**Geotechnical lab**

Experiment No.10

**To determine the shrinkage limit of soil.**

**OBJECTIVE:-**

To determine the shrinkage limit and calculate the shrinkage ratio for the given soil.

**NEED AND SCOPE:-**

Soils which undergo large volume changes with change in water content may be troublesome. Volume changes may not and usually will not be equal .A shrinkage limit test should be performed on a soil.

1. To obtain a quantitative indication of how much change in moisture can occur before any appreciable volume changes occurs.
2. To obtain an indication of change in volume.
3. The shrinkage limit is useful in areas where soils undergo large volume changes when going through wet and dry cycles (as in case of earth dams)

**APPARATUS:-**

* Shrinkage dish
* electric oven
* mercury
* electric balance
* sieve#40
* spatula and containers

**PROCEDURE:-**

1. Take a soil sample passing through sieve#40 and add some amount of water in it to form a thick uniform paste.
2. Take the shrinkage dish, weigh it, and put some of the soil mixture in it by spatula, fill it and again weigh it.
3. Place the shrinkage dish in the oven for 24hours at 110-115C.
4. Find the volume of the shrinkage dish using mercury this will be equal to the volume of the saturated soil sample.
5. Take mercury in container and weigh it, put dry soil in it the mercury is displaced.
6. Collect carefully the displace mercury and weigh it with great accuracy.
7. The volume of dry soil is then determined by dividing the weight by the unit weight of mercury.
8. The shrinkage limit is then calculated using the formula.

S.L = {(w1-wd)-(v1-vd) γw}/ wd] x 100

Where,

W1 = M2-M1

Wd = M3 - M1

**CALCULATION**

Wt. of container in gm, W1= 19.5g

Wt. of container + wet soil pat in gm,W2  = 55.2g

Wt. of container + dry soil pat in gm, W3 = 48.1g

Wt. of container+ Mercury = 269.9gm

Displaced Mercury= 219g

Wt of oven dry soil (Ms) = 28.8gm

Moisture content = 24.82%

Volume of wet soil , V1 = Wt of mercury

Density of mercury

V1 = 247

13.6

V1= 18.19

Volume of dry soil particle (V2) = Displace Mercury

Density of mercury

= 219

13.6

= 16.10

Link: <https://www.youtube.com/watch?v=UyWdZJg4f_Y&t=68s>

<https://www.youtube.com/watch?v=uvi8D7NZyms>