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Enhancing the Bearing Capacity of Pond Ash Soil by Inducing Stone Columns

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***Abstract:** As all of us know that ash pond deposits consist of large compressiblity,less bearing power,that is why large amount of these weak land sections gets abandoned or squandered.These slumy areas have less tangential shear force. As we know our country population is growing day by day.In future ,it will become very difficult to acquire any piece of land for construction of buildings and any other engineering structures.Nowadays many improvement methods for these low quality soils are implementedwhich makes them fit for use for common practices which can be carried out by these soils.As ,this is great area of concern for many highly standard people and other common organisations .On one side growing population with rapid increase and other side lot of sections of land gets trapped up under these ash deposits.A lot of studies and observations have been evaluated about inducing stone columns at plastic Cohesive soils.But yet no such works or observations have been implemented on these weak deposits.So in current study our main efforts relies upon testing these weak deposits of soil individually and after getting upon results from them,we try to observe these weak soils on treating them with some segments of fresh stones and then observe the variations and differences between first and second stages of these testing programmes.*

***Keywords:**Compressibility,Slumyareas,tangential force*

I. INTRODUCTION

In the present Era, it becomes a great essential requirement for our County to make sure that weak soil areas like ash deposits nearby various thermal power plants needs to be cured .As we know these ash soils possess very low cohesive strength or we can say these soils possess no cohesive power.The nature of these soils are non plastic.as their plasticity charecteristics are very low.Presently our country has number of industries and steel factories which releases lot of ashes always in very huge amount every year.As.it is also obvious that our country largely made its dependence upon coal sources as means of Energy.So in present as well as in future time this process remains the same,that means a large amount of land gets trapped under these industrial effuluents.

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So it becomes important and essential that these soil sections needed to be cured by different improvement techniques.
Many ground rehabilitation methods must be implemented to stabilize these weak sections of land ,so that these areas become fit for constructional purposes.
Till this time no such works have been evaluated on stone sections on these weak soils.Literature witnesses that settled sections of stone sections can be easily induced in silt to very minute particles of sands.These ash soils also falls in this catagory.So,in the current observation our aim is to just make it sure that bearing strength of these weak soils gets improved

Objectives

- To Characterize the pond dust very strictly and get out the aspects of consolidation energy on strength and reliablity of pond ash
- To examine the pressure and twist reaction of consolidated ash section reinforce with pebble segments of various proportions of length and area ratios
- To scrutinize the bearing strength and settlement reaction of restricted ash beds fortified with stone sections.
- To evaluate the pond ash at different diameters of rock columns and determine the bearing strength of the ash ponds

Material Used

Residue soil from ash deposits :Ash debris was carried from deposits of Kalakote thermal power system Rajouri.The particles were passed through various filters to separate out grades .
Pebbles: Fresh small Pebble aggregates were carried from common plant in Sidco Pulwama. All these pebbles are cleaned and dried.These small pebble particles were cured for future use and sheltered from water dampness.

Methodology Observations of compaction test

Consolidation energy(j/m3)		Dry weight (kg/m3)
116	44.25	0.974
337	41.98	1.312
596	37.04	1.364
1192	34.41	1.401
1877	31.78	1.462

Deviation of OMC and MDD at various stages

Cohension at OWC (g/cm^2)	Cohension at saturation (g/cm^2)	Angle of internal Friction at OMC In degrees	Angle of internal Friction at saturation In degrees
0.17	0.017	23.16	17.21
0.19	0.13	28.07	26.23
0.22	0.16	30.40	29.04
0.27	0.19	36.92	34.65
0.32	0.23	39.61	36.77

Observations of unconfined compressive strength test

UCS results of failure stress and strain of ash soil compacted at OMC

Compaction energy(kj/m^3)	Stress in (kPa)	Strain in (%)
116	20.41	2.75
337	32.98	2.45
596	48.94	2.44
1177	57.45	2.25

Deviation of shear parameters at various Compaction stages

Compaction energy (kj/m^3)	Stress in (kPa)	Strain in (%)
116	9.14	2.50
337	17.68	2.77
596	28.03	2.93
1192	33.73	3.00

UCS results of failure stress and strain of ash soil compacted at saturation

Triaxial test observations on compacted ash deposit

Triaxial test findings of unreinforced compressed ash deposits

Energy(kj/mol)	Confinement Pressure(kg/cm^2)				Cohension (g/cm^2)	Angle of internal friction in degrees
	1		2			
	Stress (g/cm^2)	Strain	Stress(g/cm^2)	Strain(mm)		
1877	3.04	0.91	5.51	0.94	0.25	36.20
1192	2.65	0.84	4.95	0.84	0.17	34.30
596	1.93	0.81	3.89	0.78	0.15	29.34
337	1.77	0.72	2.97	0.66	0.12	24.64
116	1.59	0.64	2.73	0.61	0.10	19.87

Footing load test

Observations of this test

Size fraction	Area Ratio (%)					
	1		20		40	
	Failure Stress j/cm^2	Strain mm	Failure Stress j/cm^2	Strain mm	Failure Stress j/cm^2	Strain mm
0.99			4.89	25.35	5.67	46.07
0.75			4.57	18.16	5.28	39.85
0.50			3.94	22.40	4.97	33.64
0.25	2.53	10.86	3.42	14.41	3.92	25.70
0			2.71	11.54	3.41	18.34

II. CONCLUSION:

On occasion of the tests aimed at on the lake debris gathered from Kalakote thermal power plant Rajouri and model balance stacking tests led on compacted lake debris beds strengthened with stone segments of assorted zone proportions, length proportions for the accompanying principle ends are drawn:

• The lake debris carries grains of the category of fine polish to residue silt with even degree of pebble sizes. The intensity of lake debris material passing through 75µ sieve was seen as 21.30%.uniformity coefficient and Curvature for lake debris was seen as 6.11 and 2.57 when taken in separate consideration, making sure that even grade of tests were carried. The exacting weight of pebbles is slightly less than of the routined ground materials

•Increment in compaction vitality brings about closer pressing of particles in this way augmentation increases in dry thickness though the ideal wetness content declines.

• Dehydrated unit mass of samples is observed to vary from 0.97 to 1.46 gm/mm3with variation in vitality from 116kJ/m3 to 1877 kJ/m3, though the OWC is initiate to diminish 44.25 to 31.78 %.

• pond lake debris has low unit mass, Both the C values and angle of friction is set up to go high with increments in consolidation energy. The expansion in these parameters is ascribed to nearer pressing and interlocking of pebble materials

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