Utilization Of Banana Fiber For Manufacturing Of Eco Friendly Brick

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Abstract- *Present Paper describes the concept and the application of the brick with the combination of banana fiber along with other natural fiber and the chemicals for the stabilization of soil before it is casted into any element . From last few years we have seen composite materials being used predominantly in various applications and industries . There are many types of natural fiber are available like jute fiber, wool fiber, rice husks, straw wheat, bagasse , banana fiber, oil palm empty fruit bunch, coconut coir, cotton , pineapple leaf fiber. India ranks first in banana production and contributing about 23% in world pool of banana production. Banana forming generates more quantity of biomass which goes as waste. It is used as a raw material in various industry for production of mat, rope , papers, bags and reinforced as a polymer composite. Since banana is a natural fiber it is used as an alternative resource to synthetic fibers as well as reinforcement for polymer composite materials and the manufacturing is inexpensive, renewable and environment friendly is a credit to its usage . In this paper, various other reviews paper of banana fibers along with different components are presented in such a way that it leads and gives clear approach towards its applications in various field .*

Keywords- Banana fibre , Natural fibres, Synthetic fibres, environment friendly.

I. INTRODUCTION

Clay soil are commonly known as expansive soil because of their texture. It starts swell or shrink excessively when it comes in contact with moisture. When an engineering structure is associated with clay soil, it experiences either settlement or heave. Design and construction of civil engineering elements and structures with and on expansive soils is a challenging task. The solution of this problem is the stabilization of soil with appropriate stabilizing agent. The clay soil contains high percentage of montmorillonite which results in high degree of expansiveness. The strength of these soils change according to the amount of water present in the voids of the soils. Most economical and effective method for stabilizing expansive soils is using admixtures that causes change in volume. Many problems arise from the industrial development. One of them is the proper and effective disposal of its waste. Expansive soils contain the clay mineral montinorillonite with claystones, shales, sedimentary and residual soils. Banana fiber is a waste product of banana cultivation and on another hand it is natural fibre . It contain lingo-cellulosic fiber, which obtained from the pseudo-stem of banana plant and it is a bast fiber with relatively have good mechanical properties.. Useful applications of such fibers will equalise the demand which would be reflected in a fall of the prices. Banana fibers are light weight , high strength, light , elongation properties without easy break , fire resistance quality, strong moisture absorption quality, great and finally a biodegradability material . In its fibre form it is used to mould in different products like ropes , filter paper, paper bags , lamp stands, pen stands, decorative papers, mats and composite material etc and as a credit it is used in currency notes in Germany and trial run in India also. But more than normal use , these are used in composite form in buildings boards and fire resistance boards and other way in the building materials also due to its mechanical properties . many research are in process to have a complete gain from the fibre and use it to the most useful manner.

COMPOSITION AND PROPERTIES OF BANANA FIBRES

Below table is referred from International Journal of Scientific & Engineering Research, Volume 6, Issue 5, May-2015 ISSN 2229-5518 Table1, shows the classification of the selected plant fibers .

Table1, shows the classification of the selected plant fibers .

TABLE I : Details of banana fibers

Botanical name	Musa Ulugurensiswarb
Palnt origin	Leaf, bast

Table 2, shows the chemical composition of banana fibers.It is noted that cellulose is the main constituent of plant fibers.

TABLE II : Chemical composition of banana fibers

Cellulose (%)	60-65
Hemi cellulose (%)	6-19

Lignin (%)	5-10
Pectin (%)	3-5
Ash (%)	1-3
Extractives (%)	3-6

II. LITERATURE REVIEW

Marwan Mostafa , Nasim Uddi, "Compressed earth block with banana fibre resisting flexural and compressional force.'' , earth block which is a combination of different proportion of clay , sand ,coarse aggregate ,cement with banana fibre after the study of characteristics of fibre. The sample is made of different proportion and tested for the result. The result from this paper helps us to set a boundary limit for the mix design for material and get a compressive and flexural value.

B.Pravin kumar, R.Arsan, et al,"Assessment of the Mechanical Properties of Banana Fibre Reinforce Epoxy Composite'' the comparison study of banana fibre and jute fibre which acts as a reinforce epoxy composite and assessment of mechanical property study is done so as a result of impact test and moisture test of the banana fibre and jute fibre is calculated and banana fibre proved to more efficient ,so as the content is kept constant to 30% of weight fraction of entire composite material. Here, the tensile strength has calculated by universal testing machine, impact strength has calculated by pendulum impact tester and hardness strength has calculated by Brinell hardness testing machine.

Bhudev Pandey, Neelesh Kumar Singh, "Manufacturing of Stabilized Soil Bricks ," The main purpose of this paper is the development of low cost housing structures, in rural as well as in urban areas. As the to aspect to reduce the cost of construction various construction element are introduced in the A brick at low cost by the composition of 33.33% of foundry sand, 40% of fly ash, 15% of cement and 5gm of plasticizer. Compressive strength of brick sample is tested at 5 days after removing the sample from mould. Keywords field .In that way clay bricks are introduced to the field along with that a non pollutants brick is manufacture .

O.S. Oladeji and A. F. Akinrinde,"Performance Characteristics Of Stabilized Clay Bricks Using Additives'' characteristics of the effects of two chemical additives namely soda ash and KS770 on the properties of clay bricks were investigated. The methodology adopted includes soil sampling , field survey, and laboratory tests. The results showed that the KS770 appears to increase the moisture content of clay hence preventing early hardening and setting .Here the brick are fired at 105°c for 24hrs.Size of brick is varied to 200x225x75mm as per the demand in the location .This as increased the sustainability in the housing industry.

Shubham Raj, Sher Mohammad, Rima Das and Shreya Saha, "Coconut fibre-reinforced cement-stabilized rammed earth blocks", is aims to investigate the optimum proportion of coconut fiber and cement suitable for rammed earth wall construction . Coconut fiber and cement can be easily mixes into the soil mixture which adds strength and durability to the block . This paper highlights the salient observations from a systematic investigation on the effect of coconut fiber on the performance of stabilized rammed earth blocks. Initially the stabilization of the soil is done with the cement at different proportion along with the fibre and compressive test are conducted and result were analysed. So as the benefits of fibre reinforcement includes both the improvement of the ductility and inhibition of crack propagation after its initial formation into the blocks.

D.Karunagaran,"Eco Friendly Brick Produced by the Reaction of Bacteria", the preparation of soil bricks using the bacteria which gave the effective way to settle down in the naturally. The genus bacillus is used for the concrete repair and to eradicate the plugging of pores so as to avoid the cracks in the concrete is done by the microbiologically induced calcium carbonate precipitation to it . In this process it uses the microbial mineral precipitation to manufacture the bricks which will improve the behavioral pattern of the concrete because it is used in the binding form which increases the stability of the element by not allowing the water to turn inside it along with it will discuss about the chemical process that takes place in the concrete. Finally it will produce the adverse effect of the environment friendly bricks.

Sanjay salla , Prof. Jayeshkumar pitroda , Dr. (smt.)B. K. Shah, "Comparative study on jute fiber and banana fiber in fly ash bricks", a normal fly ash brick but with the combination of banana fiber so as the quantity of fly ash is decreased and the replaced fiber enhance the strength of the brick since it indirectly act as an reinforcement .The process used here is molding ,vibration and high pressure is given for a period of 8 sec .Then finally a water curing is done this is a step differ by the normal brick such as a compressive strength ,water absorption ,tensile strength are calculated in the result and at different values of mix proportion .The test sample is formed , tested and finally analyzed .

G.Vinoth Kanna, G Dhanalakshmi,"Experimental Investigations on Bricks with the replacement of Coconut Fibre", the investigation report of the brick which is partially replaced with coconut fiber in order to decrease the agriculture waste in this form. We are using the waste, Coconut fiber in this project for building material and to protect environment and natural resource like clay and sand. The basic waste used in this project is coconut fiber in addition with polymer as used to attain the strength of the brick The replacement is done in various mix percentage with the combination ,but the result revealed is best for the 10% replacement for compressive strength and water absorption .

Tanu H M, Chaitra H, Nirmala M V, "Study on the effect of sugarcane bagasse ash and banana fiber on pressed laterite soil brick" , the brick which are one of the major construction materials as they are mainly used for the construction of walls in buildings. Laterite soil bricks are used to construct building in many parts of India where lateritic bed rocks are found in huge amount. The geotechnical properties of the soil with and without sugarcane bagasse ash and banana fiber with different composition were investigated. The bagasse ash content was in the ratio of 0 to 15% and banana fibers with the ratio of 0.5, 1.0, 1.5 and 2%. The Bricks were casted and investigated for their tensile and compressive property of size 200x100x100mm and optimal result is obtained.

III. CONCLUSION

The present review paper explored the potentiality of banana fiber and its composites with different other natural fibre , which clears the both mechanical and physical properties along with their chemical composition. The acceptance and application of the cheaper natural fibre with its high performance nature it is possible to occur a different composite materials . By proper choice of different materials in the composition or combination of single more useful , cheaper and versatile element is obtained which enhance the use of waste product in different useful form and applied in various field and industry . As per the usage and versatility of the banana fibre it as a bright future because it is cheaper, lighter and environmentally superior to other synthetic fibers in general. Hence, it is concluded that, the composites of different components along with banana fibre gives a best result in the experimental investigation as well as a useful and a profitable product to the field .

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