

**Particle Size Distribution (Sieve Analysis)**  
**1/27/2010**

10

**1. Objective:**

To determine the particle sizes in a given soil sample and draw particle size distribution curve.

**2. List of Equipment:**

- Mechanical sieve-shaker
- Set of ASTM sieves: #10, 20, 40, 60, 100, 200
- Electrical balance
- China dish

**3. Procedure:**

- a. First, a sample of soil (703 g) was poured into a set of six ASTM sieves (#10, 20, 40, 60, 100, 200), which was then put into a mechanical sieve-shaker.
- b. The soil remained in the mechanical sieve-shaker for 4-5 minutes and then the sieve shaker was turned off. The six sieves and the bottom pan were then removed from the sieve shaker.
- c. Starting with the top sieve, sieve #10, the soil was poured into a china dish (122.81 g) and was then weighed using an electrical balance. The soils in the remaining five sieves were then weighed in the same fashion, including the soil in the bottom pan.

**4. Data:**

Sieve #	Opening (mm)	Weight of Soil Retained (Including Weight of China Dish) (g)	Weight of Soil Retained (g)	% Retained	Cumulative % Retained	% Finer
10	2	341.34	218.53	31.09	31.09	68.91
20	0.85	185.03	62.22	8.85	39.94	60.06
40	0.425	161.69	38.88	5.53	45.47	54.53
60	0.25	163.46	40.65	5.78	51.25	48.75
100	0.15	229.98	107.17	15.24	66.49	33.51
200	0.075	283.92	161.11	22.92	89.41	10.59
Pan		192.61	69.8	9.93	99.34	0.66

## 5. Analysis of Data:

Computations (all examples shown are for Sieve #20)

1) Weight of Soil Retained (g) = Weight of Soil Retained (Including Weight of China Dish (g) – Weight of China Dish (g)

Ex:  $185.03 \text{ g} - 122.81 \text{ g} = \boxed{62.22 \text{ g}}$

2) % Retained = [Weight of Soil Retained (g) / Total Weight of Soil (g)] X 100

Ex:  $(62.22 \text{ g} / 703 \text{ g}) \times 100 = \boxed{8.85\%}$

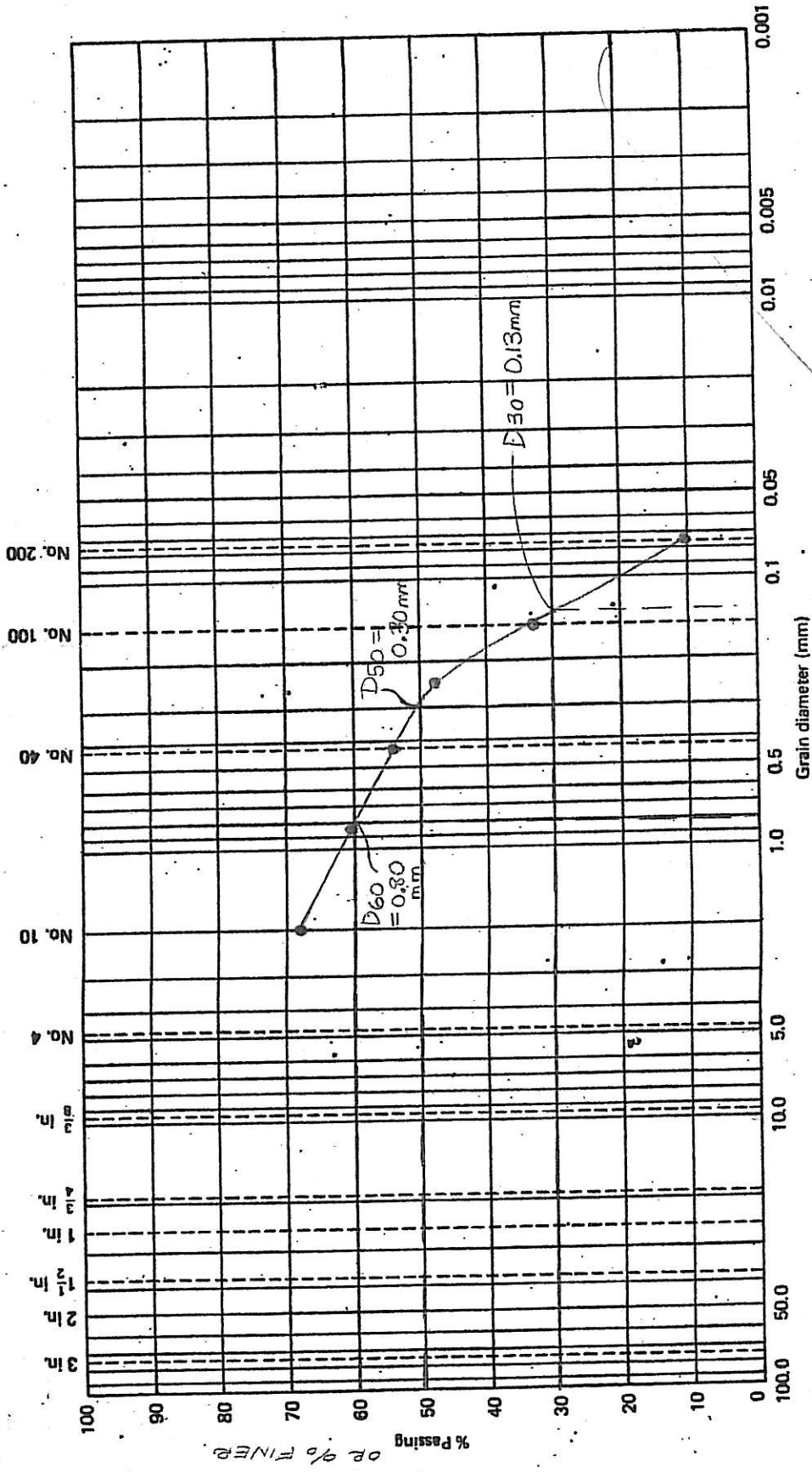
3) Cumulative % Retained = % Retained + % Retained in Sieve Before

Ex:  $8.85 + 31.09 = \boxed{39.94\%}$

4) % Finer = 100 – Cumulative % Retained

Ex:  $100 - 39.94 = \boxed{60.06\%}$

(Graph found on handout given in class)



Grain-size distribution curve

**6. Conclusion:**

According to the results of my Grain-Size Distribution Curve, I can conclude that the soil sample we tested in class is a well graded soil. A well graded soil is a soil whose particle sizes are distributed over a wide range.

**7. Additional Remarks:**

The total weight of the soil was 703 g. At the end of the experiment, the soil in each of the six sieves added up to 698.36 g. With that said, 4.64 g of soil were lost during the experiment due to either sticking to the sides of the sieves or falling out of the sieves during the weighing. As a result, the data shows that there was 0.66% finer soil instead of 0% finer soil still left after the soil in the pan was weighed.



# **Sieve Analysis**

**January 20<sup>th</sup>, 2010**

10

**Objective:**

To determine particle sizes in a given soil sample and draw the Particle Size Distribution graph.

**Equipment:**

Mechanical sieve shaker  
Set of ASTM sieves: #s 10, 20, 40, 60, 100, 200  
Electrical balance  
China dish

**Procedure:**

1. Weigh the soil sample to get initial weight.
2. Order the sieves from largest to smallest starting at the top, place the pan last.
3. Pour the entire soil sample into the top of the sieves.
4. Turn the mechanical shaker on and allow it to shake for 4 to 5 minutes.
5. After 4 or 5 minutes, remove the sieves from the shaker.
6. Weigh the china dish alone, and then pour the contents of one sieve into the china dish. Using the initial weight of the china dish, calculate the weight of the soil contents in each sieve.
7. Record the results of each sieve in a table. Calculate and plot the Particle Size Distribution curve.

**Data:**

ASTM Sieve #	Weight of Retained Soil (g)	Sieve Opening (mm)	Percent Finer Than (%)
10	218.5	2.00	68.9
20	62.6	0.850	60
40	38.9	0.425	54.5
60	40.7	0.250	48.7
100	107.2	0.150	33.4
200	161.1	0.075	10.5
Pan	69.8	-	0

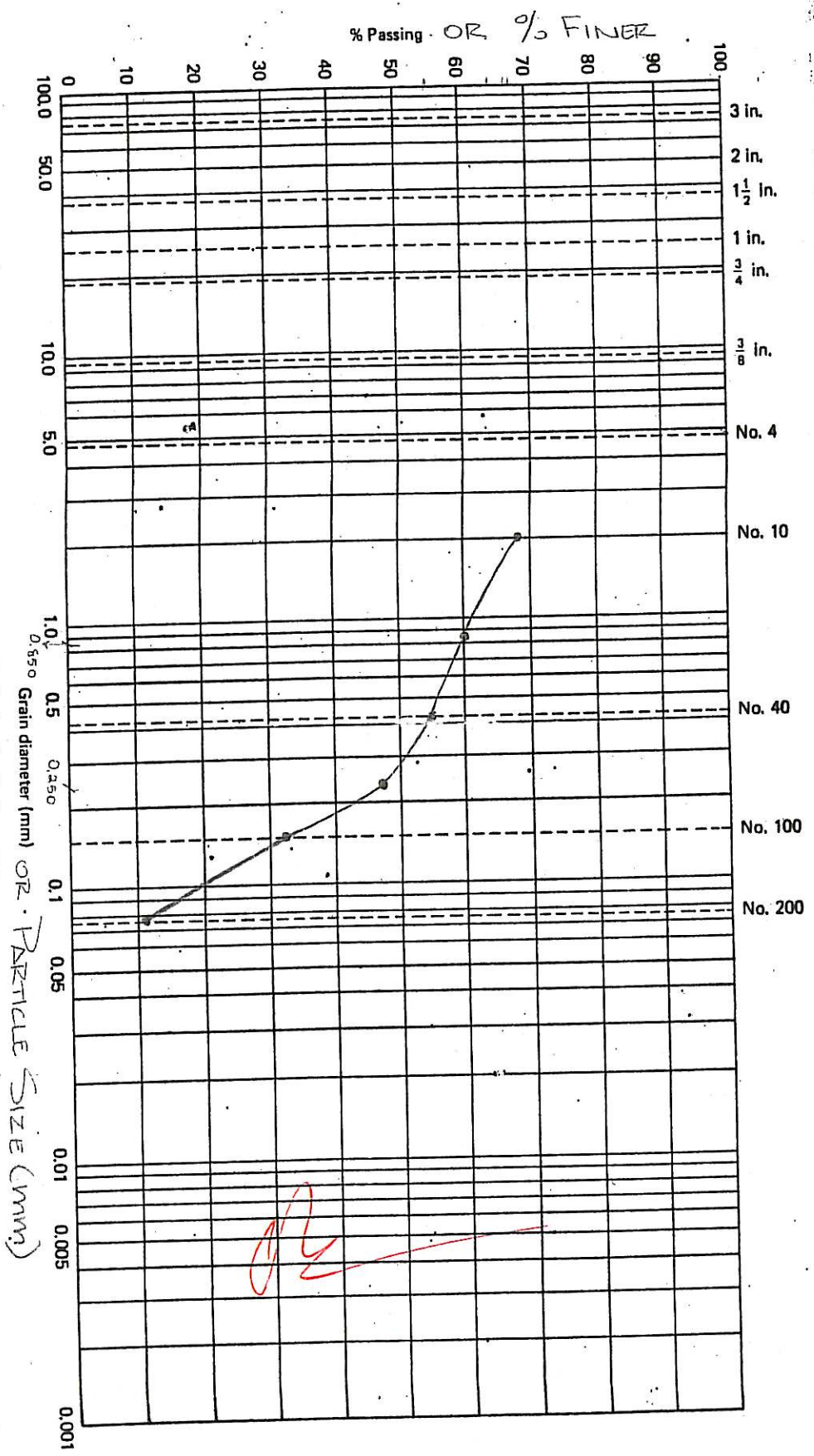
$\Sigma=698.8g^*$

**Analysis:** (Grain Size Distribution curve attached)

**Conclusion:**

The soil sample that was used in this experiment consisted mostly of medium to smaller sized particles. The Grain Size Distribution curve tells us that this soil sample is more of a well graded sample rather than a uniformly graded sample.

\*The initial weight of the soil sample was 703g. Normally, if more than a 10% loss through sieves is recorded, the experiment must be performed again. For this experiment, the calculations were performed using the initial sample weight of 703g.



Project No. SUL  
 Plotted by \_\_\_\_\_

Sample No. 2  
 Date \_\_\_\_\_

Grain-size distribution curve  
 Grain diameter (mm) OR PARTICLE SIZE (mm)

ANNE HEATH  
 SIEVE ANALYSIS  
 1/20/2010