ISSN: 2063-5346
Section A-Research paper

CHARACTERIZATION OF SANDY SOIL, POND ASH AND RANDOMLY DISTRIBUTED FIBERS- A PRESPECTIVE

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Abstract: Soils that are encountered by the practicing engineers in the field vary widely in their properties and in their response to any external stimulus. Soils that specialize in small particles such as rock, sand and coarse mud will not be able to absorb even the lowest pressure in stress and fail instantly with high penetration values. Further that should be improvised by the special methods used in Geotechnical Engineering there by enhancing various engineering properties of the soil. It's worth mentioning that every method adapted has its own limitations and adaptability for having maximum output from soil conditions with minimum input. A number of trials have already been used by various scientists to technical know how about the random discrete installation method installed in the soil enhances its load change behavior by interacting with the soil particles mechanically through spatial collisions and interactions. Most of the tests were conducted on different type of soils but perhaps none of them used both horizontal and vertical permeability tests for the application of neutral stresses in fiber reinforced soils along with the use of geotextile and pond ash/ fly ash simultaneously. So a thorough study is utmost required for the sand or a combination of sand and pond ash to get established as a material

Keywords: Sand, Soil, Pond ash, strength

1.INTRODUCTION

Soils that are encountered by the practicing engineers in the field vary widely in their properties and in their response to any external stimulus. Not all soils respond favorably under all circumstances. When soils with unfavorable characteristics are met with in the field, they have to be either discarded in total or have to be treated for the modification of their unfavorable properties so as to suit the field requirements. Soils that specialize in small particles such as rock, sand and coarse mud will not be able to absorb even the lowest pressure in stress and fail instantly with high penetration values. The first person knew the incident by sight. During recent times, various environmental and economic problems have sparked insight to the production/resurge of viable options and reuse of roughage or liquid/gaseous wastes arising out of industries / products that can achieve the specificity of natural resources such as improved sand for energy-efficient goods and simultaneous reduction of entry. . Outcomes generally include savings on construction costs and a reduction in start-up period. Further may

be achieved through usual methodology found in Geotechnical Engineering to improve ground machinery and engineering facilities. However, each process has its limitations and suitability for improving soil conditions with minimal effort.

The subgrade soil can be amended for having the best usage of materials in road by addition of chemicals/natural ingredients. It involves adding one or more additives with varied proportions with or without a binder. Added ingredient can be different variety of soil making it more stable by adjusting the particle size distribution.

On the basis of mechanism by which the engineering properties of soil are improved, the various ground improvement technique can be divided into following categories

a.) Densification Techniques.
b.) Reinforcement Techniques.
c.) Stabilization Techniques.
d.) Miscellaneous Methods.

2. LITERATURE REVIEW

Sand is a natural substance made of small separated rocks/ minerals. The composition of the sand varies depending on the parent rock and the mode of transport. The sand is transported by various agents such as air and water, and is deposited in the form of beaches, dunes, sand dunes, sand dunes etc. The fine sand found on the beach is usually brown in color and angular in shape. It contains salts and traps that absorb moisture from the atmosphere. Such absorption causes moisture and dispersion of the work process. Sea sand also delays the setting of cement. For these reasons, this type of fine sand is often avoided for engineering purposes. Used only as a local object for indirect purposes. Desert sand is often well-drained and poorly organized, creating major problems with infrastructure.

Review of literature has been carried out under the following heads:

1. Literature on strength aspects of pond ash/fiber reinforced pond ash/ soils.
2. Literature on permeability of sand /fiber reinforced sand/soils.
3. Combination of pond ash and sand /fiber reinforced pond ash and sand.

LITERATURE ON STRENGTH ASPECTS OF POND ASH/FIBER REINFORCED POND ASH/ SOILS

Singh et al. (2008)

study the dissolving behavior of lake ash found in an Indian thermal power plant. Samples of lake ash found above 5 m are prepared at a rate of 20%. Tests were performed on a small Shake Table in the laboratory at varying speeds ranging from 0.1g to 0.5g, which kept the frequency of the variable load constant. Liquefaction resistance is determined by the pore water pressure (ru) ratio. Liquefaction resistance is also determined using the values collected in field test. The results showed that the lake ash being investigated could not be dissolved as the high rumax pore water pressure ratio remained below unity. Continuously the impact of the acceleration rate on the ash of the lake is different from that commonly seen in sand as the vibration rate reduces the amount of rumax. Field-based methods also do not show fluid due to the high percentage of good content.

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However, it should be noted that these conclusions are for lake ash collected from a specific source and will not apply to all sites. Continuing authors recommend many laboratory experiments, especially those based on cyclic triaxial machines to reach a practical conclusion.

Ghosh et al. (2010) present usage of the Class F ash-pool in experimental ash pool experimental results with various lime combinations in different strengths to the tune of four, six and ten percent and river-grade ash in half and one percent to analyze and having adaptability for the suitability of stable road ash. foundation construction and minimal foundation. Various compaction tests were performed to divulge the bonding properties of a stable lake ash. Bearing ratio tests were performed on samples, combined with high dryness and high humidity acquired by standard compaction tests, treated for seven, twenty eight and forty five days. Both immersed and immersed bearing ratio tests were performed. It gives an insight about the impact of ingredients and healing time of average carrying capacity of a stable lake ash. The empirical model is designed to measure the carrying capacity of stable mixes with multiple retraction analyzes. Linear empirical relationships are presented here to measure the ratio of immersed bearing from the un-soared bearing of stable lake ash. Experimental analysis highlighted that the mixture of pond ash-lime-PG has the potential to act as a base in the road and underground basic material.

Jakka et al. (2010) conducted a case-control study about geotechnical features of lake ash samples, collected at the inbound / outbound points of two Indian ash pools come as outcome. Strength factors were explored from triaxial tests sideways pressure amounts performed for composite models of pool ash tasters under various closed pressure. Appraises from the entry revealed alike to sandy soils. It has shown greater strength when compared to citation material (Yamuna sand), although their gravitational pull and combined dryness are much lower than sand. Ash samples from the exit area showed weighty dissimilarities as far as their assets and prices are considered, compared to samples from the exit area. The shear strength in the testers collected from the outlet is perceived low, especially in the loose state where the dry liquid is detected.

LITERATURE ON PERMEABILITY OF SAND/ FIBER REINFORCED SAND/SOILS

Tang et.al. (2009) discussed the Exploratory about Earth's Extended Strengthened Structures using non-closed pressure tests. Extended soil reinforced with synthetic fibers is a modified method developed in recent years, but the results of research to test their engineering behavior are not yet uncommon. Polypropylence monofilament fibers were adopted to stabilize expanded soils in Xinxiang, China, with the effect of moisture content, compaction degree, fiber content and sample size in the non-concentrated strength behavior of expanded soils reinforced by experimental analyzes. of expanded soil reinforced with synthetic fibers. Experimental results have shown that the unstable strength of expanded soil converted by fibers is increased by increasing the bonding and fiber content, decreasing with increasing humidity; under the same circumstances, the power from the sample of small size was greater than that of the sample of bigger size.

Diambra et al (2010) studied fortified roughage sands: Testing and modeling. Sand reinforced with small pp fibers was tested for tests of compressibility and expansion. A test program was developed to scrutinize the consequence of fibers bound to the power driven behavior of Hostun RF sand. Various common triaxial tests were performed on unstable and hardened sand. In these

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tests considerable up-rise in strength is due to the presence of fibers, while the gain gain of the fibers is very limited. The modeling approach was proposed to combine the effects of fibers with stress-strain behavior of unstable soils.

REVIEW ON COMBINATION OF POND ASH AND SAND /FIBER REINFORCED POND ASH AND SAND

Roy et al. (2008) studied the impact of cement on alluvial soils reinforced with lake ash and rice husk ash to form a narrow road .Portland pozzolanic Cement and alluvial soil of blackish gray clayey silt (MI) were used. A total of 12 mixtures were prepared with RHA as 20% and pool Ash varied as 20%, 40% & 60% and Portland pozzolana Cement (PPC) varied from 0 to 3% respectively. Atterberg boundary, standard proctor testing and CBR performed. The result showed that the use of lake ash, RHA in bulk reduces environmental pollution. Liquid boundary and plastic limit of soil erosion by increasing the percentage of PPC and the ash of the pond where the soil is added at a reduced rate. The high density of the mixed soil decreases with the increase of lake ash up to 40% and increases with the percentage increase of the ashes of the lake and remains part of RHA the same again without the addition of cement. The CBR value of mixed soils increases with an increase of cement percentage from 0 to 3% in immersed and immersed conditions.

SUMMARY OF REVIEW OF LITERATURE

Thus, through appraisal of the literature review it is observed that several attempts have already been made by researchers to study the effect of additives on stabilization of different soils with a reduction in permeability of soils. Most of the researchers used pond ash as alone stabilizer, with lime/cement and very few on fibre reinforced pond ash along with the sand.

It can be said that

a) Among the soil characters that influence the most is the improvement of composite being well graded. These soils have better contact efficiency i.e., it grips the soil better, some moisture is helpful in mixing of fibers but does not affects strength of soil (Charan, 1996 ; Santoni et.al, 2001). After certain percentage of fiber content there is mixing problem i.e., fibers ball up.
b) Shear strength of soil enriched with fibers greatly depends upon the fiber properties and on some soil properties.
c) Permeability of the soil can be reduced when some admixtures like pond ash is mixed with the sandy soil.
d) Strength of composite improves with fiber length (but up to some limit), fiber content and denier of fiber. Fiber need not to be very strong, the only thing is that making the fiber rough and long is not sufficient. The governing condition is that the strain required to rupture the inclusion should be greater than tensile strain in pure soil. Fibrillated shape is best. Short fibers require higher confining pressure.

3. CONCLUSIONS:

By examining the various papers it appears that several attempts have already been made by researchers to understand how randomly placed implants implanted in the soil and improve its load-changing behavior by interacting with soil particles mechanically through ground collisions

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and interactions. Many experiments were performed on different types of soil but probably none of them used horizontal and vertical tests to apply neutral pressures to the fiber-reinforced soil and the use of geotextile and lake ash / ash at the same time. Extensive research is therefore strongly required in order for sand or a mixture of sand and lake ash to be established as a material to replace existing road / curb materials.

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