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INCREASING PROPERTIES OF SOIL BY ADDING FLYASH AND REINFORCING SOIL WITH RECRON3S FIBRE

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ABSTRACT

Soil represents an advanced mix of minerals and water, air, organic matter and innumerable living things and soils in Asia, such as the expansion of black cotton soil, land deposits, laterite soil. The soil stabilizing process is used to build foundations, shrubs and roadways, aerodromes and village to highways or highways. Soil stability enhances the soil's carrying capacity, softness, strength and alternating soil features.

In this work Recron 3s fibre as well as flyash has been used for stabilization of soil as it seems to have an outstanding potential to reduce the harmful impacts of expansive soils on buildings, earth restraint and roads. However, an impacted fibre strengthening analysis of fine grain soils is carried out, without conditioning the results on compaction qualities, strength and hydro-mechanical properties.

This study provides an excellent technique to enhance black cotton soil characteristics. When Fly ash is added to black cotton soil with Rechron-3S fiber, greater compression than a percentage is seen. Finally, we have determined, in terms of economics, that the usage of Recron-3S and Fly ash is good, with the results of compressive force and UCS value.

Keywords—Recron 3S, Flyash

1. INTRODUCTION

The Indian tract comprises of sundry deposition style of soil. Many terrain configuration has difficulty in designing and building the engineering structure. Low shears are the main reason causing damages to the engineering structure such as roads, roadways and dams with dispersing soils. The approach to achieve the specific qualities needed to build the pavement. The stabilization equipment method. A literature audit on the issue was carried out through inspections of the research centre and field testing when necessary. Chemical additive stabilization, overburdening and a dihydrogen oxide bar are general modifications in soil that migrate swelling troubles. The influence of the chemical modification of soils which upgrades and improve the engineering

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qualities has become increasing in recent years. Typically Recron-3 and Sisal fibres transform the soil index properties by group action to have an exceptional potential as an economic way to improve the geospatial character of expansive soils. Recently, more emphasis has been paid to soil reinforcement with fibre variants based on experimental results gathered in recent years shows the potential for fibre variations in reinforcing problem soils. In order to fully understand the strength values of unreinforced and bolstered soils, conduct a number of experiments on non-expansive soil and evaluate the suitability of sisal fibres as reinforcement material. Finally, a major change in failure deviator stress and shear strength parameters (c and ø) is achieved. Instruction of shear strength of soils with the presence of Ricron-3 and sisal fibre desultorily dispersed. Therefore, the fibre in the Recron 3s seems to have an outstanding potential to reduce the harmful impacts of expansive soils on buildings, earth restraint and roads. However, an impacted fibre strengthening analysis of fine grain soils is carried out, without conditioning the results on compaction qualities, strength and hydro-mechanical properties.

Here during this project, soil stabilization finished the assistance of haphazardly distributed polyester (Recron-3s) fibers obtained from waste materials. The development within the shear strength parameter has been applied victimization totally different ways of shear resistance activity.

Problem identification

Black cotton soils are major “Problematic” and typically as “Potential natural hazard” as a result of the causes depth injury to light-weight structure based on them because of excessive seasonal volumetric amendment (swell and shrinkage) they are typically expansive because to the presence of giant share of expansive clay minerals know as Montmorillonite. Black cotton as low bearing capacity and has UCS and CBR low price so it is tough to apply in road and air field construction.

2. OBJECTIVES

1. To investigate the physical qualities of black cotton.
2. To study strength properties of soil.
3. To establish black-cotton soil compaction characteristics.
4. To evaluate optimum percentage of Fly ash in increasing the strength of black cotton soil.
5. To investigate the influence of fly ash on the compaction and shear parameters.
6. To discover how Recron-3s affect soil shear characteristics.
7. To know how strong black cotton soil is increasingly varying percent of Recron-3s fiber.
8. To know the effects of addition of fibers in UCS.
9. Identify optimum percentage of Fly ash by conducting tests by varying the percentage of Recron-3s fiber.

3. MATERIALS

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- Black cotton soil
- Fly ash
- Recron-3s fiber

4. METHODOLOGY

1) The black cotton soil is brought from the Bidar. It is collected from the depth of 2m from the ground surface. This soil is used in current project to conduct experimental work.
2) After collection of the black cotton soil sample was spreaded and hand sorted and smashed and clodded or lumps onto soil.
3) The additive Recron-3s fiber and Fly ash were directly purchased from the company.
4) Before conducting the experimental work, basic tests were conducted on the raw soil just to know about the soil properties like Sieve Analysis, Specific Gravity, Consistency limit, Compaction, Unconfined compressive test are conducted
5) After the analysis of black cotton soil, the soil is mixed with varying percentages of fly ash from 10%, 20%, 30% and 40%. Then optimum percentage of Fly ash is derived from the study.
6) After Fly ash treated with soil, it is mixed with Recron-3s fiber in variation dosage like 0.25%, 0.50%, 0.75% and 1% by its dry weight of soil and then the experiment is conducted.
7) Then the results obtained are tabulated and calculated using the formula and then the graph are plotted.
8) From the analysis we decide the optimum percentage of recron-3s fiber that should be used to get soil stabilized.

Technical specification of the experimental setup

- 1st Experiment : Specific gravity test by using Pyconometer -1000ml
- 2ndExperiment: Particle size distribution of soil by exploitation IS-set of sieves (4.75mm, 2.36mm, 1.18mm, 600micron, 300micron, 150micron, 75micron, Pan)
- 3rd Experiment: liquid limit test by using Casagrande device(11mm wide at top and 2mm wide at bottom)
- 4th Experiment: plastic limit test by using porcelain dish, spatula, wash bottle, drying oven, glass plate.
- 5th Experiment: compaction test by using cylindrical metal mould (Dia-100mm,Effective height-127.5mm),
  Hammer-2.5kg, Detachable base plate, and collar
- 6th Experiment: unconfined compression test by using Undistributed cylindrical specimen (dia-40mm, length-75mm), proving ring

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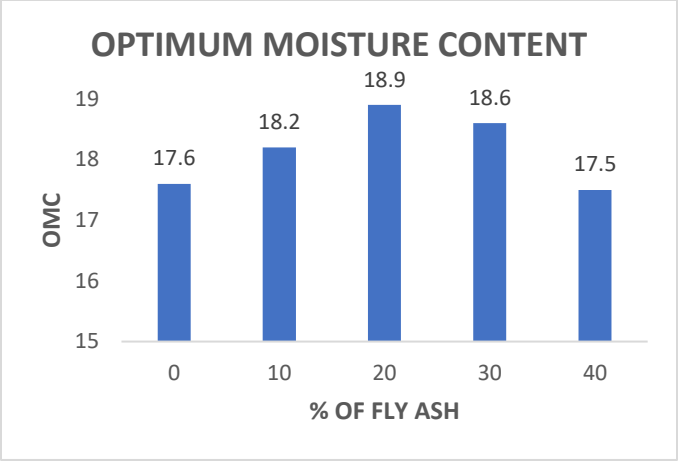
5. RESULTS AND DISCUSSION

5.1 COMPARISION OF TEST RESULTS

BLACK COTTON SOIL+ FLY ASH



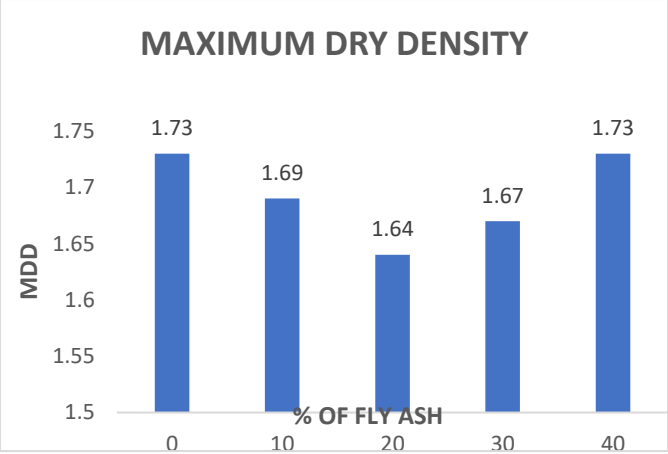
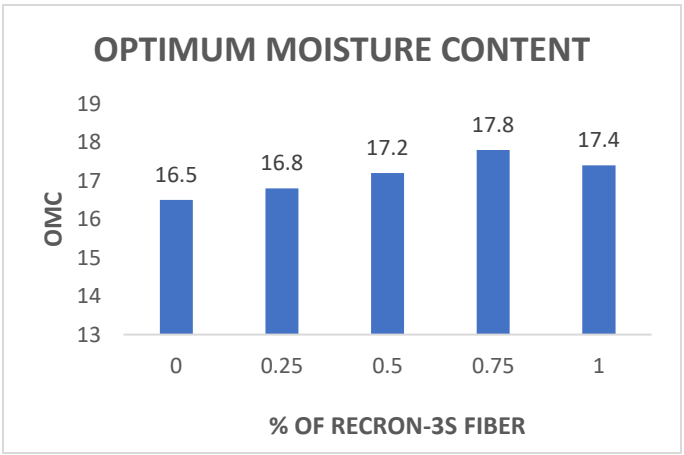


Fig 5.1: A compaction variation in black cotton soil stabilized by fly ash.

5.1.2 Compaction curve for Recron-3s fiber stabilized Black cotton soil.

BLACK COTTON SOIL+ RECRON-3S FIBER



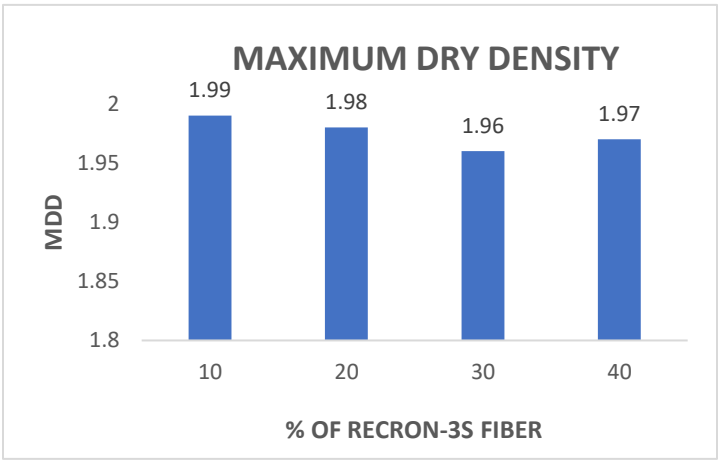


Fig 5.2: Variation in compaction of Recron-3s fiber stabilized black cotton soil

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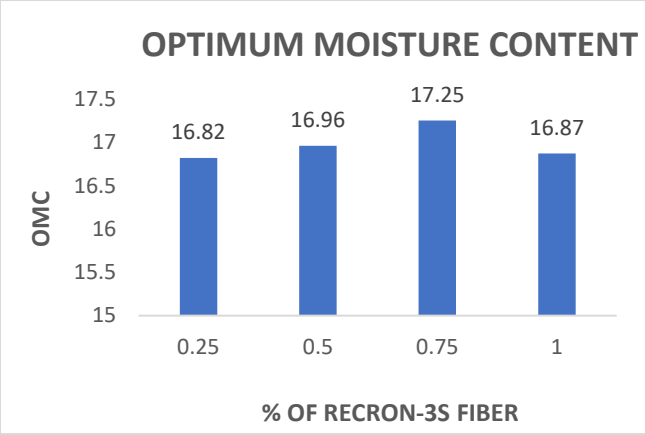
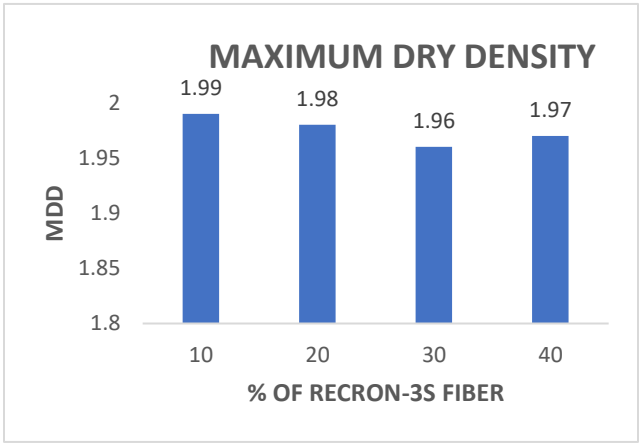
5.1.3 Compaction curve for black cotton soil +20%fly ash with varying percentage of Recron-3s fiber





`Fig 5.3: Variation in compaction of 20%Fly ash and varying recron-3s fiber stabilized black cotton soil

5.1 UCC TEST RESULTS

5.2.1 Unconfined compressive curve for Fly ash stabilized Black Cotton soil.

BLACK COTTON SOIL+ FLY ASH

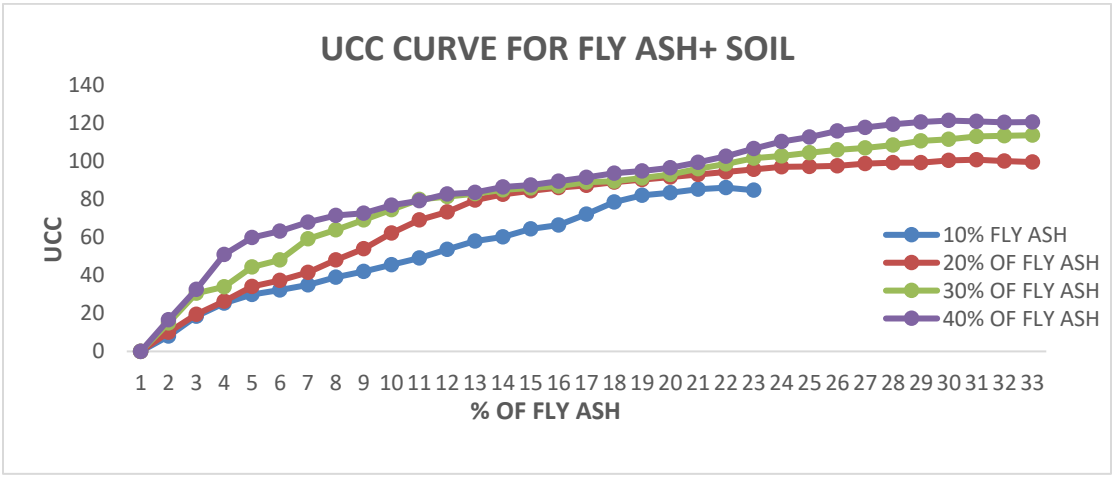


Fig 5.4: variation curve of UCS of FLYASH stabilized with black cotton soil.

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5.2.2 Unconfined compressive curve for Recron-3s fiber stabilized Black Cotton soil.

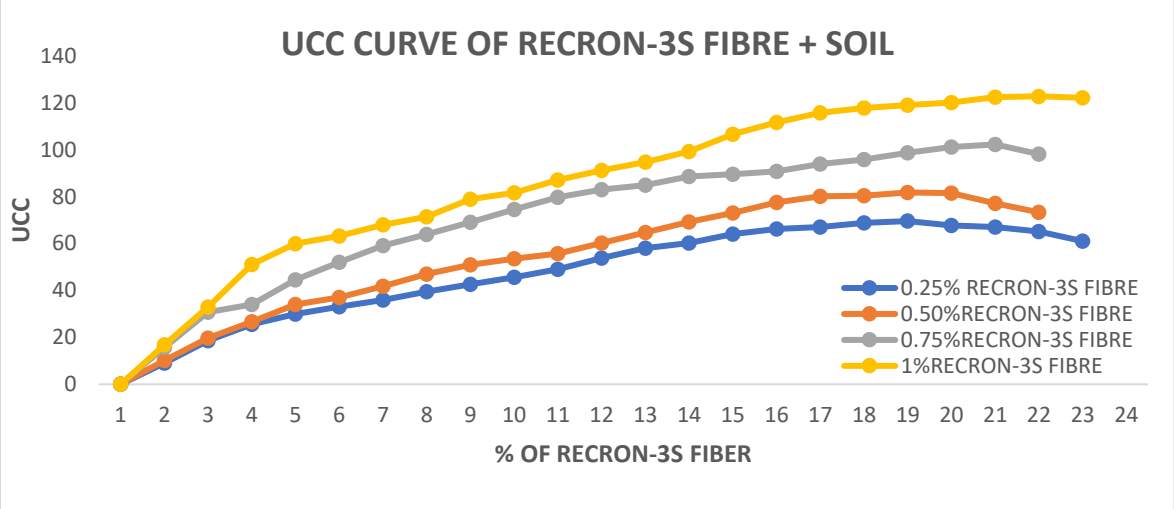

Fig 5.4: variation curve of UCS of Recron-3s fiber stabilized with black cotton soil.

5.2.3 Unconfined compressive curve for black cotton soil +20%fly ash with varying percentage of Recron-3s fiber

BLACK COTTON SOIL+ 20% FLY ASH + RECRON-3S FIBER

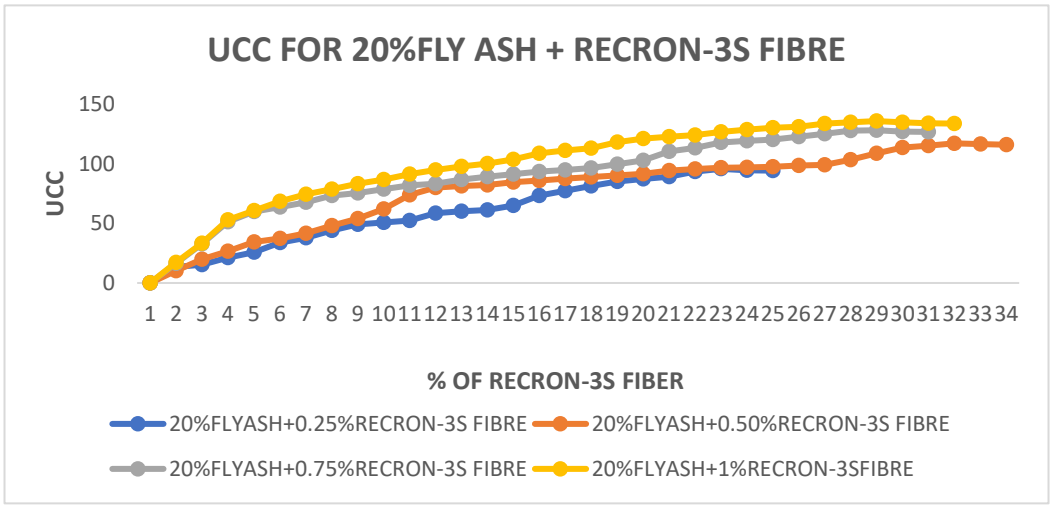

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Fig 5.4: Compressive curve +20 percent fly ash with a different proportion of Recron-3s fiber for black cotton

6. CONCLUSION

This study provides an excellent technique to enhance black cotton soil characteristics.

- The fly ash addition helps to increase the strength of the ground. The UCS test result of black cotton soil rises 64.10KN per square meter to 132.5KN per square meter. A 10 percent increase in fly ash. He also noted that the amount of fly ash grows further (10 percent, 20 percent)
- The soil's sub-strength will be enhanced by adding Recron-3S fiber. The outcomes of the UCS test demonstrate that the UCS value of the soil is increased by the 64.10KN /m2 to 120.69KN /m2, adding 0.25% of Recron-3S fiber. The amount of Recron-3S fiber also increased significantly (0.25 percent, 0.5 percent& 0.75 percent of dry soil).
- Recron-3 fibers are most commonly utilized to enhance the soil subgrade. Black cotton soil improves its UCS value from 64.10KN/m2 to 143.40KN/m2.
- The Recron-3S fiber having high tensile strength.
- The supplement of fly ash contributes to the improvement of the soil's strength. The UCS test result of black cotton soil rises 64.10KN per square meter to 132.5KN/square. A 10 percent increase in fly ash. He also noted that the amount of fly ash grows further (10 percent, 20 percent of the dry soil) and then observed that decreases.
- When Fly ash is added to black cotton soil with Rechron-3S fiber, greater compression than a percentage is seen.
- Finally, we have determined, in terms of economics, that the usage of Recron-3S and Fly ash is good, with the results of compressive force and UCS value.

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