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Analysis of Soil Stabilization by the Intervention of Jute Fiber

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ABSTRACT: The objectives of the current study are to analyze the improvement of locally accessible soil utilizing some jute fiber and to evaluate quality attributes of mixed soil utilizing distinctive length of Jute. The soil samples were collected from proposed site in Pulwama. Different tests and investigation were done to look at the impacts of the Jute Fiber and Jute on the dirt soil in particular molecule estimate appropriation examination, particular gravity test, Atterberg limits test, compaction test and Direct Shear test. In view of these tests, the required amount of Jute fiber for successful adjustment of the dirt soil was resolved. The Experimental work of the undertaking will be done in two stages one after the other. The present study revealed that jute is an excellent material for stabilization of soil at certain concentration. The display work can be broadened considering more varieties of jute geo-materials and soils. In the investigations concerned with reinforcement of delicate soil further developed innovation, precise application strategies and support, can be received. Field tests can be done to get more functional outcomes. Studies related to debasement perspectives and their belongings can be studied.

I. INTRODUCTION

There is a wide assortment that jute strands can be utilized to reinforce soil. There is generous degree for conveying out further work around there as the fate of Jute geo-material is very dynamic and it is be driven by different factors such as cost, execution and accessibility of assets Ramaswamy and Aziz, (1989) [1] . In the region of geo-material use, there are a few contending ideologies today. On one hand, we have a developing need to create eco-accommodating geo-material and then again there is a constant need to use the assets given by nature. The display work can be broadened considering more varieties of jute geo-materials and soils. In the investigations concerned with reinforcement of delicate soil further developed innovation, precise application strategies and support, can be received. Field tests can be done to get more functional outcomes Mandal (1992) [2]. Studies related to debasement perspectives and their belongings can be studied. It has been confirmed that the addition of jute fibers significantly increases the liquefaction strength of sand. This means that jute fiber inclusions increase the number of cycles required to cause liquefaction during undrained loading. With the aim of reducing pavement thickness on poor subgrade new techniques of construction and soil stabilization have been continuously explored. Poor natural soils make them practically unsuitable for many civil engineering construction activities including road pavements. In such cases natural soils are being treated with different kinds of materials to improve their engineering properties Arabi and Wild [3].The techniques of improving the engineering properties of soil are called soil stabilization, which has been quite successfully used in many engineering problems such huge numbers of added substances have been utilized with various kind soils with shifting level of achievement. An added substance is agreeable when it updates the nature of soil yet all the prerequisites can't be met at once Punmia, (2005)[4]. For preferable outcomes more over one added substance can be presented checking the appropriateness. The objectives of the current study are to analyze the improvement of locally accessible soil utilizing some jute fiber and to evaluate quality attributes of mixed soil utilizing distinctive length of Jute Brooks (2009) [5].

II. EXPERIMENTAL

A. Site Details

The soil test on which the venture work is to be done is gathered from proposed site for close-by lodging territory in Pulwama. On the visual assessment, the dirt example is gathered at a profundity of 2 feet from characteristic ground surface and predominantly named Kareva soil known for saffron development. The soil example seen to be dark colored mud.

B. Test Methodology and Testing Program

Different tests and investigation will be done to look at the impacts of the Jute Fiber and Jute on the dirt soil in particular molecule estimate appropriation examination, particular gravity test, Atterberg limits test, compaction test and Direct Shear test. In view of these tests, the required amount of Jute fiber for successful adjustment of the dirt soil was resolved The Experimental work of the undertaking will be done in two stages one after the other:

1) Phase – I: in this stage, the essential trial of the plain soil test were done according to significant codal arrangements:

2) Phase- II : in this stage, on the expansion of the added substance jute Fiber and Jute, similar tests were rehashed and deviations from the stage I will be noted deliberately.

C. Assurance of Grain Size Distribution

Wet strainer Analysis for the part held on 75µ: The molecule estimate appropriation communicates the measure of particles as far as rate by weight of the dirt passing each sifter. The strategy includes stove drying the dirt soil test for 24 hours enabling it to cool, and dousing additionally for 24 hours. The sifter 75 µm is then used to wash and strainer the dirt which was then broiler dried and its subsequent weight was recorded. The strainers were orchestrated by the opening size and the reweighed sand was filled the arrangement of sifters and shaken energetically for 10minutes. The sifter was left for some time for the example to settle, the sand held on every strainer was weighed and recorded and the comparing rate held and passing were figured. A chart of the rate passing was plotted against the strainer sizes.

D. Normal dampness content

This test was utilized to decide the measure of dampness content present in the dirt as a level of its dry mass. The exhaust can was weighed to the closest 0.1 g (and spoke to as M1) after which a lot of wet example was put in that and weighed (spoke to as M2). From that point, it was put into the broiler to dry for 24 hours, expelled and weighed (spoke to as M3). The dampness content (MC) was figured as a level of dry soil mass by utilizing Eq. (1).

MC = … (1)

E. Particular gravity test

The particular gravity of a dirt soil test can be characterized as the weight in demeanor of a given volume of soil particles to the weight in water of an equivalent volume of refined water of around 40°C in temperature. The strategy for its assurance included purging, drying and measuring the particular gravity bottle (to give M1) into which 50 g of the dirt example was presented and weighed (to give M2). Water was then added to the example in the glass jug to 1/3 of its genuine stature and mixed vivaciously till the example particles were in suspension. This was permitted to remain for 30 minutes before water was added to 2/3 of the glass jostle and kept for 24 hours after which it was filled to the glass jolt overflow and weighed as (M3). From that point, the container content was spilled out and cleaned. Also, the container was loaded with water to the overflow and its subsequent weight was resolved as (M4). The particular gravity (Gs) was figured by utilizing Eq. (2).

F. Compaction Test

Graph of moisture content versus dry density was plotted and the maximum dry density (MDD) and optimum moisture content (OMC) corresponding to standard proctor compaction test were determined. The calculations under the compaction test were carried out using Eqs. (5) and (6).

$$\text{Wet density } (\gamma_{wet})\ g/cc = \frac{\text{weight of the soil in mould}}{\text{volume of the mould}} \quad \ldots\ldots\ldots\ldots\ldots(5)$$

$$\text{Dry density } (\gamma_{dry})\ g/cc = \frac{(\gamma_{wet})\ g/cc}{1+\frac{WC\,(\%)}{100}} \quad \ldots(6)$$

G. California bearing ratio test

The readings of load intensity were plotted against the readings of penetration and a smooth curve was drawn through the points. The values of the load at penetration of 2.5 mm and 5.0 mm were expressed as percentages of standard load intensity of 70 kg/cm^2 and 150 kg/cm^2 respectively. The higher value out of these two was considered as the CBR. The CBR values were calculated by using Eqs. (7) and (8).

$$\text{CBR at 2.5 mm penetration} = \frac{\text{load taken by soil}}{\text{standard load intensity at 2.5mm penetration}}$$

$$\text{CBR at 5mm penetration} = \frac{\text{load taken by soil}}{\text{standard load intensity at 5mm penetration}}$$

III. RESULTS

The natural moisture content, particle size distribution, specific gravity tests and the Atterberg limits tests were carried out to classify the clay soil while the compaction, and direct shear tests were carried out to assess the effects of Jute Fiber and Jute on the clay soil.

A. Calculations and discussions

Sieve Analysis: On dry sieving plain soil sample, most of soil passed through 0.075 mm sieve. So grain size distribution becomes insignificant. It is, however, normal practice to do wet sieving of such soils. Based on the wet sieving, the soil used in this research consists of about 98% of fines. Fine soils are classified on the basis of their plasticity.

B. Determination of Specific Gravity of soil

The specific gravity of soil is frequently required for computation of several quantities such as void ratio, degree of saturation, unit weight of solids etc. It is determined using a Pycnometer.

Table 1: Grain size distribution.

Time	Rh	He	sqrt(He/t)	D(mm)	R=Rh-C	N
				4.75		100
				2.36		100
				1.18		100
				0.6		100
				0.45		100
				0.3		99.62
				0.15		98.8
				0.075		98
1	30	11.15	3.33916157	0.04313973	29.75	95.56060606
2	28	11.53	2.40104144	0.03101985	27.75	89.13636364
5	23	12.48	1.57987341	0.02041091	22.75	73.07575758
10	18	13.43	1.15887877	0.01497194	17.75	57.01515152
15	14	14.19	0.97262531	0.01256567	13.75	44.16666667
30	10.5	14.855	0.7036808	0.00909108	10.25	32.92424242
60	7	15.52	0.50859283	0.00657068	6.75	21.68181818
120	5	15.9	0.36400549	0.00470271	4.75	15.25757576
240	4	16.09	0.25892406	0.00334513	3.75	12.04545455
1440	3	16.28	0.10632759	0.00137368	2.75	8.833333333

Table 2: Plastic Limit Determination.

Observation	Sample I (gm.)	Sample II (gm.)
Mass of empty container (M1)	6.8	6.8
Mass of container + wet soil (M2)	11.4	12.4
Mass of container + dry soil (M3)	10.4	11.4
Mass of water= (M2-M3)	1	1
Mass of dry soil=(M3-M1)	3.6	4.6
Plastic limit%	27.7%	21.7%

Therefore, average plastic limit, wP =24.7%: Weight of Soil sample = 120g

Table 3: Liquid Limit Calculation.

Determination No.	1	2	3	4	5
No. of blows(N)	15	22	25	27	33
Mass of empty container (M1	18	18	18	18	18
Mass of container + wet soil (M2)	44.04	38.42	36.99	41.02	35.49
Mass of container + dry soil (M3)	37	33	32	35	31
Mass of water= (M2-M3)	7.04	5.42	4.99	6.02	4.49
Mass of dry soil=(M3-M1)	19	15	14	17	13
Water Content (W%)	37.05	36.13	35.64	35.41	34.54

Table 4: Determination of Specific Gravity of soil.

Observation	1	2	3
Temperature	27	27	27
Mass of empty Density Bottle(M1)	35.05	33.12	33.51
Mass of Density Bottle + Dry soil(M2)	44.95	43.13	43.48
Mass of Density Bottle + soil+ water (M3)	90.35	88.16	88.5
Mass of Density Bottle + Water (M4)	84.58	81.83	82.46
M2 - M1	9.9	10.01	9.97
M3- M4	5.77	6.33	6.04
G = (M2-M1)/{(M2-M1)-(M3-M4)}	2.40	2.72	2.54
Avg. (G)	2.551		

C. Light Weight Compaction

In order to carry out plate load test and to find shear strength parameter light weight compaction is performed to obtain optimum moisture content and maximum dry density. This test is performed to all the proportioned soil. The obtained results are discussed below.

Table 5: Calculation of Dry Density.

Dry Density Observation						
Observation	**Mass of empty mould (M1) (gm.)**	**Mass of mould + Soil (M2) (gm.)**	**Mass of soil (M2-M1) (gm.)**	**Bulk density (M/V) (gm./cc)**	**Dry density (gm./cc)**	**Dry density (kN/m3)**
1	3274	4976	1702	1.702	1.545	15.45
2	3274	5184	1910	1.91	1.690	16.90
3	3274	5280	2006	2.006	1.713	**17.13**
4	3274	5196	1922	1.922	1.585	15.85

Table 6: Calculation of water content.

Container No.	Mass of empty container (M1) (gm)	Mass of container + soil (M2) (gm)	Mass of container + Dry Soil (M3) (gm)	Mass of Water (M2-M3) (gm)	Mass of Dry Soil (M3-M1) (gm)	Water Content (M2-M3)/(M3-M1)
1	15.83	34	32.32	1.68	16.49	10.19
2	16.43	37.6	35.1	2.5	18.67	13.00
3	15.94	40.82	37.19	3.63	21.25	17.08
4	16.94	41.11	36.87	4.24	19.93	21.27

Table 7: Calculation of Dry Density with .25% Jute Fiber.

Observation	Mass of empty mould (M1) (gm.)	Mass of mould + Soil (M2) (gm.)	Mass of soil (M2-M1) (gm.)	Bulk density (M/V) (gm./cc)	Dry density (gm./cc)	Dry density (kN/m^3)
1	3274	4860	1586	1.586	1.459	14.59
2	3274	4991	1717	1.717	1.552	15.52
3	3274	5120	1846	1.846	1.602	16.02
4	3274	5220	1946	1.946	1.608	16.08
5	3274	5214	1940	1.940	1.583	15.83

Table 8: Calculation of Dry Density with .5% Jute Fiber.

Observation	Mass of empty mould (M1) (gm.)	Mass of mould + Soil (M2) (gm.)	Mass of soil (M2-M1) (gm.)	Bulk density (M/V) (gm./cc)	Dry density (gm./cc)	Dry density (kN/m^3)
1	3274	4886	1612	1.612	1.469	14.69
2	3274	4983	1709	1.709	1.510	15.10
3	3274	5119	1845	1.845	1.560	15.60
4	3274	5209	1935	1.935	1.580	15.80
5	3274	5207	1933	1.933	1.570	15.70

Table 9: Results of compaction proctor test.

S. No	% additive	OMC (%)	MDD(KN/m^3)
1	0.0	17.08	17.13
2	0.25% Jute	21.0	16.08
3	0.5% Jute	22.45	15.80
4	0.75%	23.56	15.80
5	1%	23.50	15.79

Table 10: DST of plain soil.

Strain dial gauge reading			Corrected Area (cm²)	Normal pressure=0.5kg/cm^2		Normal pressure=1.0kg/cm^2		Normal pressure=1.5kg/cm^2	
				Shear Load (KN)	Shear stress (KN/m^2)	Shear Load (KN)	Shear stress (KN/m2)	Shear Load (KN)	Shear stress (KN/m^2)
Dial gauge reading	ΔL (mm)	Strain (%)		1	1	1	1	1	1
0.000	0.000	0.000	36.000	0.000	0.000	0.000	0.000	0.000	0.000
100.000	1.000	1.667	35.400	0.028	7.905	0.030	8.418	0.038	10.678
200.000	2.000	3.333	34.800	0.032	9.138	0.034	9.838	0.055	15.931
300.000	3.000	5.000	34.200	0.036	10.600	0.042	12.420	0.065	18.974
400.000	4.000	6.667	33.600	0.041	12.114	0.049	14.529	0.072	21.563
500.000	5.000	8.333	33.000	0.044	13.298	0.055	16.715	0.077	23.291
600.000	6.000	10.00	32.400	0.046	14.133	0.064	19.764	0.080	24.694
700.000	7.000	11.66	31.800	0.048	15.000	0.071	22.330	0.083	26.151
800.000	8.000	13.33	31.200	0.049	15.696	0.072	23.165	0.089	28.471
900.000	9.000	15.00	30.600	0.051	16.627	0.077	25.070	0.093	30.471
1000.000	10.00	16.66	30.000	0.052	17.278	0.080	26.628	0.096	31.920

Table 11: Direct Shear test of soil sample with .25% (1cm) Jute fiber.

Strain dial gauge reading			Corrected Area (cm²)	Normal pressure=0.5kg/cm^2		Normal pressure=1.0kg/cm^2		Normal pressure=1.5kg/cm^2	
				Shear Load (KN)	Shear stress (KN/m^2)	Shear Load (KN)	Shear stress (KN/m^2)	Shear Load (KN)	Shear stress (KN/m^2)
Dial gauge reading	ΔL (mm)	Strain (%)		1	1	1	1	1	1
0.000	0.000	0.000	36.000	0.000	0.000	0.000	0.000	0.000	0.000
100.000	1.000	1.667	35.400	0.039	11.049	0.058	16.477	0.061	17.263
200.000	2.000	3.333	34.800	0.053	15.352	0.070	20.131	0.083	23.716
300.000	3.000	5.000	34.200	0.071	20.642	0.080	23.358	0.105	30.579
400.000	4.000	6.667	33.600	0.079	23.566	0.092	27.454	0.119	35.438
500.000	5.000	8.333	33.000	0.087	26.404	0.107	32.468	0.127	38.373
600.000	6.000	10.000	32.400	0.090	27.678	0.119	36.592	0.134	41.222
700.000	7.000	11.667	31.800	0.097	30.600	0.125	39.376	0.139	43.585
800.000	8.000	13.333	31.200	0.103	33.023	0.127	40.844	0.145	46.341
900.000	9.000	15.000	30.600	0.088	28.682	0.130	42.577	0.151	49.412
1000.000	10.000	16.667	30.000	0.068	22.578	0.119	39.625	0.161	53.550

Table 12: DST of soil sample with .5% (1cm) jute fiber.

Strain dial gauge reading			Corrected Area (cm²)	Normal pressure = 0.5 kg/cm^2		Normal pressure = 1.0kg/cm^2		Normal pressure = 1.5 kg/cm^2	
				Shear Load (KN)	Shear stress (KN/m2)	Shear Load (KN)	Shear stress (KN/m2)	Shear Load (KN)	Shear stress (KN/m2)
Dial gauge reading	ΔL (mm)	Strain (%)		1	1	1	1	1	1
0.000	0.000	0.000	36.000	0.000	0.000	0.000	0.000	0.000	0.000
100.000	1.000	1.667	35.400	0.049	13.834	0.072	20.238	0.079	22.246
200.000	2.000	3.333	34.800	0.067	19.190	0.087	25.141	0.103	29.690
300.000	3.000	5.000	34.200	0.088	25.849	0.100	29.105	0.131	38.316
400.000	4.000	6.667	33.600	0.099	29.529	0.115	34.342	0.149	44.250
500.000	5.000	8.333	33.000	0.109	32.956	0.134	40.538	0.158	47.918
600.000	6.000	10.000	32.400	0.112	34.548	0.149	45.985	0.167	51.528
700.000	7.000	11.667	31.800	0.121	38.200	0.157	49.444	0.173	54.481
800.000	8.000	13.333	31.200	0.129	41.381	0.159	51.106	0.181	57.952
900.000	9.000	15.000	30.600	0.109	35.749	0.163	53.248	0.189	61.765
1000.000	10.00	15.833	30.300	0.095	31.485	0.163	53.775	0.201	66.327

Table 13: Comparison of DST of Untreated Soil with Treated Soil at Normal pressure 0.5kg/cm^2.

0.5Kg/cm^2					
% STRAIN	100% soil	0.25% jute (1cm)	0.50% jute(1cm)	0.75% jute(1cm)	1% jute(1cm)
0	0	0.000	0.000	0.000	0.000
1.6666667	7.9050847	15.300	17.123	19.5433	23.653
3.3333333	9.137931	18.000	20.739	21.839	22.512
5.00	10.6	23.800	27.766	29.123	30.123
6.6666667	12.114286	26.200	31.132	33.432	34.332
8.3333333	13.298182	27.800	33.842	35.765	37.765
10.00	14.133333	29.300	36.060	39.160	40.160
11.666667	15	31.200	39.371	41.371	42.312
13.333333	15.696154	32.400	41.783	41.783	41.876
15.00	16.627451	24.000	31.485	41.585	41.485
16.633333	17.00198	21.300	28.196	41.496	41.495

Table 14: Comparison of DST of Untreated Soil with Treated Soil at Normal pressure 1.0kg/cm^2.

1.0Kg/cm^2					
%STRAIN	100% soil	0.25% jute (1cm)	0.50% jute(1cm)	0.75% jute(1cm)	1% jute(1cm)
0	0	0.000	0.000	0.000	0.000
1.6666667	8.4175141	18.605	23.120	24.12	25.124
3.3333333	9.837931	21.868	27.381	29.939	32.512
5.00	12.420468	25.435	31.887	32.123	35.123
6.6666667	14.529167	30.462	38.268	40.532	44.332
8.3333333	16.714545	35.093	43.818	44.795	47.765
10.00	19.76358	38.810	48.587	50.140	53.160
11.666667	22.32956	39.851	49.915	50.381	50.312
15.00	25.069935	42.999	53.775	54.585	54.485
16.633333	25.945875	39.625	49.452	50.496	54.495

IV. DISCUSSION

It is proven that jute fibers used with cement mortar can produce high-performance fiberboard, which can be used as a substitute for asbestos-cement. A higher economy can be achieved when vegetable fibers are used together with soil to form load bearing structures Ramakrishna and Pradeep Kumar (2006) [6]. It has been confirmed that the addition of jute fibers significantly increases the liquefaction strength of sand. This means that jute fiber inclusions increase the number of cycles required to cause liquefaction during undrained loading. It has also been found that some vegetable fibers as an admixture can reduce the thermal conductivity and weight of building blocks The New Encyclopaedia Britannica [7].

A report is available stating that randomly distributed geo fibers (0.25% and 0.50% with aspect ratios of 15, 30 and 45) are useful in restraining the swelling tendency of expansive soils. Some researchers have reported that fibers change the stress– strain behavior from strain softening to strain hardening for sandy silt. Fiber inclusions also impede the compaction process, causing a reduction in the maximum dry density of reinforced specimens with increasing fiber content. The strength losses associated with in-service saturation are significantly reduced with fiber reinforcement Chaudhuri (1982) [8]. Fiber reinforcements, however, could reduce soil brittleness providing smaller loss of post-peak strength. The change in the ductility of the soil specimens can be defined using a brittleness factor, which quantifies the differences in the stress–strain curves of the soil. The brittleness factor is defined as the ratio of the peak principal stress ratio to the residual principal stress ratio minus unity: The value of IB ranges from 1 to 0, where 0 represents perfectly ductile behavior. The brittleness factor for unreinforced clay specimens ranged from 0.61 to 0.35, while the factor ranged from 0.26 to 0.01 for reinforced soil specimens, Pijush Kanti (1954) [9].

Recently, Abtahi *et al*. have applied short fibers to increase the bearing capacity of composite soils stabilized with polyvinyl alcohol and polyvinyl acetate at saturated conditions. Although, the chemical resins generally improve the bearing capacity of the composite soils at dry conditions, their performances at soaked conditions are doubtful. Thus, fibers can protect the resin-stabilized soil at saturated conditions by the phenomenon of ''interlocking effect''. The same investigations have been done by Marin et al. to use sheep's wool fibers and alginate polymer to reinforce a local clayey soil. Atkinson (1965) [10].

Aggarwal and Sharma used different lengths (5–20 mm) of jute fibers in different percentages (0.2–1.0%) to reinforce soil. Bitumen was used for coating fibers to protect them from microbial attack and degradation. They concluded that jute fiber reduces the MDD while increases the OMC. Maximum CBR value is observed with 10 mm long and 0.8% jute fiber, an increase of more than 2.5 times of the plain soil CBR value. Islam and Ivashita showed that jute fibers are effective for improving the mortar strength as well as coherence between block and mortar Dcbnath (1975) [11].

In an effort, Segetin *et al.* improved the ductility of the soil–cement composite with the addition of flax fibers. An enamel paint coating was applied to the fiber surface to increase its interfacial bond strength with the soil. Fiber length of 85 mm along with fiber content levels of 0.6% was recommended by the authors.

''Uku'' is a low-cost flax fiber-reinforced stabilized rammed earth walled housing system that has been recently designed as a building material. In this way, a mobile flax machine is used enabling the fast and mobile processing of flax leaves into flax fibers . Ghosh *et al* (1977) [12].

From the delegate test, it has been watched that the ideal dampness content (OMC) increments by the expansion of jute in parent soil and most extreme dry thickness (MDD) diminishes. At first the OMC and MDD of the parent soil were 20.04 and 1,66 gm/cc individually as per the delegate test directed. But after the expansion of jute with continuous increment in the jute length, it is watched that the most extreme water content increments and most extreme dry thickness diminishes definitely Ranjan, (1973) [13]. What's more by fluctuating the length of the jute in the parent soil with the steady sum (1%), it has been watched that the ideal dampness substance of the blend demonstrates a diminishing propensity with increment in the jute length .i.e. for 1cm length of jute ideal dampness content is 25.16, 24.56 for 1.5cm jute length and 23.85 for 2 cm jute length. Likewise the greatest dry thickness for the above jute fluctuates as 1.56gm/cc, l.58gm/cc and 1.16gm/cc for 1 cm, 1.5cm and 2 cm separately. The greatest dry thickness demonstrates the expanding pattern with the expansion of the jute length in the dirt blend. From comes about it is evident that as ideal water content reductions most extreme dry thickness increments as per the opposite connection amongst MDD and OMC, Again by expansion of 1% gypsum with the above jute blend, it demonstrates slight increment in ideal dampness substance of the separate jute blend .i.e. For 1cm jute length blend, the ideal dampness content is 25.16 for the jute blend and 24.76 after the expansion of 1% gypsum. For 1.5cm jute length blend, the ideal dampness content is 24.56 for the jute blend and 24.12 after the expansion of 1% gypsum. For 2 cm jute length blend, the ideal dampness content is 23.85 for the jute blend and 23.69 after the expansion of 1% gypsum Ghosh, *et al* (1977) [14].

From the UCS test led for an indistinguishable examples from depicted in the delegate test, the quality of test indicates expanding propensity with the expansion of changing length of jute in a consistent sum .i.e. for parent soil quality got l,7kg/cm Be that as it may, for the jute blend the quality acquired 2kg/cm, 2.3 kg/cm and 2.8 kg/cm" for I cm. 1.5cm and 2cm jute length individually, Pal (1952) [15].

V. CONCLUSION

In light of the perceptions and the outcomes acquired, it can be concluded that the jute fiber utilized as a part of the task has a significant impact on the dirt properties. Shear quality, dry density has been compared before and in the wake of laying of the jute geo-material. While shear quality is expanded on introduction of jute geo-materials, showing critical change in the designing conduct. Thus, jute geo-material assumes very effective part in the change of soil properties by reducing their compressibility and expanding their strength. The soil test on which the undertaking work was done is gathered close Islamic University of Science and Technology Awantipora, Pulwama. On the visual examination, the dirt example is gathered at a profundity of 2 feet from normal ground surface and mostly named Karewa soil known for saffron development. The soil sample seen to be darker clay. There is generous degree for conveying out further work around there as the fate of Jute geo-material is very dynamic and it is be driven by different factors such as cost, execution and accessibility of assets. In the region of geo-material use, there are a few contending ideologies today. On one hand we have a developing need to create eco-accommodating geo-material and then again there is a constant need to use the assets given by nature. The display work can be broadened considering more varieties of jute geo-materials and soils. In the investigations concerned with reinforcement of delicate soil further developed innovation, precise application strategies and support, can be received. Field tests can be done to get more functional outcomes. Studies related to debasement perspectives and their belongings can be studied. Laboratory test have indicated the behavior of proportioned soil on addition of Jute. The obtained results are discussed below:

Significant increase in soil properties:

- On addition of Jute MDD decreased at concentration of 0.55.
- On addition of Jute OMC increased at 0.5% Jute Fiber.
- On addition of Jute Shear strength increases at 0% jute.
- On addition of Jute Unconfined Compressive strength increases from 26.33KN/m^2 at 0% Jute Fiber to 69.8KN/m^2 at .5% Jute Fiber.
- On addition of Jute angle of internal friction increases, however, it remained constant at 1.0% concentration in almost for all the cases.

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