

GEOTECHNICAL ENGINEERING

CHAPTER # 5: GROUND IMPROVEMENT TECHNIQUES:

- GROUND IMPROVEMENT TECHNIQUES:

Ground improvement techniques are the techniques which are used to enhance the engineering property of soil in order to bear heavy structural load.

The main properties are shear strength, permeability, bearing capacity and stiffness etc.

NEED OF GROUND IMPROVEMENT TECHNIQUES:

- The soil in which volumetric changes take place due to shrinkage and swelling such soil needs ground improvement techniques.

- The soil which is organic in nature.

- The soft soil also required ground improvement techniques.

- The soil which is sandy and gravelly.

The foundation in sanitary dump places also required ground improvement techniques.

METHODS OF GROUND IMPROVEMENT TECHNIQUES:

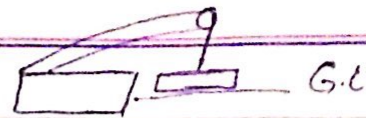
1. REMOVAL AND REPLACEMENT OF SOIL:

This is an oldest and simple method. This method is performed on loose soil.

In this method the unsuitable soil is replaced with compacted fill. In this method the same soil is used to refill the higher compaction and better engineering properties.

This method is applicable above the ground water table.

2. DYNAMIC COMPACTION:



This method is used to increase the bearing capacity of soil. This also increases the consolidation rate. This method also increases the density of soil. In this method, actually densification of soil takes place.

3. VIBRO COMPACTION:

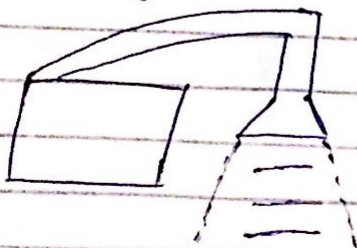
It is also called vibro densification. In this method, the compaction takes place at a certain depth in granular soil through a vibratory probe. This vibratory probe is run by an electric motor. The penetration of the probe is enhanced by ejecting water at the tip of the probe.



4. RAPID IMPACT COMPACTION:

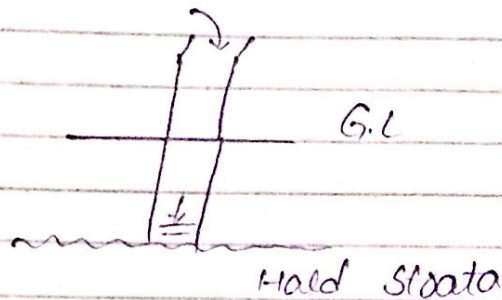
Impact energy is applied to the surface of the ground as a result of which densification of soil takes place up to a depth of 15 feet.

This impact energy is actually applied through a hydraulic ram. The hydraulic ram weight varies from 4-8 tons.



5. VIBRO CONCRETE COLUMN:

Vibro concrete columns is a ground improvement technique which transfers the load from weak strata to hard strata by using strength concrete.



6. WET SOIL MIXING:

In this method of ground improvement technique a paste of cement is prepared and inserted in the soil. This method is used to improve the characteristics of weak soil by using cementitious binders slurry.

7. DRY MIXING OF SOIL:

Dry soil mixing is a ground improvement technique by which the characteristics of weak soil are improved by using dry cementitious binders.