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PERFORMANCE OF POLYESTER AND POLYPROPYLENE IN EXPANSIVE SOIL STABILIZATION

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ABSTRACT

This Project shows study of Recron-3s fibre as the admixture or stabilizer in improving engineering properties of soil. The main objective of this study is to effect of Recron-3s fibre in geotechnical applications. In this study a brief review is prepared on the research work of various authors. The experiment evaluates the effect of Recron-3s on the some basic engineering properties of these soils such as California Bearing Ratio (CBR) value and Unconfined Compressive strength (UCS). The different values adopted in the present study for the percentage of fibre reinforcement are 0.75%, 1.5%, 2.25% and 3%.For any structure made on land, the soil surrounding the structure is extremely important. While Construction a lot of difficulty is faced because of soil if it is not properly stable. Soils are usually weak in tension; soil stabilization by the additives is very necessary and is suitable for road pavement foundation because it improves the engineering properties of different soil to sustain load carrying capacity in terms of quality and quantity of performance.

KEYWORDS:-Maximum dry density (MDD), Compressive strength, Aggregates, Recron-3s fibre, soil stabilization.

I. INTRODUCTION

GENERAL

Soil stabilization is one of the major way to enhance road surfaces. The basic target of soil stabilization is usually to improve the California Bearing Ratio of in-situ soil by means of 4 to 6 times. The other objective of soil stabilization is to strengthen on-site resources to create a solid and robust sub-base and base lessons.

In certain parts of the world, commonly developing countries and now with greater regularity in developed countries, stabilization is used to create entire road. In past, soil stabilization was done by using the binding properties involving clay soils, cement based solutions or utilizing the “rammed earth” process and lime scale. As technology evolved, presently there have now emerged new varieties of soil stabilization techniques, most of which

are classified as "green technologies". Some of the green technologies are biopolymers, surfactants, synthetic polymers, co-polymer products, tree resins, enzymes, fibber reinforcement, ionic stabilizers, calcium chloride, cross-linking styrene acrylic polymers, sodium chloride. Some of these completely new stabilizing tactics create hydrophobic surfaces along with mass that prevent stops road surface from failure and also from water penetration or heavy frosts by inhibiting the ingress of waters into the treated layer. The stabilization of soil has been performed from very past time. It was recognized before the Christian era began that certain geographic regions were plagued with surface materials and ambient conditions that made the movement of armies and goods difficult, if not impossible, over the paths between villages and towns. The Mesopotamians and Romans separately discovered that it was possible to improve the ability of pathways to carry traffic by mixing the weak soils with stabilizing agent like pulverised limestone or calcium. This was the first chemical stabilization of weak soils to improve their load carrying capacity. Over the past 60 years they had used cement and lime these being most effective stabilizers for road and airfield applications.

II. LITERATURE REVIEW

Recron-3s

Mrudul U.V,Prof.S.M Damodaria (2016) In this paper investigation of black cotton soil treated with Terrasil and cement. In this study soil with variable dosages were tested for stabilization process and strength of the stabilized soil has been evaluated after curing period. This test was carried out to determine the consistency limits, CBR value of soil Specimens with and without stabilizers for curing period.

Manju Suthar and Parveen Aggarwal (2015) In this paper results of a clayey soil modified with lime and recron3s fibre(6mm and 12mm long separately) is presented. Investigation include evaluation of specific gravity, grain size distribution, atterbergs maximum dry density, optimum moisture content and CBR value of clayey soil and lime or recron 3s fibre modified clayey soil mixed with lime stabilizer in 2%, 4%, 6% by weight of dry soil.

Jyoti S.Trevedi,Sandeep

Nair,ChakradharIyyunni, (2013) Stabilization of expensive over consolidated clay using hydraulic binders. This paper is to formulate a model based on genetic algorithm which can be used to predict variation in the value of CBR of the subgrade soil with the addition of a specific percentage of Fly ash added. For analysis of soil using fly ash, Evolver 5.7 sn add-in software of excel is used. Properties used for analysis are L.L, P. L, OMC and CBR.

Prof.R.K.Sharma (2012)this paper work on "Subgrade Characteristics of locally available soil Mixed with Fly ash and Randomly Distribution Fibres".This paper presents the results of investigation on behavior of expensive soil modified with fly ash and Recron 3s fibre of 12 mm length. The properties like grain size distribution, moisture density related and CBR are studied for soil blended with fly ash in range of 2080%.

P.V.Koteswara Rao, (2012) et al studied the performance of recron-3s fiber with cement kiln dust in expansive soils. In the present work, an attempt is made to study the influence of polymer fibres on the properties of locally available Black Cotton soil with and without admixture modification. This study revealed that the fibre reinforcement improves the soil properties in terms of improved stress-strain patterns.

III. SELECTION OF MATERIALS AND METHODOLOGY A. Clayey soil

Clayey silty soil of low plasticity, fine and inorganic in character with particle size range of 0.002 mm to 0.075, according to soil classification system IS (1498) 1970(3) .

B. Aggregates

Aggregates are broadly classified into two types depending on size of particles discussed below:-

- Coarse Aggregates
- Fine Aggregates

Coarse Aggregates:-Sand, natural gravel and crushed stone are used for this purpose. Coarse aggregate along with the soil and recron 3 s fibre make pavements strong and improves bearing capacity of soil.

Fine Aggregates:-The properties of concrete in fresh as well as in hardened state are affected by the characteristic property and quality of fine aggregates.

C. Water

Water acts as important constituent in soil. I used tap water with properties same as that of normal water of specific gravity 1.0.

D. Recron 3s fibre

Recron 3s is a polyester fibre that is used to increase the strength of soil as well as concrete. It is one of the best materials to change the properties of soil used for pavements. It is used as a secondary reinforcing element. It also provides impact and abrasion resistance.

E. Admixtures

If we use recron 3s fibre with admixtures like lime the soil the unconfined compressive strength is increased by 7 times. Admixtures' enhances the properties of soil along with recron 3s fibre.

IV. TEST METHODS

1. Specific gravity of soil
2. Determination of soil index properties(Atterberg's limit)
3. Determination of the maximum dry density and optimum moisture content
4. 4. Direct Shear test
5. Unconfined compression test
6. Particle size distribution by sieve analysis

V. RESULTS

1. This whole experimentation were carried about to know the combined effect of Recron 3s fiber and soil.

2. This whole evaluation was done by evaluating the representatives for unconfined compressive Strength, Shear Strength and Flexural strength.

3. After completion of this process the results obtained from these investigations were differentiated with normal soil.

Given below results were concluded from the whole experiment:-

1. When we use Recron 3s fibre with soil the compressive strength of soil is increased fantastically.

2. Fiber absorbs everything and maintains the road surface intact, resolving variety of issues such as potholes, cracking, and pavement disintegration.

3. The cohesiveness of the soil is significantly reduced when using Recron fiber thread.

4. The addition of both reinforcing elements raises the F -value.

5. The use of Recron fibre boosts the soils unconfined compressive strength.

6. The friction angle of clayey soil varies nonlinearly with the amount of Recron fibre , and sandy soil shows a similar tendency.

VI. CONCLUSION

1. From all the results and investigations we concluded that as we added soil with recron 3s fibre, as a result the strength of soil increases resulting less potholes in pavement, less disintegration in soil.

2. By adding the recron 3s fibre to soil, unconfined soil strength is increased, F value also increases, improves the quality of soil.

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