Notre Dame University
Date : 09/04/2010

Exam1: Shallow Foundations – CEN 325

Problem 1

Refer to the following soil profile:

1) Draw the total stress, pore pressure and effective stress profiles with depth for the case presented in figure 1.
2) Compute the consolidation settlement from an additional foundation load which would occur in the first clay layer by dividing this layer into two sub-layers of depth 4m.

The maximum past pressure (σ'_c) at 14m is 300 kN/m^2 and the final actual stress at this depth after the foundation load has been applied is 250 kN/m^2.

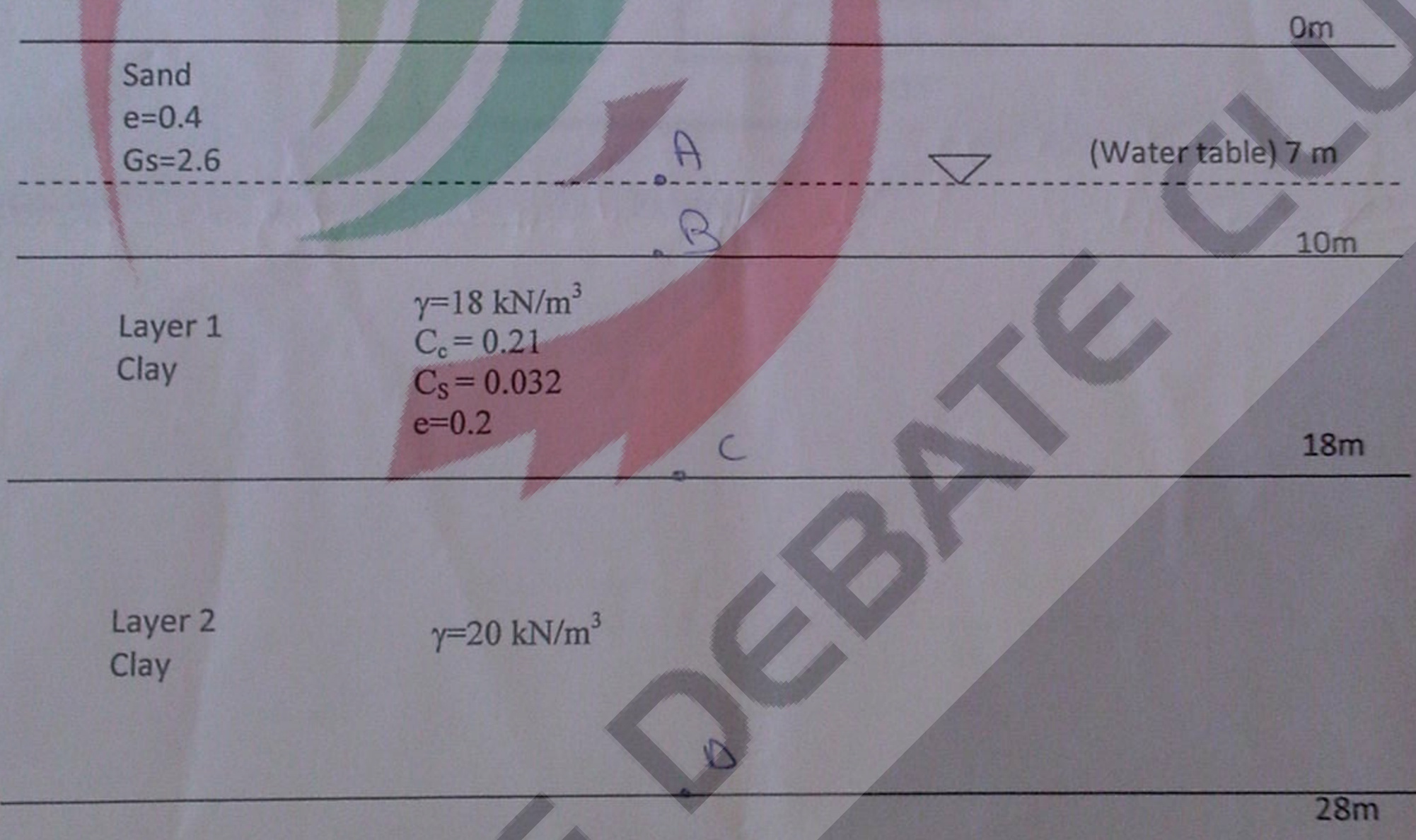

Figure 1

Problem 2

Referring to figure 2 with a safety factor SF=3, the water table is at a depth 3m from the ground surface:

1) Find the size of square footing to carry the inclined load (with V and H components shown). Use the general equation of the bearing capacity.
2) Consider that the same footing is placed at the top of a slope of inclination equal to 45°. The spacing between the footing and the slope is equal to 1m. Find the bearing capacity of this footing. What do you conclude?

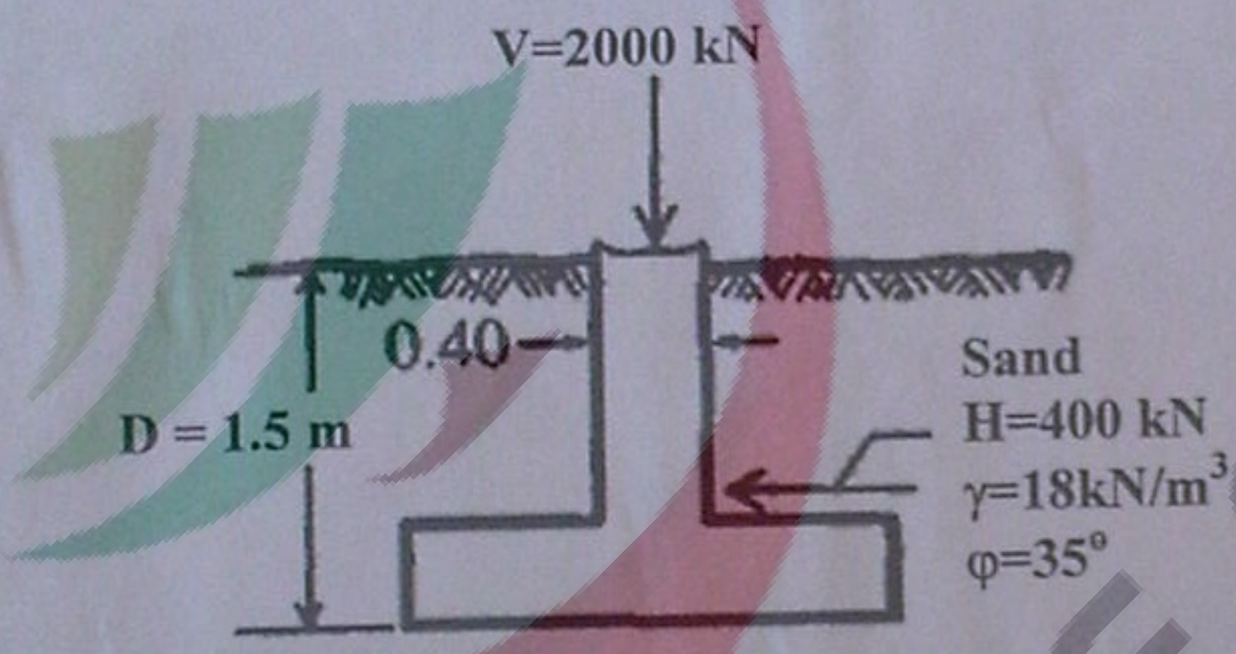

Figure 2