FORMATION OF INSULATING BRICKS FROM AGRICULATURAL WASTE &DETERMINATION OF THERMAL PROPERTIES BY COMPARING WITH PRESENT BRICKS

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Abstract

Today world is facing challenge of energy crisis. There are many ways of heat energy wastage in the form of heat in heat transfer applications. It is require recovering these waste heats by some means. The present study includes experimental investigation for heat transfer in fire bricks & saving heat energy & increase efficiency of furnace. From experimental data, analysis and comparison of result with industrial fire bricks has done. Experimental result of heat transfer rate from fire bricks is compared to thermal analysis. Overall this investigation discusses to saving the heat transfer rate by using agricultural waste.

Key words: *bricks, waste material*

1.Introduction

Energy is essential for the economic growth and industrial development of any country. The quality of life is closely related to energy consumption, which has continuously increased over the last few decades in developing countries .For increasing the energy output of furnace it is very essential to saving the amount of heat transfer rate. The energy output of furnace systems using agricultural waste can be used for to fabrication of bricks. In the recent year different ways are adopted for improving the efficiency of furnace. The efficiency depends on the rate of heat transfer i.e. available heat energy, It is essential to know the actual energy input of furnace in a given location in order to establish the energy budget of a furnace, for this different theories were developed. The need of energy conservation has become a major thing,where a lot of work is required to do. In case of thermal losses, thermal insulating materialsplayan important role in preventing heat losses.

India is one of the agricultural country which produce large amount of by product from agriculture but its fact that large amount of agricultural waste is still not used in proper way. In this project we are mainly focus on by product of coconut, rice& wheat .Project mainly accommodate the formation of insulating bricks using agricultural by product.
Various agricultural by-products waste such as coconut shell, wheat straw andrice husk, were analysed in term of composition, mechanical structure and thermal properties. The insulation properties are checked by thermal analysis.

Requirement for economic and environmental friendly material has extended an interest in natural fibre from the previous researcher many natural, many natural sugarcane bagasse has been successfully incorporated into fire clay bricks. Therefore in this study natural coconut shell has been utilized for similar studies.

Agricultural wastes such as rice hulls, sugarcane stalks, coconut husk, corn cob or stalk oil palm shell and leaves or straw from cereal crops have high degree of fibrous content (lingo-cellulosic compound)andconserve as the main

ingredient for composite materials making them suitable for formation of insulating fire bricks. The aim of this research is to investigate the potential of agricultural waste as thermal insulation materials.

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2. Literature Review

The numbers of researches were presented by the different researcher for analysis of fire bricks from agricultural waste Some researchers are as follows:

2.1 George W. Church [1]. has been studied on the confined soil bricks, A confined soil brick including a preformed container of desired configuration with a compacted soil filler therein; a water repellant coating or sheet material may be applied to at least one side of said container. The present invention relates to confined soil bricks and more particularly to such confined soil bricks which utilize the soil available at the building site. The present invention relates to confined soil bricks wherein the soil in the locality is utilized; such soil is placed in a preformed container and compacted there in An object of the present invention is the provision of a low cost building material which may be manufactured at the construction site. Another object is to provide such a building material utilizing readily available materials which often are unused and must be transported away from the construction site.

2.2 SIVAKUMAR NAGANATHAN [2]. has been studied on the Bricks From Waste Material . Recycling of such waste as raw material alternatives may contribute in the exhaustion of the natural resources; the conservation of not renewable resources; improvement of the population health and security preoccupation with environmental matters and reduction in waste disposal costs. In the review of utilization of those waste, this paper reviewed recycling various waste material in bricks production.

The effects of those wastes on the bricks properties as physical, mechanical properties will be reviewed and recommendations for future research as out comings of this review will be given. This reviewed approach on bricks making from waste is useful to providepotential and sustainable solution.

2.3 VIKTOR BÁNHIDI [3] has been studied on agricultural waste which is providing insulating property. The use of agricultural wastes (byproducts) in various segments of brick and tile industry is increasing continuously. These additives, which are previously mixed into the raw or compound clay, start to ignite during the firing process, providing extra thermal energy inside the product and decreasing the required external energy need. Besides this effect, the combustion of additives increases the porosity of the final product resulting in enhanced thermal insulation properties. In this paper the effect of some common agricultural wastes (sawdust, rice-peel and seed-shell) on the thermal properties of brick clay products was investigated.

2.4 DAVID EHIGIE ESEZOBOR [4] has been worked on coconut shell. The use of coconut shell particulates to enhance the insulating refractory properties of Ukpor, Osiele and Kankara fireclays in Nigeria was studied in this paper. The chemical analysis of the raw materials was conducted using Atomic Absorption spectrometer. The samples used for different tests were prepared by mixing the clay, bentonite and coconut shell,

2.5 IRENA MARKOVSKA [5] has been worked on agricultural waste which is light in weight & studied on properties of material. Lightweight ceramic materials in the form of bricksand blocks are widely used in modern construction. They may be obtained by adding of rice husk ,rye straw, etc., as porous forming materials. Rice husk is a major by-product of the rice milling industry. Its utilization as a valuable product has always been a problem. Various technologies for utilization of rice husk through biological and thermochemical conversion are being developed. The purpose of this work is to develop light weight ceramic materials with clay matrix and filler of rice husk and examine their main physic mechanical properties. The results obtained allow to suppose that the materials synthesized on the basis of waste materials can be used as lightweight materials for construction purpose.

2.6 LÁSZLÓ A. GÖMZE[6] has been worked on the properties of insulation of bricks. The use of technologically by product agricultural wastes in various segments of the brick and tile industry is increasing continuously. The additives, mixed into the raw clay ignite during the firingprocess, adding extra thermal energy from inside the mixture decreasing the energy requirements of the manufacturing process. Added to this, through the combustion of the bio-wastes the porosity increases enhancing the thermal insulation properties of the final product. We have investigated some common, agricultural wastes to determine their effect on the thermal properties of bricks. In our

experiments industry relevant amounts of additives (sawdust, rice-peel, seed-shell) were added to the basic clay composition.

2.7 GERHARD BAYER [7] has been worked on method of production of bricks from red mud. A method for producing bricks from red mud, including mixing filter-wet red mud with a water-fixing substance, then mixing the mixture of red mud and water-fixing substance with clay to provide a resulting mixture containing 50 to 92 weight percent red mud based on the dry weight of red mud plus clay, and water-fixing substance, forming the resulting mixture into raw bricks, drying the raw bricks with heated gases at a temperature below 70 DEG C, and firing the dried raw bricks at a temperature between 900 DEG -1,100 DEG C.

2.8 CHAOUKI SADIK [8] has been study on the Production of porous firebrick from mixtures of clay and recycled refractory Waste. Production of porous and lightweight bricks with acceptable flexural strength is accomplished. Expanded perlite was used as an additive to an earthenware brick to produce the pores. SEM-EDX, XRD and XRF analysis of the raw materials and the elaborated refractory were performed. Mixtures containing perlite were prepared at different proportions (up to 30%Vol.%). Apparent porosity at 1600°C was investigated with the bulk density, water absorption, firing shrinkage and flexural strength. Microstructural investigation was carried out by both natural light microscopy and polarized light microscopy. The results obtained showed that the samples tested here maintained their shape without undergoing any deformation up to 1600°C. The use of expanded perlite decreased the fired density of the bricks down to 1.55g/cm.

2.9 AJAY KUMAR [9] has been study on the rice husk & its thermal properties**.** The technological trend towards waste utilization and cost reduction in industrial processing has attracted use of Rice Husk as a value added material. Both rice husk (RH) and Rice Husk Ash (RHA) has been found suitable for wide range of domestic as well as industrial Applications .Considering the importance and increasing demand of this material, a systematic study based on properties and industrial applications has been carried out and reviewed in this paper. Potential and suitability of RH for use in possible new areas in near future has also been highlighted. Though RHA finds largest and most commercially viable markets in cement, concrete and steel industries, constraints to the expansion of this market is due to the health issues associated with using crystalline ash and hence there is a great potential for use of amorphous RHA in these area. Rice husk has been used directly or in the form of ash either as a value added material for manufacturing and synthesizing new materials or as a low cost substitute material for modifying the properties of existing products. Presence of silica is an additional advantage in comparison to other byproduct materials which makes RH an important material for a wide range of manufacturing and application oriented processes. Easy availability and low price of rice husk in rice producing countries is an extra benefit towards the use of this material. Despite having high potential and suitability in so many well established uses, use of rice husk has been limited. In the competitive market, proper utilization of rice husk and its ash will benefit industrial sectors. The use of rice husk as fuel/electricity generation in efficient manner is likely to transform this agricultural waste material in to a valuable fuel for industrial sectors. A systematic approach to this material can give birth to a new Industrial sector of rice husk.

2.10 KyautaE.E. [10] has been study on ice Husk, Bagasse and Corncob as materials for thermal insulation, a solution which offers a reduction in resource use, promote recycle of the wastes, less dependent on toxic chemical types in wood/cellulose based insulators, in addition to reducing energy consumed by altering internal air conditions.The criteria for evaluation include experimental determinationof Thermal Conductivities and Specific Heat Capacities for composites samples and other dependable properties.The results from evaluations have identified that sample G with 0.231Wm-1k-1and 22.114m-1is the best mixed with more rice husk and considerable percentage of bagasse to less percentage of corncob.

3. Conclusions

Thus we have studied various insulating material from agricultural Therefore the proposed project is to reduce the heat transfer rate& save heat & compare with present bricks.

4. References

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