

Unit 6 - Week 4

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

Week 4

External Stability Analysis of Reinforced Soil Retaining Walls

Seismic Loads and Internal Stability Analysis of Reinforced Soil Walls

Testing Requirements for Reinforced Soil Retaining Walls

Quiz : Assignment 4

Week 4 Feedback : Geosynthetics And Reinforced Soil Structures

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Text Transcripts

Download Videos

Assignment 4

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

Due on 2020-02-26, 23:59 IST.

(Choose all the correct answers – more than one choice could be right)

1) What are the different modes of failure considered in external stability analysis of reinforced soil walls?

1 point

- Lateral sliding
- Overturning about toe
- Global slip circle failure
- Pullout failure of reinforcement

No, the answer is incorrect.
Score: 0

Accepted Answers:

Lateral sliding

Overturning about toe

Global slip circle failure

2) The length of reinforced block in reinforced soil walls is related to,

1 point

- External stability calculations
- Rupture failure of reinforcement
- Depends on vertical spacing of reinforcement layers
- Foundation soil characteristics

No, the answer is incorrect.
Score: 0

Accepted Answers:

External stability calculations

Foundation soil characteristics

3) Design height of the reinforced soil retaining wall is,

1 point

- From the bottom of levelling pad to the top of the wall
- From top of the levelling pad to the top of the wall
- From the ground surface to the top of the wall
- From foundation depth to top of wall

No, the answer is incorrect.
Score: 0

Accepted Answers:

From top of the levelling pad to the top of the wall

Answer the Questions 4-12 with respect to the data provided below.

A 10 m high wall supports soil with horizontal surface. The properties of the backfill soil are $c = 0$, $\phi = 33^\circ$ and $\gamma = 20 \text{ kN/m}^3$. The initial length of the reinforced soil block was assumed as 6 m. The permanent and live load surcharge on the soil are 15 kPa and 23 kPa respectively. The foundation soil has properties of $c = 25 \text{ kPa}$ and $\phi = 40^\circ$ and $\gamma = 20 \text{ kN/m}^3$.

4) What is the total lateral force for the design?

1 point

- 208.45 kN/m
- 435.86 kN/m
- 406.82 kN/m
- 1379.85 kN/m

No, the answer is incorrect.
Score: 0

Accepted Answers:

406.82 kN/m

5) What is the factor of safety against lateral sliding of the reinforced soil block?

1 point

- 1.19
- 1.59
- 1.28
- 1.75

No, the answer is incorrect.
Score: 0

Accepted Answers:

1.28

6) What is the over turning moment on the wall?

1 point

- 1972.5 kN-m/m
- 1542.8 kN-m/m
- 982.7 kN-m/m
- 1321.9 kN-m/m

No, the answer is incorrect.
Score: 0

Accepted Answers:

1542.8 kN-m/m

7) What is the minimum allowable bearing pressure required for the foundation soil to prevent excessive settlements and bearing capacity failure (as per Meyerhoff's theory)?

1 point

- 387 kPa
- 372 kPa
- 296 kPa
- 312 kPa

No, the answer is incorrect.
Score: 0

Accepted Answers:

372 kPa

8) It is proposed to construct the above structure in the Himalayan region which falls in Seismic Zone-V. Assume that the foundation consists of rocky strata.

The period of vibration may be assumed as 2 seconds. The ratio I/R may be taken as unity. What is the seismic acceleration factor at the bed rock level & within the reinforced soil fill?

- 0.09, 0.12
- 0.12, 0.16
- 0.06, 0.08
- 0.18, 0.23

No, the answer is incorrect.
Score: 0

Accepted Answers:

0.09, 0.12

9) Lateral force is applied on top of a reinforced soil retaining wall at a distance of 2.5 m through a footing of 1.5 m width. If the friction angle of the reinforced soil is 33° , up to what depth will the effect of the lateral force spread?

1 point

- 1.76 m
- 5.98 m
- 4.60 m
- 2.76m

No, the answer is incorrect.
Score: 0

Accepted Answers:

5.98 m

10) If the seismic acceleration factor in reinforced soil fill (α_m) is 0.15, what is the additional seismic force to be considered for external stability calculations as per FHWA?

1 point

- 206.22 kN/m
- 262.45 kN/m
- 187.45 kN/m
- 212.5 kN/m

No, the answer is incorrect.
Score: 0

Accepted Answers:

206.22 kN/m

11) What is the additional overturning moment due to the seismic forces as per FHWA?

1 point

- 1250.35 kN-m/m
- 1424.73 kN-m/m
- 1312.25 kN-m/m
- 1087.35 kN-m/m

No, the answer is incorrect.
Score: 0

Accepted Answers:

1087.35 kN-m/m

12) If the seismic acceleration factor in reinforced soil fill (α_m) is 0.15, what is the inertial force to be considered for internal stability calculations for the data in Problem 7? Assume that the reinforcement layers are of flexible type.

1 point

- 112.37 kN/m
- 81.43 kN/m
- 93.65 kN/m
- 53.42 kN/m

No, the answer is incorrect.
Score: 0

Accepted Answers:

93.65 kN/m

13) The height of a reinforced soil wall is 8 m. The friction angle of the reinforced soil fill is 35° . Flexible geogrids are provided as reinforcement layers. The seismic inertial force for this wall is 150 kN/m. The net sum of all anchorage lengths of all the reinforcement layers is 98.7 m.

1 point

The top most reinforcement layer is of 6 m length and is at a depth of 0.3 m from the top. What is the seismic inertial force transferred into this layer.

- 3.03 kN/m
- 6.5 kN/m
- 7.25 kN/m
- 8.19 kN/m

No, the answer is incorrect.
Score: 0

Accepted Answers:

3.03 kN/m

14) A reinforced soil retaining wall is supported by steel strips which are placed at horizontal and vertical spacings of 0.5 m and 0.75 m. The particular steel strip is at a depth of 9 m from the top of the wall. The vertical pressure at this depth is 345 kPa.

1 point

The friction angle of the reinforced soil is 35° . What is the tensile force transmitted to this particular reinforcement layer?

- 55.2 kN
- 35.1 kN
- 70.2 kN
- 110.4 kN

No, the answer is incorrect.
Score: 0

Accepted Answers:

35.1 kN

15) In a 8m high reinforced soil retaining wall, the length of the top most reinforcement layer is 6m. This layer is at 0.3 m depth below the surface. The friction angle of the soil is 35° . Normal pressure at this depth is 30.5 kPa. The coefficient of pullout interaction parameter is 0.60.

1 point

The width of the reinforcement strip is 70 mm. What is the pullout capacity of this layer?

- 7.14 kN
- 3.59 kN
- 1.79 kN
- 5.95 kN

No, the answer is incorrect.
Score: 0

Accepted Answers:

3.59 kN