

SOIL MECHANICS I

BASIC (PHYSICAL) PROPERTIES OF SOILS

PROBLEM 1: An undisturbed soil sample has 38 mm diameter and 76 mm height and its natural mass is 165 g. When dried completely in an oven, the specimen's mass is 153 g. The solid density of soil is 2.67 Mg/m^3 . Determine,

- a) natural density
- b) water content
- c) porosity
- d) void ratio
- e) degree of saturation
- f) dry density
- g) saturated density

PROBLEM 2: A wet soil sample has a water content of 0.12 and a mass of 2500 kg. In order to rise water content as 0.25, how much water must be added to this soil?

PROBLEM 3: For a fully saturated soil, it has a mass of 354 g. After being completely dried in an oven the mass of the sample is 240 g. The density of solid particles is 2.72 Mg/m^3 . Determine,

- a) water content
- b) void ratio
- c) porosity
- d) saturated density
- e) dry density
- f) natural density when the degree of saturation has a value of 50 %.

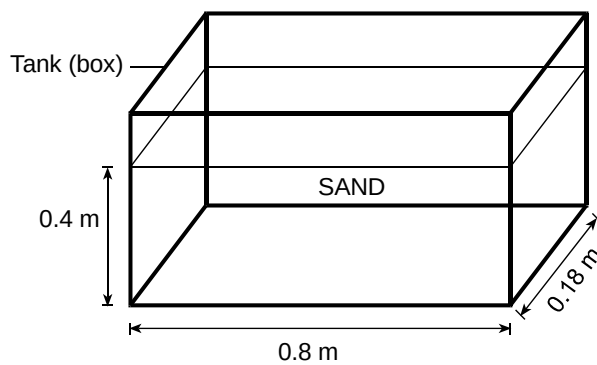
PROBLEM 4: A wet soil has a porosity of 0.44, a degree of saturation of 0.96 and a solid density of 2.67 Mg/m^3 . Determine,

- a) dry density
- b) water content
- c) natural density

PROBLEM 5: A wet soil has a porosity of 0.44, a degree of saturation of 0.93 and a solid density of 2.65 Mg/m^3 . Determine,

- a) dry density
- b) water content
- c) void ratio
- d) natural density

PROBLEM 6: Find dry mass of sand. Water content of sand is 0.12.



$$\begin{aligned} e_{\max} &= 0.86 \\ n_{\min} &= 0.36 \\ D_r &= 0.55 \\ \rho_s &= 2.68 \text{ Mg/m}^3 \quad (G_s = 2.68) \end{aligned}$$