



Nilachal Polytechnic

Bhubaneswar

Sem. : 6th Subject : ACT

Branch: Civil Engineering

Name of the Faculty : Sweta Sarangi

Text Book to be followed by Student / Faculty

Book- : S.K.Duggal

Chapter- 7 : Soil Reinforcing Techniques

1. Learning Objectives

Student will learn –

About the various techniques of soil reinforcing.

Necessity of soil reinforcing.

About Slope Stabilization in cutting and embankment

About the wire mesh and geosynthetics

About Soil nailing

2. Essential Questions

What are the various reinforcing techniques of soil reinforcing?

Write down the necessities of soil reinforcing?

What is geosynthetic and wire mesh?

What is Soil Nailing and also explain its procedure?

How to stabilize the soils in slopes and embankment by reinforcing technique?

3. Hours Required

Theory	3 hrs
Problems	nil
Question & Answer Theory	1 hr
Total	4 hours

4. Question for Teaching / Assignment / Self Practice

Question sets	02 Marks	05 Marks	10Marks
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Teaching	3	1	1
Assignment	1	1	1
Self Practice	1	1	1
Total	5No.s	3 No.s	3no.s

Lesson Description:-

soil reinforcement is a technique used to improve the stiffness and strength of soil using geo-engineering methods.

Soil reinforcement is necessary in lands where chances of erosion are high. It is particularly useful in areas with soft soil as it cannot provide adequate support to any construction or building.

This type of soil is also highly susceptible to various environmental and natural factors such as high compressibility, poor shear strength, temperature changes, etc. In soil reinforcement, different engineering techniques are used to enhance the soil strength.

The basic principle behind ground improvement using geosynthetics is that the reinforcing elements absorb the tensile loads or shear stress within the structure and thus preventing its failure due to shear or excessive deformation.

The improvement in the engineering properties happens due to the friction developed at the soil–reinforcement interface and the passive resistance that occurs through the development of bearing-type stresses on transverse reinforcement surfaces in a direction normal to the relative movement of soil reinforcement.

Course Material

CHAPTER - 7 **Soil Reinforcing Techniques**

Soil reinforcing techniques

(i) Soil reinforcing is defined as a technique to improve the engineering characteristics of soil.

(ii) Soil reinforcement is the act of improving soil strength to enable it support or carry more load.

Wire mesh

(i) Wire mesh fencing is one of the most basic types of fencing. It can be either be made from galvanized steel or stainless steel.

(ii) Wire mesh fencing has a lot of uses from residential to industrial purposes

Geo-synthetics

(i) Geo-synthetics are synthetic products used to stabilize soil.

(ii) This includes 8 main products such as:- geotextiles, geo grids, geonets, geomembranes, geosynthetic clay liners, geofabric, geocells, and geocomposites.

(ii) These are generally made from polymers for the stabilization of soil.

(iii) Geosynthetics increase the strength of the soil and are extensively used for various engineering purposes

Reinforcing

Reinforcing is a technique used to increase the strength of any material.

Soil Nailing

Soil Nailing is a technique used to reinforce and strengthen the existing ground.

Soil nailing consists of installing closed spaced bars in to a slope or excavation.

It is an effective and economical method of constructing retaining wall for excavation support, support bridge cuts, bridge abutments and highways.

This process is effective in cohesive soil, broken rock etc.

Workability is the ease with which a concrete can be mixed, placed and compacted so that a dense concrete is obtained.

Segregation is defined as the separation of the constituent materials of concrete.

Wiremesh and geosynthesis

Wiremesh

- i. Wiremesh is a grade which consists of steel wires in parallel to the longitudinal directions.
- ii. Wiremesh consists of steel fibers which increases the strength of soil.
- iii. Wire mesh are more economical and generally used in many construction projects.
- iv. Wire mesh are used in construction of roads, retaining walls etc.
- V. Wire mesh is also used for stabilization of soil.

Geosynthesis

- i) Geo-synthetics are synthetic products used to stabilize soil.
- (ii) This includes 8 main products such as:- geotextiles, geo grids, geonets, geomembranes, geosynthetic clay liners, geofoam, geocells, and geocomposites.
- (ii) These are generally made from polymers for the stabilization of soil.

Geosynthetics increase the strength of the soil and are extensively used for various engineering purposes

Strengthening of embankment by soil reinforcing techniques

Increase of load bearing capacity of soil-

By using the soil reinforcing techniques it increases the soil capacity for geo-textiles, wiremesh etc.

Reduce the permeability of soil.

In soil Reinforcing techniques we use chemicals to reduce the permeability of soil for water retaining dams.

Reduce the plasticity of soil-

We mix the various types of soil to reduce the plasticity index of soil and reduce the shrinkage of the soil.

To avoid soil erosion-

Soil reinforcing techniques is used to avoid the removal of soil due to heavy rainfall.

Question set

Classroom Teaching

Group A

What is soil reinforcing techniques?

What is the use of wire mesh?

What is geo-synthetics?

Group-B

Explain briefly what is the necessity of soil reinforcing? [2014W]

Group-C

Write short notes on
2018S

2016(s),

Wire mesh

Geo-synthetics

Slope stabilization

Soil reinforcing

Assignment Questions

Group-A

What do you mean by reinforcing?

2016(s)

Group-B

How to strengthening of embankment by soil reinforcing techniques?

Group-C

Write the uses of wire mesh and geo-synthetics in soil reinforcing techniques. [2018]

Self Practice

Group-A

Define Soil Nailing.

Group B

What is the slope stabilization in cutting and embankment by soil reinforcing techniques?

Group-C

Write the uses of wire mesh and geo-synthetics in soil reinforcing techniques.

Faculty

HOD

Principal