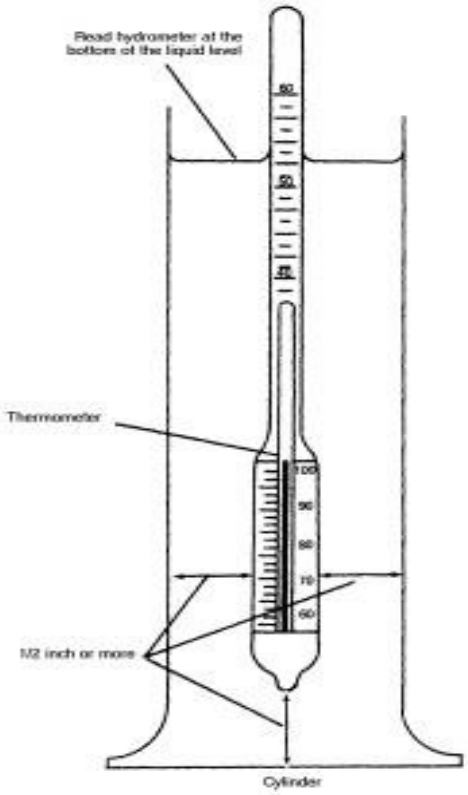
SEDEMENTATION JAR:

It is cylindrical in shape and having a capacity of 1000cc or 1000 ml.

PRATICLE APPLICATIONS:

1) This method is very useful for the analysis of very fine particles.
2) It helps in computing the %age of silt and clay present in the given soil sample.

Hydrometer immersed in sedimentation jar



FORMULAE USED:

1) $H_e = H + h/2 - V_h/2A$
2) $D = \sqrt{1800 * \eta * v / \gamma_w (G - 1)}$
3) $V = H_e / 60t$
4) $\% \text{ Finner} = (G * H/w_d (G - 1))*100$

Where

H_e = *Effective height*
H = *Distance between the hydrometer reading and neck of the hydrometer bulb*
h = *Height of hydrometer bulb*
V_h = *Volume of hydrometer bulb*
A = *Area of sedimentation jar*
D = *Diameter of soil particles*
η = *Viscosity of soil*
v = *Settling velocity*
γ_w = *Unit weight of water*

G = specific gravity
R_h = Hydrometer reading
w_d = Weight of dry soil

PROCEDURE:

1) *Find the weight of the given soil sample passing sieve no. 200.*
2) *Take 1000 c.c of water in a sedimentation jar and add 8 gm of sodium hexametphosphate per 50 gm of soil.*
3) *Now put soil sample in a sedimentation jar.*
4) *Mix thoroughly the suspension in a jar by placing the palm of a hand on the open side and turning the jar upside down and back.*
5) *Place the jar on the table and insert the hydrometer with least disturbance, start a stopwatch simultaneously.*
6) *Read the top of meniscus at suitable time intervals.*
7) *Record the temperature for each hydrometer reading for very precise computations.*
8) *From the observed readings, find the size and %age of particles in suspension at suitable time intervals.*
9) *Draw a grain size distribution curve.*

PRECAUTIONS:

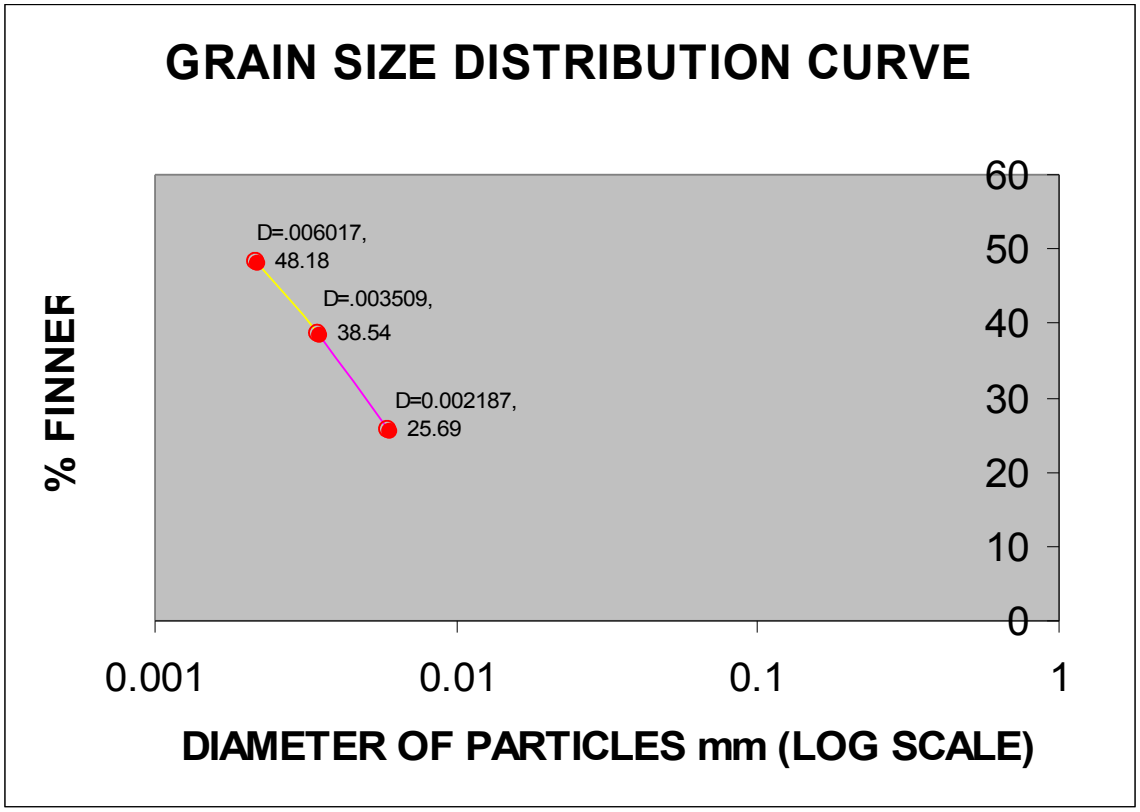
1) *Insert the hydrometer in a sedimentation jar slowly and carefully.*
2) *All the readings should be noted carefully.*

OBSERVATIONS AND CALCULATIONS

V_h = 60 cm^3
A = 35.7cm^3
h = 14cm
G = 2.65
W_d = 50 gm
ɳ = 1.83*10 $^{-6}$ g – sec/cm^2
T = 20 ċ

S.N 0	Time (min)	Hydrometer readings R_h (cm)	H	Effective depth He (cm)	Settling velocity V (cm/cec)	Size of particles D (mm)	% Finner
1	2	30	8	14.15	0.1179	0.006016 906	25.69
2	5	25	12	18.15	0.0605	0.003508 835	38.54
3	15	20	15	21.15	0.0235	0.002186 851	48.18

GRAPH



PRACTICLE NO. 06

TITLE:

TO DETERMINE THE LIQUID LIMIT OF A GIVEN SOIL SAMPLE

APPARATUS:

1) *Standard liquid limit apparatus*
2) *Grooving tool*
3) *Balance*
4) *Electric oven*
5) *Sieve # 40*
6) *Containers*
7) *Spatula*

RELATED CONCEPTS:

LIQUID LIMIT:

Liquid limit is the minimum water content at which the soil sample just changes from the liquid state to the plastic state when the water content decreases.

"OR"

The water content at which the soil sample has such a small shear strength that it flows to close a groove of standard dimension for a distance of ½" made in the soil paste, when 25 blows are applied on it in a liquid limit apparatus.

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STANDARD LIQUID LIMIT APPARATUS OR CASAGRANDE, S APPARATUS

PRACTICLE APPLICATIONS:

1) *To classify fine-grained soil the values of liquid limit are used.*
2) *The values of liquid limit and plastic limit are used to indicate flow index, toughness index and plasticity index of soil.*
3) *To find the stability of soil for building construction, by finding the values of liquid limit.*

PROCEDURE:

1) *Take about 100-120gm of dry soil passing through sieve#40 in a container.*
2) *Add small quantity of water in soil and stir it properly by means of spatula to form a uniform paste.*
3) *Place a part of this paste in a cup of casagrande apparatus and smoothen the surface with spatula.*
4) *Make a groove in soil paste by means of grooving tool.*
5) *Turn the handle of casagrande apparatus at a rate of about 2 rev/sec until the two parts of soil sample come into contact along a distance of 0.5".*
6) *Note the no. of blows.*
7) *Take a sample of soil paste from the cup of casagrande apparatus and determine the moisture content.*
8) *Repeat the entire procedure describe in step#01 to step#07 there by increasing the mount of water in the soil sample three to four times.*
9) *Plot a graph between the no. of blows on log scale on X-axis and known moisture content on ordinary scale on Y-axis.*
10) *Read the moisture content corresponding to 25 blows from the obtained graph, as to indicate the liquid limit of a given soil.*

NOTE:

In our experiment there is no need to draw graph as in our 2nd reading the groove in our soil paste closed at exact 25 blows.

PRECAUTIONS:

1) *After each test cup and grooving tool must be cleaned.*
2) *The no. of blows should be just to close the groove.*
3) *The no. of blows should be between 10 & 40 according to ASTM standard.*

If
No. of blows < 10 *Then max water is there in the soil paste.*
&
If
No. of blows > 40 *Then min water is there in the soil paste.*

4) *All the readings of mass should be noted carefully.*

OBSERVATIONS & CALCULATIONS:

TESTED BY GROUP NO. 01

(FROM C.NO 4 1 TO 5 0)

Name of container	*F*	*A*
No. of blows	*36*	*25*
Wt of empty container (M1) (gm)	*51*	*53.4*
Wt of container + wet soil (M2) (gm)	*86.6*	*80.1*
Wt of container + dry soil (M3) (gm)	*74*	*70.5*

"FOR CONTAINER F"

Mw = M2 - M3

Mw = 12.6 gm

Ms = M3 - M1

Ms = 23 gm

*Mc = Mw/Ms *100*

Mc = 54.78 %

"FOR CONTAINER A"

Mw = M2 - M3

Mw = 9.6 gm

Ms = M3 - M1

Ms = 17.1 gm

*Mc = Mw/Ms *100*

Mc = 56.14 %

NOTE:

In our experiment there is no need to draw graph as in our 2nd reading the groove in our soil paste closed at exact 25 blows.

EXPERIMENT NO 07

TITLE:

TO DETERMINE THE PLASTIC LIMIT OF A GIVEN SOIL SAMPLE

APPARATUS:

1) *Sieve # 40*
2) *Glass plate*
3) *Balance*
4) *China dish*
5) *Electric oven*
6) *Spatula*

PLASTIC LIMIT APPARATUS

RELATED CONCEPTS:

PLASTIC LIMIT:

It is defined as the minimum water content at which a soil thread of 1/8"(3.2mm) diameter starts crumbling (cracks develops) is called as the Plastic limit of soil.

PRACTICLLE APPLICATIONS:

1) *The values of plastic limit are used to classify fine-grained soil.*
2) *The values of plastic limit are used to find toughness index, flow index and plasticity index of soil.*

PROCEDURE:

1) *Take about 50gm of dry soil passing sieve # 40 in a china dish.*
2) *Add small quantity of water in soil and stir it properly by means of spatula.*
3) *Take about 5gm to 10gm of soil paste in your palm and roll it into small ball.*
4) *Now place the ball on a glass plate and roll it between the hands glass plate (to remove the moisture) to form a soil thread.*

5) *If diameter of thread becomes less than 1/8"without cracks, then reduce the moisture content unless and until the sample starts crumbling just at a diameter of 1/8".*
6) *If crumbling starts before 1/8"diameter thread, add a small quantity of water in a soil sample and repeat the above process unless and until the soil just crumbles down at a diameter of 1/8".*
7) *Collect the pieces of crumbled soil at 1/8"diameter and place it in a container for moisture content determination*
8) *Repeat the practical for 2nd time.*
9) *Take average of the two readings; this will be plastic limit for that soil.*

PRECAUTIONS:

1) *The apparatus required for test should be cleaned.*
2) *Make thread with less pressure.*

OBSERVATIONS & CALCULATIONS

TESTED BY GP # 02

Sample	*1*	*2*
Container no	*24*	*25*

Mass of empty container M1	*53.3gm*	*54.7gm*
Mass of container + wet soil M2	*56.6gm*	*57.1gm*
Mass of container + dry soil M3	*56.2gm*	*56.7gm*

WATER CONTENT:

SAMPLE NO: 01

$W_1 = (M2 - M3 / M3 - M1) * 100$
$W_1 = 14.8\ \%$

SAMPLE: 02

$W_1 = (M2 - M3 / M3 - M1) * 100$
$W_1 = 15\ \%$

PLASTIC LIMIT:

$P.L = (W_1 + W_2) / 2$

$\mathbf{P.L = 14.9\ \%}$

EXPEIMENT NO 08

TITLE:

TO FIND THE SHRINKAGE LIMIT OF A SOIL SAPMPLE

APPARATUS:

1) *Shrinkage dish*

2) *Electric oven*
3) *Mercury*
4) *Sieve # 40*
5) *Spatula*
6) *Container*

RELATED CONCEPTS:

Shrinkage limit:

The maximum water content where further loss of water will not cause any reduction in the volume of the soil mass.

PROCEDURE:

1) *Take a soil sample and pass it through sieve # 40 and add water in it to form a thick paste.*
2) *Take a shrinkage dish weight it and put some of this paste in it by means of spatula and again weight it.*
3) *Place the shrinkage dish in oven for 24 hours at a temperature of 105 - 110 ċ to find moisture content.*
4) *Find the volume of shrinkage dish using mercury. This is equal to volume of standard soil sample.*
5) *Take mercury in container and weight it, put dry soil from shrinkage dish in it, it will displace mercury. Find the weight of mercury displaced. Determine the volume of mercury displaced, which will give you volume of dry soil.*
6) *Find the shrinkage limit by using the following formula.*
   Shrinkage limit $= [W_c - \{(V_1 - V_d) / W_d]]*100$
   Where

W_1 = *Weight of water*
W_d = *Weight of dry soil*
V_1 = *Volume of saturated soil*
V_d = *Volume of dry soil*
γ_m = *Unit weight of mercury*

PRECAUTIONS:

1) *Insert dry soil in mercury slowly and carefully.*
2) *No drops of the displaced mercury should be wasted.*
3) *Take all the readings carefully.*

OBSERVATIONS & CALCULATIONS

STEP # 01

Determination of water content:

Wt of empty shrinkage dish = M_1 = 21.4 gm
Wt of shrinkage dish + wet soil = M_2 = 49.3 gm
Wt of shrinkage dish + dry soil = M_3 = 43.1 gm
$W_1 = M_2 - M_3$
W_w = 6.2 gm
$W_d = M_3 - M_1$
W_d = 21.7 gm
W_c = 28.57 %

STEP # 02

Determination of volume of saturated soil:

Wt of empty shrinkage dish = M_1 = 21.4 gm
Wt of shrinkage dish + Mercury = M_4 = 229.9 gm
Wt of mercury = Wm = $M_4 - M_1$ = 208.5 gm
$\gamma_m = Wm / Vm$
OR
$Vm = Wm / \gamma_m$
Vm = 208.5 / 13.6
Vm = 15.33 c.c
AS
$Vm = V_{shrinkage\ dish} = V_{sat\ soil}$
SO
$V_{sat\ soil} = V_1$ = 15.33 c.c

STEP # 03

DETERMINATION OF VOLUME OF DRY SOIL:

Weight of mercury displaced = W_{md} = 165gm
AS
Volume of mercury displaced = Volume of dry soil
So
Volume of dry soil = W_{md} / γ_m
Volume of dry soil = 165 / 13.6
Volume of dry soil = V_d = 12.13 c.c

STEP # 04

USING THE ABOVE GIVEN FORMULA:

S.L = 13.83%

EXPERIMENT NO: 09

TITLE:

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STANDARD PROCTOR COMPACTION TEST OF A GIVEN SOIL SAMPLE

APPARATUS:

1) *Mould (dia 4" & height 4.59")*
2) *Rammer (wt 5.5 lbs & height 12")*
3) *Sieve # 04*
4) *Oven*
5) *Weighing balance*
6) *Containers*
7) *Collar (dia 4" & height 2")*

RELATED CONCEPTS:

The standard Proctor compaction test was developed by R.R Proctor in 1933 and hence known as Standard proctor compaction test in his honor.
He showed that there is a definite relationship between the soil water content and degree of dry density to which a soil might be compacted.

Compaction:

The process of removing the air from the air voids is called as the compaction. It is an artificial process .

Consolidation:

The process of removing the water from the air voids is called as the consolidation.
It is a natural process.

O.M.C:

It is the water content at which maximum compaction is possible.

"OR"

The water content at which the soil sample has maximum density.

PRACTICLE APLICATIONS:

Compaction increases soil density, thereby producing three important changes:

1) *An increase in further settlement*
2) *A decrease in permeability*
3) *An increase in shear strength*

These three changes in soil characteristics are very much of importance for earth constructions such as dams, highways railway tracks etc.
Greater the compaction greater will be the stability of these structures.

PROCEDURE:

1) *Take about 4kg of air-dried soil passing sieve#04 and add 7 % of water in it.*
2) *Clean and dry the mould and base plate.*
3) *Weigh the mould, attach a collar to it and place it on a solid base.*
4) *Compact the moist soil to the mould in three layers of approximately equal height by 25 blows from 5.5 lbs rammer dropped from a height of 12".*
5) *Remove the collar and trim off the excess soil projecting above the mould by using straight edge. Take the weight of mould with compacted soil in it.*
6) *Remove the 100gm compacted soil specimen for the water content determination.*
7) *Add water in increment of 1% in soil.*
8) *Above procedure will be repeated for each increment of water added. The total number of determination should be at least four times.*

PRECAUTIONS:

1) *Ramming should be done continuously.*
2) *The blows should be distributed uniformly over the surface of each layer.*
3) *Weighing should be done accurately.*

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OBSERVATIONS & CALCULATIONS:

STEP # 01

DRY DENSITY DETERMINATION:

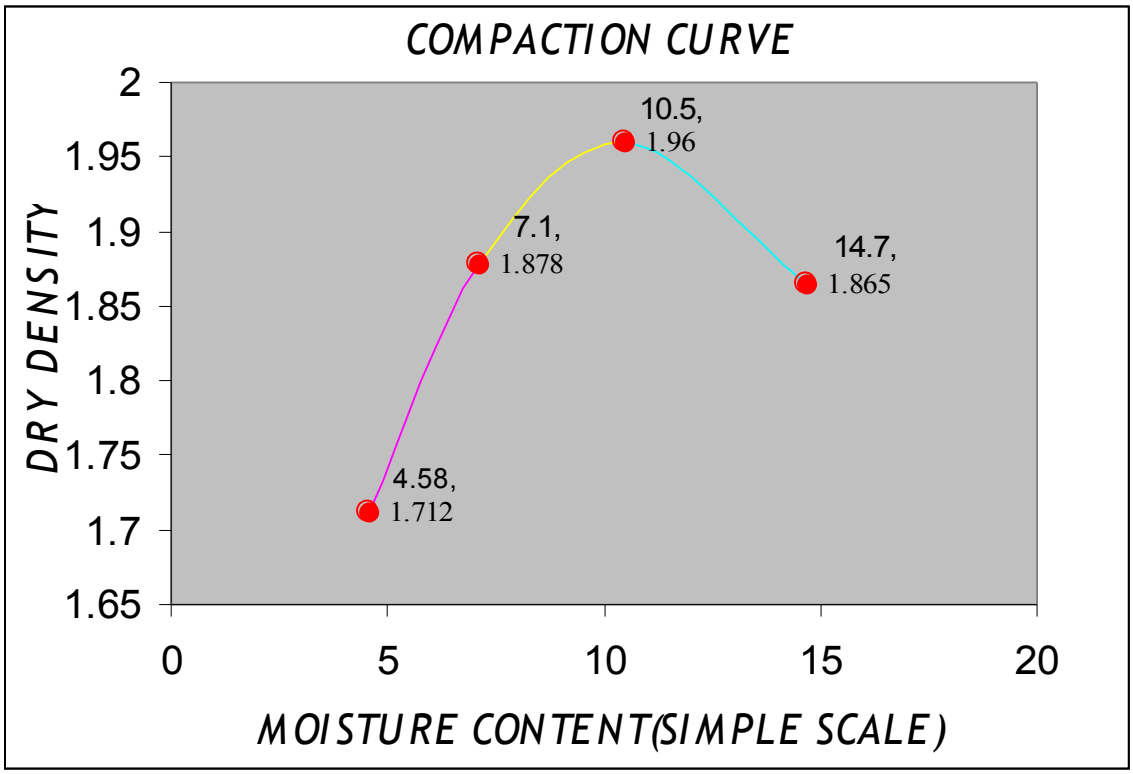
Determination no:	*1*	*2*	*3*	*4*
Wt of wet soil + mould (gm)	*6040*	*6250*	*6395*	*6370*
Wt of wet soil (gm)	*1690*	*1900*	*2045*	*2020*
Wet density gm / cm^3	*1.790*	*2.012*	*2.166*	*2.140*
Dry density gm / cm^3	*1.712*	*1.878*	*1.960*	*1.865*

STEP # 02

WATER CONTENT DETERMINATION:

Container no:	*4*	*45*	*10*	*15*
Wt of container M1 (gm)	*44.5*	*52.4*	*51.9*	*53.8*
Wt of container + wet soil M2 (gm)	*181.4*	*251.8*	*270.5*	*290.9*
Wt of container + dry soil M3 (gm)	*175.4*	*238.5*	*249.5*	*260.4*
Moisture content %	*4.58*	*7.1*	*10.5*	*14.7*

GRAPH:


COMPACTION CURVE
DRY DENSITY
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
0
5
10
15
20
MOISTURE CONTENT(SIMPLE SCALE)
10.5,
1.96
7.1,
1.878
14.7,
1.865
4.58,
1.712

SOIL MECHANICS-01
LAB COPY
INSTRUCTER: ENGR HALLEMA ATAULLAH
PREPARED BY:
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