Editorial
Volume 11:5, 2020

Journal of Civil & Environmental Engineering

ISSN: 2165-784X

Open Access

Editorial on Soil Stabilization

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Introduction

Soil stabilization is the process of altering engineering features of soil, such as strength parameters, in order to increase the soil's carrying capacity. It's usually done when the subgrade soil isn't strong enough to support the structural loads. Soil stabilization improves the soil's shear strength while also lowering the permeability and compressibility of the mass. Soil compaction and drainage are the most basic soil stabilisation techniques. Soil stabilisation is critical for pavement construction. The shear strength capability of the pavement is constantly emphasised, as it must be sufficient to resist shear forces and prevent layer deflection due to fatigue. The soil stabilisation process can improve several soil properties.

Methods of soil stabilization

Soil stabilization can be achieved by following methods,

Mechanical stabilization: This is the method of achieving soil stability by changing the gradation of the soil by compacting it using mechanical energy. For this procedure, rollers, vibrators, and earth rammers are typically employed.

Compaction of the soil removes entrapped air and pores, as well as reducing permeability. It is sometimes possible to attain desired qualities by combining two classes of soil to create a composite soil. The other two ways for stabilising the soil in slope areas are soil filling and backfill, as well as soil reinforcement.

Stabilization using Admixtures: The additive approach is also known as this. To achieve the desired stabilising quality, chemical additives are mixed into the soil. These admixtures are non-toxic, biodegradable, and environmentally friendly. Cement, lime, fly ash, and blast furnace slag are the most widely utilised materials.

Some other admixtures and procedures that have been used and some of them are:

Bituminous stabilisation: Bitumen is added to existing soil in a controlled amount.

Rice husk ash stabilisation: It is a pozzolanic substance that is used to stabilise rice husk ash. The ash produced is then burned at a controlled temperature and used for soil stabilisation.

Thermal Stabilization: This is done by either heating or cooling the soil to meet the engineering qualities of the soil.

Electrical Stabilization: The principle of electro osmosis is used for electric stabilisation. Pour water travels towards the negative electrode as DC current is transmitted through the clay soil. It isn't financially feasible.

Factors affecting the strength of stabilized soil

Organic matter: When a considerable amount of organic matter is present, it reacts with the hydration product, resulting in a low pH value. This will slow down the hydration process and have an impact on soil stability.

Sulphates and sulphides: The presence of sulphates and sulphides slows down the stability of soil.

Compaction: Good compaction boosts the soil's bearing ability and it's also important in cement and lime stabilisation.

Moisture content: Moisture content is critical for hydration and compaction efficiency. Water content from the surroundings is used to make 20% of the weight of hydrated cement and 32% of the weight of quick lime.

Temperature: The pozzolanic reaction is temperature sensitive. Low temperature slows the pozzolanic reaction, resulting in weakened stable soil.

As of today's improved technology, a variety of soil stabilising technologies and chemicals have been introduced. Improving the durability, strength, and computability of soil is critical for the construction of airfields, buildings, and pavements. Other approaches, such as injection and spray techniques, must also be investigated further in order to achieve cost-effective soil stabilisation.

How to cite this article: Sushma P. "Editorial on Soil Stabilization." Civil Environ Eng 11 (2021): 391

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Received 10 May, 2021; **Accepted** 15 May, 2020; **Published** 20 May, 2021