RESEARCH ARTICLE OPEN ACCESS

An Overview of Rha And Scba Clay Bricks

[1]Er. Ravindra Kumar, [2]Er. Jatinder Kumar & [3]Er. Kshipra Gupta
[1,2]Research Scholar, Civil Engineering Department, Universal Institutions of Engineering & Technology, Lalru Mandi
[3]Assistant Professor, Civil Engineering Department, Universal Institutions of Engineering & Technology, Lalru Mandi

ABSTRACT
Burnt clay brick is one of the major and widely used building units in construction around the world. The manufacturing of burnt clay bricks using waste materials can minimize the environmental overburden caused by waste deposition on open landfills and would also improve the brick performance at low production cost leading to more sustainable construction. These wastes utilization would not only be economical, but may also help to create a sustainable and pollution free environment. This study aims to evaluate the effect of the waste addition produced from two major crops: sugarcane and rice in clay bricks manufacturing.
Keywords: *Clay bricks, Sugarcane bagasse ash (SCBA), Rice husk ash (RHA).*

I. INTRODUCTION

Population scenario comes towards India by means of increasing industries. The successful efforts of industries lead to develop India. As the industries increases also the waste coming from them at the end of product. At the end of survey result coming that the amount of the approximately 250 to 300 million tons of industrial wastes are being produced every year by chemical and agricultural process in India. It is very essential to dispose these wastes safely without affecting health of human being, environment, fertile land, sources of water bodies; etc. Sugar cane bagasse, the fibrous residue after crushing and juice extraction of sugarcane, is a major industrial waste product from the sugar industry. Shelter is a basic human need and owning a house becomes a life long struggle as majority of Indians find housing costs prohibitively expensive. This problem becomes even more acute when considering the low income families who accounts for about 60-70% of Indian population. This brings out the need to reduce the cost of the housing and make it affordable for the booming population. Burnt clay bricks are being used extensively and the most important building material in construction industry. In India the building industry consumes about 20000 million bricks and 27% of the total natural energy consumption for their production. In addition to this, Clay bricks available in certain region are poor in quality and have lower compressive strength, higher water absorption, high efflorescence, higher wastage during transportation and handling, uneven surface etc., which have forced engineers to look for better.

Bricks: A brick are a block or a single unit of a kneaded clay-bearing soil, sand and lime, or concrete material, fire hardened or air dried, used in masonry construction. Lightweight bricks (also called lightweight blocks) are made from expanded clay aggregate. Fired bricks are the most numerous types and are laid in courses and numerous patterns known as bonds, collectively known as brickwork, and may be laid in various kinds of mortar to hold the bricks together to make a durable structure. Bricks are produced in numerous classes, types, materials and sizes which vary with region and time period, and are produced in bulk quantities. Two most basic categories of bricks are fired and non-fired brick. Fired bricks are one of the longest lasting and strongest building materials sometimes referred to as artificial stone and have been used since circa 5000 BC. Air dried bricks have a history older than fired bricks, are known by the synonyms mud brick and adobe, and have an additional ingredients of a mechanical binder such as straw.

Clay Bricks: The majority of used are made from clay and shale; they are used preliminary in the construction of walls by bleeding and jointing of bricks into established bonding arrangement. Clay is an abundant raw material with a variety of uses and properties. It is a complex of group of material that consist of minerals commodities, each having somewhat different mineralogy, geological occurrence, technology and applications. They are natural earth fine grained minerals of secondary origin and composed of an aluminates silicate structure with an additional iron, alkalis and alkaline earth element. Common clays are sufficiently plastic to permit ready moulding and when firing, they make at 1000oC. The clay bricks have been traditionally manufactured by mixing the ground clay with water forming into the desired shape, size, drying and firing.

Bagasse Ash: Nowadays, it is commonplace to reutilize sugar cane bagasse as a biomass fuel in

boilers for vapour and power generation in sugar factories. Depending on the incinerating conditions, the resulting sugarcane bagasse ash (SCBA) may contain high levels of SiO2 and Al2O3, enabling its use as a supplementary cementious material (SCM) in blended cement systems. Uses of Sugarcane bagasse ash waste in brick can save the sugarcane industry disposal costs and produce a 'greener' bricks for construction.The burning of bagasse which a waste of sugarcane produces bagasse ash. Presently in sugar factories bagasse is burnt as a fuel so as to run their boilers. This bagasse ash is generally spread over farms and dump in ash pond which causes environmental problems also research states that Workplace exposure to dusts from the processing of bagasse can cause the chronic lung condition pulmonary fibrosis, more specifically referred to as bagassosis. So there is great need for its reuse, also it is found that bagasse ash is high in silica and is found to have pozzolanic property so it can be used as substitute to construction material.

Rice Husk Ash Rice: husk ash is obtained by burning rice husk. Physical properties of RHA are greatly affected by burning conditions. When the combustion is incomplete, large amount of unburnt carbon is found in the ash. When combustion is completed, grey to whitish ash is obtained. The amorphous content depends on burning temperature and holding time. Optimum properties can be obtained when rice husks are burnt at 500 - 700° C and held for short time, this temperature at which the husk is being burnt is less then that required for formation of clinkers in cement manufacturing process, the resulting ash can be used as a replacement of cement in concrete. The Rice Husk ash used in plain cement concrete often achieves economy and cost savings and imparts specific engineering properties to finished products.

II. RESULT AND DISCUSSION

Rha Bricks

Sr. No.	Reference	Year	Conclusion
1	Tanvir Hossain et al.	2011	It has also been found that addition of RHA in brick does not affect its shape and size, therefore volume of brick remains unchanged. However, inclusion of RHA in brick increases its water absorption and decreases its crushing strengths. RHA also decreases specific gravity of bricks and increases impact values of brick aggregates.
2	Ajay kumar et al.	2012	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.
3	N.Vamsi Mohan et al.	2012	1. By the addition of RHA upto 40% to clay, the strength gradually decreased and beyond the addition of 40% RHA the compressive strengths decreased rapidly. 2. Optimum proportion for (RHA + Clay) bricks was observed as 30% RHA and 70% Clay (Maximum of 30% RHA) as the bricks exhibited high compressive strength and low brick weight. 3. As the percentage of RHA increased, water absorption of RHA-Clay bricks also increased. 4. In full replacement of clay with 40% RHA, 40% Lime and 20% gypsum and 50% RHA, 30% lime and 20% gypsum gives more strength (41 kg/ cm2) when compared to all other possible proportions after 28 days curing period. 50% RHA, 30% lime and 20% gypsum is optimum proportion due to its light weight at that proportion. 5. As the percentage of lime and gypsum increased, water absorption of RHA+ Lime+ Gypsum bricks decreased.
4	Ruhul Amin et al.	2013	Compressive strength observed from the pilot plant study for this brick is not sufficient to build high storeyed buildings. So the use of this brick should be limited to build one

			storeyed low cost houses. Compressive strength and peak load of the brick can be improved by increasing the amount of binder & lime. Ultimately the cost will be increased and it will not be feasible. So optimum amount of binder & lime can be increased to improve the Compressive strength of the brick. It is also important to study the behavior of this brick for long term exposure with environment. So further study can be extended to analyze the exposure behavior with different environment parameters like rain, humidity, sunlight, gaseous composition of air etc.
5	Akshay Satish More et al.	2014	1. The clay burnt bricks manufactured with fly ash and rice husk ash had similar appearance when compared to the conventional clay bricks. 2. The clay bricks having fly ash as an admixture showed the best performance, having a compressive strength of about 23% greater than that of conventional bricks. The percentage of water absorption for these bricks was found to be more than that of conventional bricks but still within the prescribed maximum limit as per Indian Standards.(Maximum allowable water absorption as per Indian Standards is 20%) Hence fly ash can be used as an admixture with clay bricks. 3. The brick having rice husk ash as an admixture showed lower compressive strength and higher percentage of water absorption when compared to the conventional clay bricks. Also, for higher percentages of rice husk ash, the edges were found to be irregular in nature. Hence, rice husk ash is not recommended to be used as an admixture with clay bricks. 4. The bricks having both fly ash and rice husk ash as admixtures in equal proportions showed a marginal increase in strength for higher percentages of admixture. The water absorption of these bricks was found to be more than that of conventional bricks. Addition of both the admixtures together gives only a small increase in performance, hence it is not highly recommended
6	Watile R.K. et al.	2015	The increasing rice husk in product decline the compressive strength because the combusted rice husk replace with the space in the product which effect the density and compressive strength. The 2 percent of rice husk by weight increase the compressive strength and lower density. The other percentages decrease the compressive strength and density. Thus, the best composition of brick is 2 percent of rice husk by weight. The 2 percent of rice husk by weight obtain 6.59 MPa of compressive loading and 14.01 percent of water absorption.

Scba Bricks

Sr. No.	Reference	Year	Conclusion
1	Apurva Kulkarni et al.	2013	Compressive strength decreases on increase in percentage of Bagasse ash as compare to fly ash. (b) Use of bagasse ash in brick can solve the disposal problem; reduce cost and produce a 'greener' Ecofriendly bricks for construction. (d) Environmental effects of wastes and disposal problems of waste can be reduced through this research. (e) A better measure by an innovative Construction Material is formed through this research. (f) It provides innovative use of class F fly ash which contains less than 20% lime.

			(g) This study helps in converting the non-valuable bagasse ash into bricks and makes it valuable. (h) In this study, maximum compressive strength is obtained at 10% replacement of fly ash as bagasse ash. (i) Bagasse ash bricks reduce the seismic weight of building. (j) It reduces the density of bricks from 20 (clay bricks) to 11(bagasse ash bricks). It reduces the cost of material per brick.
2	G. Viruthagiri et al.	2014	Although the incorporation of ash inhibits the formation of mullite during sintering of the clay material, SCBA behaves like non- plastic material and decreases the linear shrinkage of clay bricks during drying and firing. The sugarcane bagasse ash waste used in this study is a low-cost material, rich in crystalline silica (SiO_2), which behaves as a filler material, and reduces the clayey formulations plasticity. The temperature of 1000 °C is a target for changes in the sintering process. Below this temperature, the properties of the clay bricks are little affected by the different concentrations of ash. For temperatures above 1000 °C, the additive (ash) participates in the liquid phase and the formation of new phases (mullite and cristobalite). The results show that for temperatures up to 1000 °C, 15 wt.% ash can be incorporated in brick making clay used to produce bricks. Therefore, the ash (SCBA) may be used as an additive to produce clay bricks that meet the Indian standards. Hence, this process can lower the volume of solid residues disposed on the environment and to increase the lifetime of the reserves of raw materials.
3	Anil partap singh	2015	1 Replacement of sand with SBA resulted in lower weight of the bricks. therefore produce light weight bricks. 2 In terms of compressive strength (SBA-SAND-CEMENT) bricks are satisfy the requirement of (I.S 1077(BIS-1992d)). So it is suitable for another alternative material. 3 To protect the clay resources and environment by using these bricks in structural building, the builder saves around 15 to20% of structural steel and concrete as these bricks reduce the dead load on the building.

III. CONCLUSION

This paper briefly discussed the use of Rice husk ash and Sugar cane bagasse ash in bricks .Many researcher has found that RHA and SCBA are agricultural waste. There is huge problem in dumping of that waste. it can be effectively used in recycled form in different industry like cement, brick etc. Bagasse ash bricks reduce the seismic weight of building. The RHA and SCBA used in this study is efficient as a pozzolanic material; it is rich in amorphous silica (88.32%). The loss on ignition was relatively high (5.81%). Increasing RHA fineness increases its reactivity. . Optimum proportion for (RHA + Clay) bricks was observed as 30% RHA and 70% Clay (Maximum of 30% RHA) as the bricks exhibited high compressive strength and low brick weight.

REFERENCES

[1]. Viruthagiri, G., Sathiya, P.S. and Shanmugam, N., 2014. Reuse of Sugarcane Bagasse Ash (SCBA) for Clay Brick Production. *Indian Journal of applied Research*, *4*, pp.1-5.

[2]. Singh, A.P. and Kumar, P., 2015. Light weight cement-sand and bagasse ash bricks. *International Journal for Innovative Research in Science and Technology*, *1*(12), pp.284-287.

[3]. Kulkarni, A., Raje, S. and Rajgor, M., 2013. Bagasse ash as an effective replacement in fly ash bricks. *International Journal of Engineering Trends and Technology*, *4*(10), pp.4484-4489.

[4]. Hossain, T., Sarker, S.K. and Basak, B.C., 2011. Utilization potential of rice husk ash as a construction material in rural areas. *Journal of Civil Engineering (IEB)*, *39*(2), pp.175-188.

[5]. Watile, R.K., Deshmukh, S.K., Durge, P.V. and Yawale, A.D., Utilization of Rice Husk for Production of Clay Brick.

[6]. More, A.S., Tarade, A. and Anant, A., 2014. Assessment of suitability of Fly Ash and Rice Husk Ash burnt clay bricks. *International Journal of Scientific and Research Publications*, pp.397.

[7]. Amin, R., Khabir,L.Md., Huda,Md. M., and kamruzzamanb,S., 2013. Energy saving brick from Rice Husk Ash. *Journal of Engineering (JOE) ISSN: 2325-0224 77 Vol. 2, No. 1, 2013, pp. 77-80.*

[8]. Mohan, N.V., Satyanarayana, P.V.V. and Rao, K.S., 2012. Performance of rice husk ash bricks. *International Journal of Engineering Research and Applications (IJERA) ISSN, pp.2248-9622.*

[9]. Kumar, A., Mohanta, K., Kumar, D. and Parkash, O., 2012. Properties and industrial applications of rice husk: a review. *International Journal of Emerging Technology and Advanced Engineering, 2(10), pp.86-90.*