

53:030 SOIL MECHANICS
Civil & Environmental Engineering
The University of Iowa
FALL SEMESTER, 2001

Homework Assignment # 2, Due Wednesday, 19 September.

From the textbook, solve problems: 1.4 – 1.7

Additional Questions:

- 1) Consider the data in Table 1 obtained from the sieving of two different soil samples.
 - a) Compute and plot the GSD for both soils on the same axes.
 - b) For both soils, compute the uniformity coefficient, the coefficient of gradation, and the sorting coefficient.
 - c) Based on both the GSDs and the coefficients, briefly describe the qualitative differences between soil samples A and B.

Table 1.

Sieve #	Size	D(mm)	Soil A Mass retained (kg)	Soil B Mass retained (kg)
1	#4	4.75	0	.10
2	#10	2.00	0	.15
3	#20	0.85	0	.18
4	#40	.425	0.40	.13
5	#60	.250	0.41	.13
6	#100	.150	.165	.12
7	#140	.106	.01	.08
8	#200	.075	.008	.07
9	pan	0.0	.007	.04
			1.000	1.000

- 2) The following data were obtained from the liquid and plastic limit tests for a soil:

Liquid Limit test results

Number of Blows (N)	Water content (%)
15	42.0
20	41.8
28	39.1

Plastic limit was found to be 18.7%.

- a) Draw the flow curve from the liquid limit test data and find the liquid limit.
 - b) What is the plasticity index of the soil?
 - c) If the in-situ water content of this soil in the field is 22% what would its liquidity index be? What would you expect the consistency of the soil to be at this water content and liquidity index?
- 3) A saturated soil with a volume of 19.65 cm^3 has a mass of 36 grams. When the soil is completely dried, its volume and mass are 13.5 cm^3 and 25 grams, respectively. Determine the shrinkage limit for this soil.
- 4) Consider the following Atterberg limits for different soil types. Based on the limits for each soil, show where it lies on the soil plasticity chart in relation to the U-line and A-line. Is any of the data suspect? If yes, which and why?
- a) LL=50%, PL=15%;
 - b) LL=30%, PL=10%;
 - c) LL=70%, PL=45%;
 - d) LL=40%, PL=5%;