

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

Homework Assignment # 3, Due Wednesday, 26 September.

From the textbook, solve problem: 2.1

Additional Questions/Problems:

- 1) Consider the soil layering shown in Figure 1:
 - i) Calculate and plot the variations of σ_v , u , and σ_v' with depth.
 - ii) If the water table were to rise by 1m, how would it change the vertical effective stresses in layers II and III?
 - iii) If the water table were to drop by 1m, how would it change the vertical effective stresses in layers II and III?

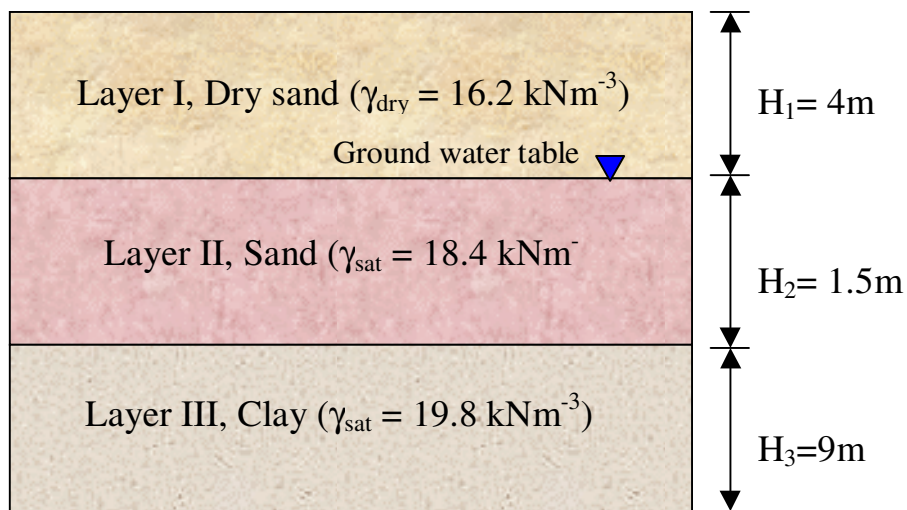


Figure 1. 3-layered soil profile.

- 2) Classify the following soils by the USDA textural classification system:

Soil	% Gravel	% Sand	% Silt	% Clay
A	18	51	22	9
B	10	20	41	29
C	21	12	35	32
D	0	18	24	58
E	12	22	26	40

3) Classify the following soils by the Unified Classification System

Size	Percent Passing				
	Soil A	Soil B	Soil C	Soil D	Soil E
No. 4	94	98	100	100	100
No. 10	63	96	100	100	100
No. 20	21	50	98	100	100
No. 40	10	28	93	99	94
No. 60	7	18	88	95	82
No. 100	5	14	83	90	66
No. 200	3	10	77	86	45
0.01mm	--	--	65	42	26
0.002mm	--	--	60	47	21
LL	--	--	63	55	36
PL	NP	NP	25	28	22

4) Classify the soils for Problem 3 above by the AASHTO classification system and give the group indices as well.

Extra Credit Problem:

Consult an engineering usage chart such as that in Table 2.6 of the reference text by Budhu. Based on this usage chart, rate all of the soils in Problem 3 for potential usage as fill in roadways here in the state of Iowa.