

Second Semester Exam (2015-2016)

Salahuddin University
 College of Engineering
 Dams & Water Resources Eng. Dept.
 Class: 3rd Year

Date / / 2016
 Time: 90 Minutes
 Subject: Soil Mechanics
 Lecturer: Hawkar Hashim-Chener Salam

Q1: (20%)

A cut is made in a stiff, saturated clay that is underlain by a layer of sand (Figure 1).
 What should be the height of the water, h , in the cut so that the factor of safety for stability of the cut remained above 1.2 ?

Solution:

$$FOS_{(flow)} = \frac{i_{\text{critical}}}{i_{\text{real}}}$$

$$i_{\text{critical}} = \frac{\gamma_{\text{sat}} - \gamma_w}{\gamma_w} = \frac{19.5 - 9.81}{9.81} = 0.9878$$

$$i_{\text{real}} = \frac{\Delta h}{l}$$

$$ht_{\text{US}} = ht_s = He + hp = 0 + 5.0 = 5.0$$

$$ht_{\text{DS}} = ht_b = He + hp = 2 + hw$$

$$\Delta h = ht_{\text{US}} - ht_{\text{DS}} = 5 - (2 + hw) = 3 - hw$$

l = distance between US and DS

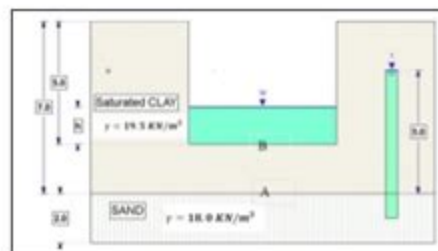
$$i_{\text{real}} = \frac{\Delta h}{l} = \frac{3 - hw}{2}$$

$$FOS_{(flow)} = \frac{i_{\text{critical}}}{i_{\text{real}}} = \frac{0.9878}{\frac{3.0 - hw}{2}}$$

$$FOS = 1.2$$

$$\frac{3.0 - hw}{2} = 0.9878 / 1.2$$

$$hw = 1.353 \text{ m}$$



Q2: (30%)

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