

**EFFECT ON RED SOIL STABILIZED BY USING JUTE FIBRE**

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**Abstract:** Red soil is the best part in the Indian earth’s land on which we can see physically in our surround of the states. The red soil contains more drainage property in the comparison of the other soil. The formation of the red soil is made up of the clay and the limestone. Soil Stabilization means improvement of the soil by using of controlled compaction, proportioning and or the addition of suitable admixture or stabilizers.

In the present investigation an attempt has been made to modify the strength characteristics of laterite soil (red soil) using Jute fibre. The admixtures are mixed with soil in various proportions to determine the strength characteristics of red soils such as standard proctor test and unconfined compression test (UCS).

**Keywords:** Laterite soil, Jute fibre, polythene, controlled compaction.

**1. INTRODUCTION**

Soil stabilization began in early 1970’s, with the increase in the demand for infrastructure, raw materials and fuel. It has started to take a new shape, with the availability of better research, material and equipment; it is emerging as popular and cost effective method for improvement. Red soil contains more drainage properties then other types of soils. Red soils in India lack nitrogenous material, phosphoric acid and organic matter and are rich in iron. It is formed by the breakdown of igneous rocks and metamorphic rocks. Some of the major crops grown in the red soil in India include groundnut, millets, ragi, rice, potato, sugarcane, wheat, tobacco, etc. In the present investigation red soil was collected from Veeravaram near Rajamahendravaram in north coastal district of Andhra Pradesh and tested for geotechnical properties like gradation, index, compaction characteristics, and unconfined compression strength at different proportions of Jute fibre.

**2. MATERIALS:**

To study the soil properties the soil was collected from Veeravaram near Rajamahendravaram at a depth of 3 m from ground level of East Godavari District were collected and tested for geotechnical characteristics such as grain size distribution, Plasticity Index, Compaction and strength tests as per IS 2720. Jute is economical and easily available in the market .jute bags are locally available and were cutted in a desired shape with an length of 5cm.by thread

**3. TESTS AND RESULTS:**

To explain the behaviour of red soil properties the following tests were conducted and shown below;

S.No	Properties of Soil	Values
1	<b>Grain Size Distribution</b>	
	Gravel (%)	0
	Sand (%)	72
	Fines (%)	28
2	<b>Index Properties</b>	
	Liquid Limit (%)	34.00
	Plastic Limit (%)	20.00
	Plasticity Index	14.00
3	IS Classification	SC
4	Specific Gravity	2.18
5	<b>Compaction Characteristics</b>	
	Optimum Moisture Content (%)	9.70
	Maximum Dry Density (g/cc)	2.04
6	Unconfined Compression Strength Test (kPa)	62

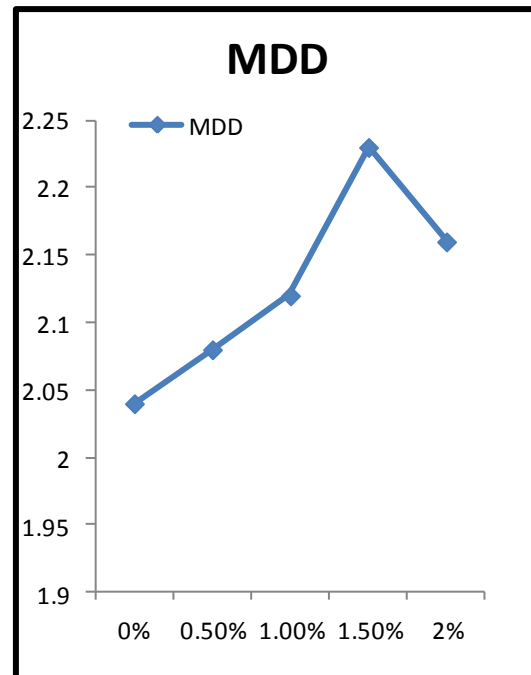
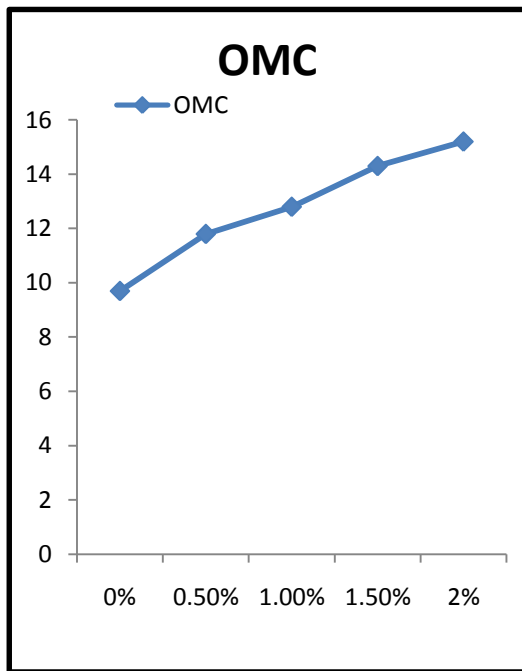
From the test results it is identified that the soil was coarse grained soil. Grain size distribution analysis shows that red soils collected are dominated by 72% sand particles and fine particles (clay and silt) are 28%. Index properties are identified that liquid limit of 34.00%, and plasticity index of 14.00 Based on the gradation and index properties the soil

is classified as SC soil. Compaction characteristics like optimum moisture content and maximum dry density are 9.70% and 2.04g/cc.

**3.1 COMPACTION CHARACTERISTICS FOR DIFFERENT PERCENTAGES OF JUTE FIBRE:**

The variation of maximum dry density (MDD) and optimum moisture content (OMC) of soil- jute mixes are shown below:

Percentage of Admixture	OMC	MDD
0% of jute fibre	9.70	2.04
0.5% of jute fibre	11.80	2.08
1.0% of jute fibre	12.80	2.12
1.5% of jute fibre	14.30	2.23
2% of jute fibre	15.20	2.16

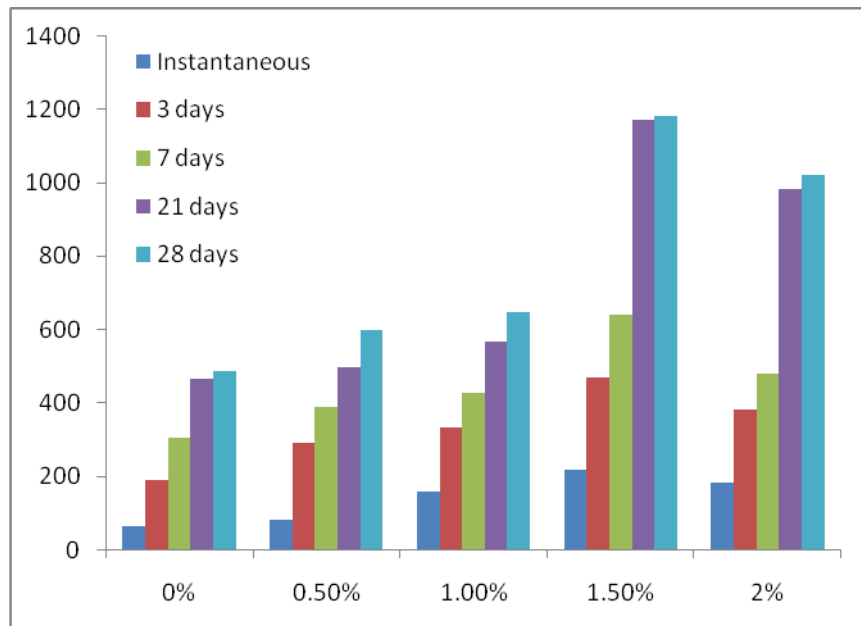


The MDD values increases significantly with increasing jute fibre from 2.04g/cc to 2.23g/cc and OMC also increase with increase of jute fibre. OMC increased by 9.70% to 14.30.

**3.2 UNCONFINED COMPRESSIVE STRENGTH (kpa)**

Specimen of 38mm diameter and 76mm height were prepared at their OMC for different percentages of jute fibre and the sample was tested for instantaneous, 3 days, 7, 21, 28 days respectively.

%of admixtures	Instantaneous	3 days	7days	21 days	28 days
0 % jute fibre	62	189	302	463	484
0.5% jute fibre	80	291	386	495	596
1.0% jute fibre	156	331	427	564	645
1.5% jute fibre	216	467	638	1170	1181
2% jute fibre	182	381	480	981	1021



It is noticed that the unconfined compression test values of the admixes increase with increasing in jute fibre up to 1.5% of stabilization. The unconfined compression for 1.5% jute fibre at Instantaneous, 3,7,21,28 days are (216,467,638,1170,1181) respectively.

#### IV. CONCLUSIONS

Based on the experimental work carried out on red soil, the following conclusions are shown below:-

1. Red soil of coarse grained nature of Veeravaram near Rajahmundry is dominated by sand particles of 72%, fines of 28%. These soils have plasticity Index of 14.00 as per I.S 1498-1970 the soil is classified as SC Soil.
2. Strength characteristics at different percentages of Jute fibre increase the dry density values at 1.5%, and goes on decrease at 2%. Similarly the strength values also increase for Instantaneous, 3,7,21,28 days till 1.5% of Admixture.

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