

HOMEWORK 2

Due on: 18 October 2016 Tuesday at 23:59.

(submit digitally 1 file via ODTUClass, or submit printed copy to Nejan Huvaj's office)

- 1) (2 points) For the example on page 22/24 of the class notes pdf, after the wide fill surcharge of 78.9 kPa is applied at the ground surface for 9 months, then the surcharge is removed and the building is constructed. Calculate the amount of primary consolidation settlement expected under the building load and calculate the time required for this much settlement to take place.

- 2) (13 points) A borehole log is given on the next page. Borehole is conducted to a depth of 15.45 m, and below that depth, we do not have any information about the subsoils. A 2-m-high embankment (having 7 m base width and 3 m top width) composed of gravel with unit weight of 21 kN/m³ is to be placed at the ground surface. Use Boussinesq stress distribution under the embankment (hint: page 3/24 of the class notes pdf), and coefficient of volume compressibility, m_v . To convert SPT-N values to N_{60} , in Turkey, use the correlation: $N_{60} = N \times 0.75$. Coefficient of consolidation, c_v , values for ML, CL and CH soils at this site, are estimated as 0.4, 0.8 and 0.55 m²/month, respectively. For all unknown information, make reasonable assumptions using your engineering judgement and write in your solution.
 - a) Calculate and plot settlement (under the center of the embankment at the original ground surface) versus time, expected under this embankment load.
 - b) A colleague suggests to do preloading by applying a very wide fill of 4-m-height (21 kN/m³) at ground surface. Make calculations and determine how long such a fill should be kept at ground surface for the preloading method to work properly.

Logo		COMPANY NAME Address				SONDAJ LOGU BORING LOG										SONDAJ NO: SK1					
İl/İlçe :		İZMİR / ...				Zemin Kotu Ground el				7		Yeraltı Suyu Durumu Ground Water Data									
Kesim Section		KM 67+240				Koordinat Coor.N.S(y)						Derinlik		Tarih Data		Saat Hour		Açıklama Remarks			
Makine Tipi Rig Type		sprago 40 c				Koordinat Coor.E.W(x)						0.5 m									
Sondaj Metodu Driling Ty		ROTARY				Derinlik Depth (m)				15.45											
Başlama T. Start Date		1/13/2012				PAFTA		ADA		PARSEL											
Bitiş T. Finish Date		1/13/2012																			
	Tabaka Derinliği Layer Depth	Muhafaza Borusu Casing	Numune derinliği Sample Depth	Numune türü ve No Sample Type and No	STANDART PENETRASYONI			SPT GRAFİĞİ / SPT Graph					Zemin Türü Group symbol	JEOLÖJİK KESİT Profile	TANIMLAMA DESCRIPTION	Plastisite indisi % Plasticity index %	Manevra Derinliği Core Depth (m)	Korot Çapı Core Diameter (mm)	Dolaşım Suyu Kaybı Circulation Loss %	Arazi Kanallı Veynli Field vane	
					DARBE SAYISI			10	20	30	40	50									60
					15 cm	30 cm	45 cm														
0	0.50		0.50	SPT-1	4	6	10							SM							
1	1.50		0.95																		
2			1.50	SPT-2	3	4	3									14					
3			1.95																		
4			2.50	UD-1																	
5	5.20		3.00	SPT-3	4	3	5							ML		16					
6	6.70		3.45																		
7			4.50	SPT-4	3	5	4														
8			4.95																		
9			6.00	SPT-5	8		50/5							GM							
10			6.45																		
11			7.50	SPT-6	4	4	6									22					
12			7.95																		
13			8.50	CORE 1																	
14			9.00	SPT-7	3	5	6														
15			9.45																		
16			9.50	UD-2																	
17			10.00																		
18			10.50	SPT-8	4	5	6									25					
19			10.95																		
20			12.00	SPT-9	3	5	5														
21			12.45																		
22			13.00	CORE 2																	
23			13.50	SPT-9	4	4	5														
24			13.95	10										CH		32					
25			15.00	SPT-11	4	4	5														
26			15.45																		
KUYU SONU = 15,45 m																					