



INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

COMPARITIVE STUDY OF EFFECT OF WASTE MATERIALS ON EXPANCIVE SOIL

PAYAL D. LUNGE, PRAGATI A.DMAKE

Dept. of civil engg, D.R.G.I.O.T.& R Amt

Accepted Date: 15/03/2016; Published Date: 01/05/2016

Abstract: Expansive soils are soils that expand when water is added, and shrink when they dry out. This continuous change in soil volume can cause homes built on this soil to move unevenly and crack. Each year in the United States, expansive soils cause \$2.3 billion in damage to houses, other buildings, roads, pipelines, and other structures. This is more than twice the damage from floods, hurricanes, tornadoes, and earthquakes combined.



PAPER-QR CODE

Corresponding Author: MS. PAYAL D. LUNGE

Access Online On:

www.ijpret.com

How to Cite This Article:

Payal D. Lunge, IJPRET, 2016; Volume 4 (9): 322-326

INTRODUCTION

Expansive soils are soils that expand when water is added, and shrink when they dry out. This continuous change in soil volume can cause homes built on this soil to move unevenly and crack. Each year in the United States, expansive soils cause \$2.3 billion in damage to houses, other buildings, roads, pipelines, and other structures. This is more than twice the damage from floods, hurricanes, tornadoes, and earthquakes combined.

In Amravati region, black cotton soil is widely present. Black cotton soil is also called as Expansive soil.

Expansive soils owe their characteristics to the presence of swelling clay minerals. As they get wet, the clay minerals absorb water molecules and expand; conversely, as they dry they shrink, leaving large voids in the soil. Swelling clays can control the behavior of virtually any type of soil if the percentage of clay is more than about 5 percent by weight. Soils with steatite clay minerals, such as montmorillonite, exhibit the most profound swelling properties.

Causes of failure:

1. As water from irrigation or rainfall migrates underneath the home's foundation, the soil around the edge of the foundation expands, pushing up on the edges of the foundation. This condition, called edge-lift, can cause cracking in the drywall and in the foundation itself.
2. Tree planted near homes can cause long term damage to the foundation. As the trees age and their roots grow beneath the foundation, the roots extract the moisture from the soil, causing it to dry out and shrink. This shrinking can result in increased settlement of the structure many years after the original construction.

Control measures:

- 1 **Geosynthetic materials can be used for reinforcement of expansive soil.**
- 2 **Use of waste materials for stabilise the expansive soil.**
- 3 **Replace the expansive soil by different soil.**
- 4 **There are also Expansive soil chemical treatment available which are designed to alter the clay minerlogy and reduce the expansion poentnal.**

Considerable length of roads planned to be constructed in India under various programmes require construction over poor subgrade soils. The performance of a road largely depends on

properties of the subgrade soil. One such subgrade soil often encountered is the black cotton (BC) soil. Instead of weak soil, improved soil with waste materials in the pavement layers can be a substitute in the economic view.

The effect of use of waste material available in Amravati region such as Marble waste, coir fibres, iron oxide, wheat husk etc. Marble is a non-foliated [metamorphic rock](#) composed of recrystallized carbonate minerals, most commonly [calcite](#) or [dolomite](#). Coir is a [natural fiber](#) extracted from the [husk](#) of coconut made of cellulose. The coir fiber is relatively waterproof, and is one of the few natural fibers resistant to damage by saltwater. Iron oxides and oxide-hydroxides are widespread in nature, play an important role in many geological and biological processes. Wheat husk is a lignocelluloses waste product which is about 15–20% of wheat and some extents of wheat husk use cattle food and fuel.

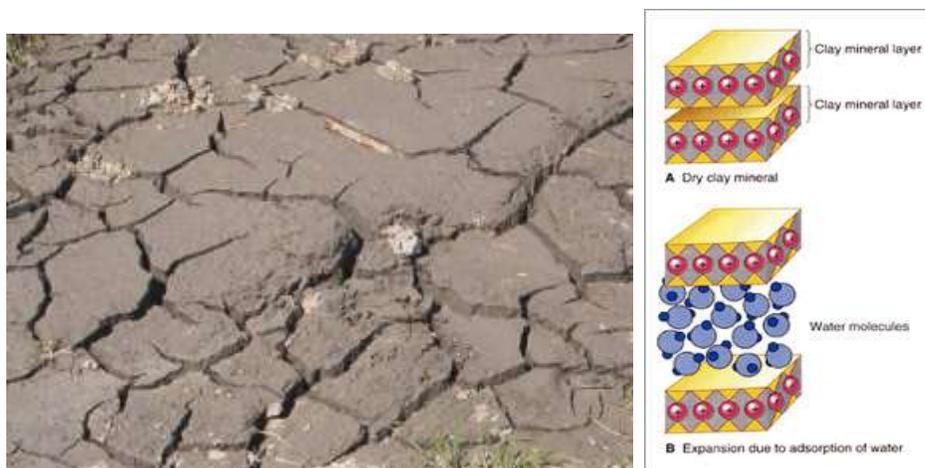


Figure 1.1.1.: Photo-view and mechanism of expansive soil

Necessity :

Soil stabilisation refers to the process of changing soil properties to improve strength and durability. It is an important to road construction and maintenance. It is important that soil stabilisation is performed to eliminate the risk of environmental concern. Although all roads need to be repaired and construction boosts the economy they can both harm the environment. Both of these processes be stopped, therefore there has to be a way to control the damage to the environment. It protects against erosion in many different places.

Now a day large quantity of industrial waste has emerging out and cannot be reused which leads to environmental pollution. By using a particular industrial waste material individually, a number of investigations have been performed by different researchers to improve the

engineering properties of black cotton soil such as index properties, compaction properties and C.B.R. value etc.

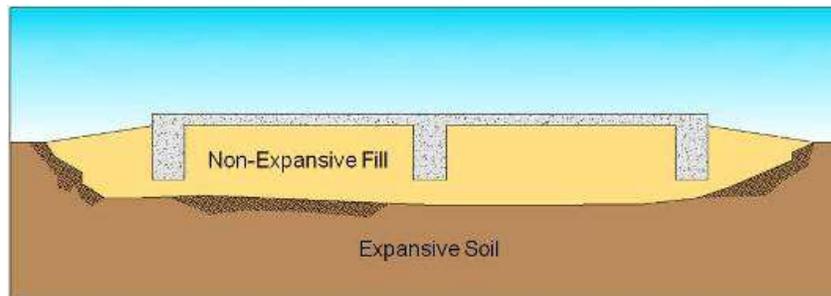


Figure 1.2.1.: View after soil stabilisation

Objectives:

- Determination of compaction properties of various percentage of marble waste.
- Determination of compaction properties of various percentage of wheat husk.
- Determination of compaction properties of various percentage of coir fibres.
- Determination of compaction properties of various percentage of iron oxide.
- Determination of compaction properties of various percentage of composite of all waste material.
- Comparison of C.B.R. values between original soil sample and sample using waste material.

Theme :

The theme of the project is to utilize the waste material such as Marble waste, coir fibres, iron oxide, wheat husk produce widely in Amravati region. In this project we compared the results obtained from the compaction properties and C.B.R. values between original soil sample and sample using waste material. Based on it, the conclusions will be made for effective, economical and ecofriendly method of soil stabilization.

Mainly the project is consist of five chapters namely Introduction, Literature Review, Methodology, Result and Discussion and References.

The FIRST CHAPTER that is introduction deals with the overall view of the nature of expansive soil present in Amravati region. The history and various effects of Expansive soil

have been discussed. Also, Necessity, Objectives, Organization, and theme of the project have been given.

The **SECOND CHAPTER** deals with the Literature Review of various studies given by the various authors. In this chapter author's effective study and their conclusions have been discussed from which the reference are taken for the effective study of materials.

The **THIRD CHAPTER** deals with the methodology of the project which includes the result of properties of original soil sample such as consistency limits, specific gravity, M.D.D. and O.M.C. The compaction properties of soil using marble dust, iron oxide, wheat husk and coir fibre on various percentages are given. The effective results have been shown.

The **FOURTH CHAPTER** deals with the results of various test performed on individual and composite materials. The compaction properties and C.B.R. value of the composite soil sample had been compared with original soil sample. Based on it the conclusions effective results had been obtained.