

Unit 10 - Week 8

Course outline

How does an NPTEL online course work?

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Week 8

● Response of Footings Resting on Reinforced Foundation Soils

● Bearing Capacity Analysis of Footings Resting on Reinforced Foundation Soils

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○ Week 8 Feedback : Geosynthetics And Reinforced Soil Structures

● Week 8 PPTs

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Assignment 8

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-03-25, 23:59 IST.

1) Which of the following are correct statements? 1 point

- Surface heaving takes place in case of punching failure
- General shear failure occurs in case of dense sands
- Rupture surface is not fully developed in case of local shear failure
- Punching shear failure occurs in the case of extremely soft soils

No, the answer is incorrect.

Score: 0

Accepted Answers:

General shear failure occurs in case of dense sands

Rupture surface is not fully developed in case of local shear failure

Punching shear failure occurs in the case of extremely soft soils

2) The Binquet and Lee (1975) theory was developed based on which of the following assumptions? 1 point

- Resistance from single layer of reinforcement is considered in equilibrium equation.
- Rupture surface passes through the points of maximum shear stress
- Pullout resistance is mobilized over the full length of reinforcement layers.
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

Resistance from single layer of reinforcement is considered in equilibrium equation.

Rupture surface passes through the points of maximum shear stress

3) What is the mode of failure if there is large number of reinforcement layers below the footing and $u/B > 2/3$ according to Binquet and Lee (1975)? 1 point

- Shear failure above the reinforcement
- Pull out of reinforcement layer
- Rupture of top most reinforcement layer
- Rupture of bottom most reinforcement layer

No, the answer is incorrect.

Score: 0

Accepted Answers:

Shear failure above the reinforcement

Data for questions 4-9 is given below. Answer the following questions based on this data.

It is required to design a strip footing of 2 m width on reinforced soil bed to carry a line load of 2000 kN/m. The soil parameters are, $c = 0 \text{ kPa}$, $\phi = 32^\circ$, $\gamma = 19 \text{ kN/m}^3$, $E_s = 35,000 \text{ kPa}$, $\mu_s = 0.30$. The allowable settlement is 30 mm. Use shape factor of 2.0 for the settlement calculations.

The reinforcement parameters are,

$F_y = 2.5 \times 10^5 \text{ kPa}$, interface friction angle $(\phi_u) = 28^\circ$, factor of safety against rupture $(FS_r) = 3$ and factor of safety against pullout $(FS_p) = 2.5$. Width of the ties is 75 mm, Linear Density Ratio (LDR) is 70%. Three reinforcement layers are provided at vertical spacing of 300 mm. The first layer is provided at a depth of 300 mm below the footing.

Use bearing capacity factors of $N_q = 23.2$ and $N_\gamma = 30.2$ to estimate the ultimate bearing capacity. The footing is provided at a depth of 1 m below the surface.

4) What is the bearing capacity of unreinforced foundation soil with a factor of safety of 3? 1 point

- 332 kPa
- 530 kPa
- 288.5 kPa
- 325 kPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

332 kPa

5) What is the safe bearing pressure? 1 point

- 338 kPa
- 150 kPa
- 288.5 kPa
- 400 kPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

288.5 kPa

6) What is the allowable bearing pressure on the unreinforced soil (q_o)? 1 point

- 530 kPa
- 288.5 kPa
- 150 kPa
- 338 kPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

288.5 kPa

7) What is the force in the upper most reinforcement layer? 1 point

- 144.7 kN/m
- 62 kN/m
- 35.5 kN/m
- 20.5 kN/m

No, the answer is incorrect.

Score: 0

Accepted Answers:

144.7 kN/m

8) What is the pullout resistance of the upper most reinforcement layer? 1 point

- 50 kN/m
- 150 kN/m
- 178.5 kN/m
- 200 kN/m

No, the answer is incorrect.

Score: 0

Accepted Answers:

178.5 kN/m

9) What is the factor of safety against pullout of the uppermost reinforcement layer? 1 point

- 1.23
- 2.46
- 1.38
- 1.04

No, the answer is incorrect.

Score: 0

Accepted Answers:

1.23

10) What are the effects of a void in the foundation soil? 1 point

- Reduced bearing capacity
- higher settlements
- No influence on the footing response
- Lower settlements

No, the answer is incorrect.

Score: 0

Accepted Answers:

Reduced bearing capacity

higher settlements