Supporting Documentation

Structural Analysis (CEGR 3122)
Fall 2018

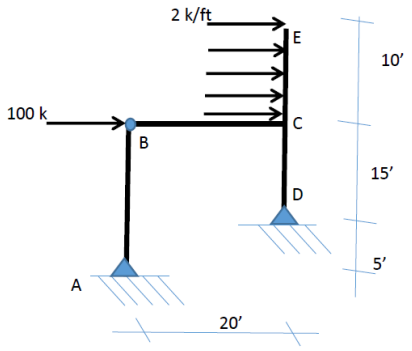
Student Outcome 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

Assessment Instrument: Final Exam Test Problem

Assessment Schedule: Annually

Target: 75% of students will earn a minimum of 13 points out of the 25 available points for this problem using the following rubric. If they have earned at least 13 points, they have identified the problem and the correct method to solve it and they are able to formulate a solution and solve the reactions in the problem (see the circles below – indicating minimum requirements for this Student Outcome).

Draw the shear, bending and axial diagrams for the following frame. Note B is a HINGE (EI are constant, Neglect G, A', A)



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	Needs Improvement	Acceptable	Excellent	Total
Ability to identify the correct method to solve the problem	Assumed the problem was statically indeterminate or Used the wrong method or Used the correct method but made some mistakes. (4)		Accurately used the correct method. (5)	____/5
Ability to identify and solve initial reactions	Used incorrect concepts to calculate reactions. (1)	Used the correct problem method, but made minor math errors to calculate reactions. (4)	Used the correct method and calculated the reactions. (5)	____/5
Ability to identify, relate, and draw the correct axial diagram for the given member conditions	Used incorrect concepts to create the axial diagram. (1)	Used the correct problem method, but made minor math errors to create the axial diagram. (4)	Used the correct method and correctly created the axial diagram. (5)	____/5
Ability to identify, relate, and draw the correct shear diagram for the given member conditions	Used incorrect concepts to create the shear diagram. (1)	Used the correct problem method, but made minor math errors to create the shear diagram. (4)	Used the correct method and correctly created the shear diagram. (5)	____/5
Ability to identify, relate, and draw the correct moment diagram for the given member conditions	Used incorrect concepts to create the moment diagram. (1)	Used the correct problem method, but made minor math errors to create the moment diagram. (4)	Used the correct method and correctly created the moment diagram. (5)	____/5

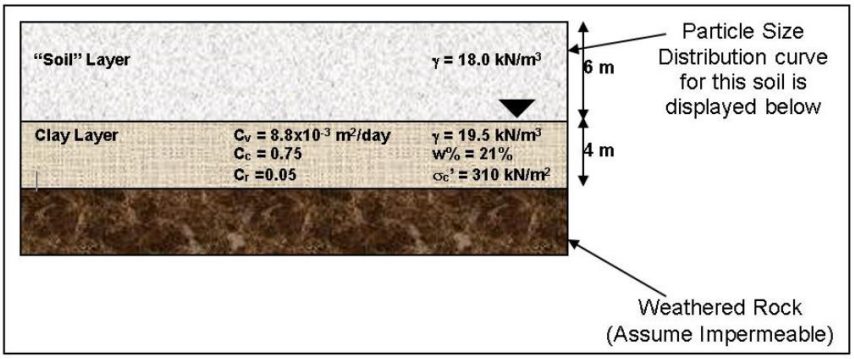
Geotechnical Engineering (CEGR 3278)
Fall 2018

Student Outcome 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

Assessment Instrument: Final Exam Test Problem

Assessment Schedule: Annually

Target: 75% of students will earn 11 points out of the 15 available points for this problem using the attached scoring rubric.



Calculate the total consolidation settlement in the "Clay Layer" (displayed in the above figure) that will result from a 600 kPa induced load. For the purpose of this question, assume the initial void ratio of the soil is 0.500. For simplicity, do not break the clay into sub layers for this question. Use the laboratory results displayed in the above figure as needed. Assume the representative sample collected to obtain these results was acquired from the middle of the clay layer. Show all calculations and display your final answer in units of centimeters.

1

Geotechnical Engineering (CEGR 3278)
Fall 2018

	Poor	Needs Improvement	Good	Excellent	Points
Ability to calculate initial and final effective stresses.	Significant errors in the initial and final effective stress calculations – does not grasp the concepts at all. (0-4)	Some errors in depth and/or unit weight assignments– struggling with basic effective stress concepts; problems with units. (4.0-5.75)	Minor errors in depth and/or unit weight assignments but understands general concepts. (6.0-7.75)	Student solves effective stress calculations correctly. (8.0)	_____/8
Ability to identify and solve the correct settlement equation.	Does not recognize the need to compare initial and final effective stresses to the pre-consolidation pressure to select the appropriate equation – does not grasp settlement calculations. (0-3.0)	Attempts to select the appropriate settlement equation but calculates and/or chooses the pre-consolidation pressure incorrectly and/or has significant errors in the process or calculations – struggling with settlement calculations. (3.5-4.75)	Minor Errors in the settlement calculation but understands general concepts. (5.0-6.75)	Chooses the correct settlement equation but has some errors in the settlement calculations – understands basic settlement calculation concepts. (7.0)	_____/7
				Total Points	_____/15

		Ratio: UNC Charlotte Performance / ABET Comparator Performance										
Semester	No. Test Takers	Mathematics	Statistics	Engineering Economy	Statics	Mechanics of Materials	Hydraulics and Hydrology	Structural Analysis	Structural Design	Geotechnical Engineering	Transportation Engineering	Environmental Engineering
2010-S	43	0.83	0.92	0.88	0.89	0.88	0.96	0.95	0.85	0.84	0.95	0.89
2010-F	29	0.89	0.93	0.33	0.97	0.79	0.90	0.92	0.33	1.03	0.54	0.88
2011-S	50	0.87	1.03	0.92	0.88	0.97	1.08	1.02	0.92	1.02	0.98	1.02
2011-F	26	0.95	1.04	0.98	1.01	0.97	1.05	1.07	0.88	1.06	0.98	1.22
2012-S	63	0.91	0.94	0.99	0.99	0.96	0.98	1.00	0.90	0.95	0.99	1.07
2012-F	48	0.95	1.02	1.00	0.94	1.03	1.06	0.93	0.95	1.00	1.16	1.02
2013-S	41	0.96	0.90	1.03	1.00	0.98	0.98	1.15	0.97	1.08	0.96	1.05
2013-F	50	0.90	1.02	1.03	1.05	1.08	1.04	0.95	0.98	1.11	1.12	1.05
2014-S	11	0.89	1.06	0.96	0.92	1.01	0.93	0.99	0.98	0.95	1.02	1.02
2014-F	18	0.98	0.88	0.90	0.96	0.95	0.96	1.06	0.89	0.94	0.99	0.95
2015-S	27	0.99	0.92	1.11	0.96	1.01	0.99	1.01	1.03	1.03	1.09	1.03
2015-F	18	0.94	0.97	0.99	0.96	0.99	1.00	1.03	1.07	1.03	1.12	1.22
2016-S	38	1.05	0.97	1.01	1.02	1.05	1.00	1.03	1.04	1.02	1.02	1.05
2016-F	25	1.01	1.03	1.02	0.98	1.00	0.94	1.09	0.99	1.05	1.02	1.11
2017-S	51	0.92	1.05	1.05	1.03	0.98	0.98	0.99	0.99	1.01	1.00	1.03
2017-F	24	0.97	1.07	1.11	0.98	1.01	0.98	1.06	1.00	1.02	1.08	1.03
2018-S	41	0.95	1.06	1.05	1.03	0.99	1.01	1.06	1.02	1.05	1.08	1.03
2018-F	39	0.96	1.06	1.04	1.00	1.07	1.03	1.04	1.07	1.02	1.02	1.03