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COMPARATIVE STUDY OF COMPRESSIVE STRENGTH OF CLAY BRICKS PREPARED WITH VARIOUS RATIO OF SUGARCANE BAGASSE AND RICE HUSK

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Abstract: Sugar is one of the main substrates of human diet. The five top sugar producing countries in the world are India, Brazil, Thailand, Australia and China. Their production accounts for 40% of the total global sugar production out of the 115 countries producing sugar in the world, Out of these countries, 67 produce sugar from sugarcane, 39 from sugar beet and 9 countries from both cane and beet. Thus, 70% of the sugar is produced from sugarcane and 30% from sugar beet and cassava. On the other hand, rice is the most important staple crop produced. Rice straw is one of the most important agricultural residues. It is an annually renewable fiber resource that is available in abundant quantity in many regions of the world whereby tons of unused rice straw residues are generated every year and only a very small percentage has been used for applications such as feed stock and energy production. This study aims to characterize the clay bricks produced by the addition of the two agricultural waste materials i.e. sugarcane bagasse and rice husk ash. Disposing off these waste materials is a very challenging task and is a hazard to environment. Sugarcane bagasse and rice straw are among the agricultural wastes that are abundantly available. The present investigation researches the potential of incorporating these two wastes into the production of insulating fired clay brick. It focuses on the feasibility of using them in fired clay brick mixtures with a percentage replacement up to 5% by weight. Physical, mechanical and thermal properties of the bricks fired at 1250 oC for 2 hours were tested according to standard procedures. The results indicated that adding up to 5% of wastes with 0.5% polystyrene beads (by weight) to standard mixture of bricks reduced the density and improved the brick thermal insulating properties. Even though incorporating the wastes has resulted into a decrease in the mechanical properties, the bricks still comply by the minimum standard for compressive strength. In conclusion, the incorporation of these two wastes at different polystyrene into fired clay bricks produced insulating fire bricks with acceptable properties while providing at the same time an alternative way of disposing the sugarcane bagasse and rice straw waste.

Keywords: Sugar cane, rice husk, clay bricks, review.

Literature Review:

Danupon Tonnayopas et al. (2008) introduced the impacts of rice husk debris (RHA) expansion on the physical and mechanical properties of the lightweight structure terminated earth blocks were examined. Various extents of RHA from 10-half by mass were blended to the crude block dirt. Higher RHA expansion required a higher water content to guarantee the right dry thickness. All test examples were delivered by uniaxial water driven press technique and terminated at 1050°C. The examples were tried by as indicated by Thai Industrial Standard (TIS) strategies and contrasted and its determinations. Up to 30% RHA expansion was found to meet TIS. It very well may be used in terminated structure blocks by exploiting minimal expense and ecological security.

J. Sutas et al. (2012) proposed this exploration has intends to consider impact between rice husk and rice husk debris to properties of blocks. Relative adding between rice husk and rice husk debris were differed by 0 - 10% by weight. The outcomes showed that seriously adding rice husk less compressive strength and thickness of examples. In any case the porosity increments when adding rice husk. By adding 2% of rice husk debris by weight is awesome of blocks properties which 6.20 MPa of compressive strength, 1.68 g/cm3 of thickness, and 15.20% of water assimilation.

Apurva Kulkarni et al. (2013) portrayed use of modern and horticultural byproducts in the business has been the focal point of examination for financial, natural, and specialized reasons. Sugar-stick bagasse is a stringy byproduct of the sugar refining industry, alongside ethanol fume. Enormous amount of debris which is a byproduct, accessible at truly unimportant rate. It causes the ongoing lung condition pneumonic fibrosis all the more explicitly alluded to as bagassios. In this paper, Bagasse debris can be used by supplanting it with fly debris and lime in fly debris blocks. Preliminary blocks of size (230x100x75) mm were tried with various extents of 0%, 10%, 20%, 30%, 40%, half and 60% with substitution of fly debris and 0%, 5%, 10%, 15% and 20% with substitution of lime. These blocks were tried in Compression test and Water retention test according to Indian Standards. The point of this exploration was to make prudent and green blocks to keep up with natural equilibrium, and stay away from issue of debris removal.

Bhavya Rana et al. (2013) introduced farming is the main financial movement of India with 60% rustic populace and which has caused economical expansion in the volume of deposits of various kinds. Agra squander has shown to be among the most flexible and financially savvy alteration of building material for development and their uses are growing quickly into practically all spaces of development. Step by step usage of value fly debris is expanding in the development business, so there is a requirement for another material for incomplete substitution of fly debris, agro squander like sugarcane bagasse debris is having capability of such material. Such perspectives may likewise be useful in acquiring LEED (Leadership in Energy and Environmental Design) focuses. Utilization of rich land in regular block creation can likewise be saved by sugarcane bagasse fly debris blocks. The flow research study was done to investigate the capability of utilizing Sugarcane Bagasse in block creation.

Mangesh V. Madurwar et al. (2014) proposed use of bio-fuel side-effect sugarcane bagasse debris (SBA) as a central crude material for the assembling of blocks was contemplated. The blocks were created utilizing the quarry dust (QD) as a substitution to regular stream sand and lime (L) as a cover. SBA as a vital crude material was described utilizing X-beam fluorescence (XRF), thermo-gravimetric examination (TGA), X-beam diffraction and checking electron microscopy (SEM). XRF affirms SBA as a cementitious material. TGA affirms warm security till C, while SEM monograph shows individual ash 650 with an unpleasant surface and various fine pores. Natural investigation of quarry residue and lime was likewise done utilizing XRF and exemplary wet test. The actual properties of quarry residue and not really settled utilizing the research center test strategies. SBA–QD–L blend blocks were planned and created in various blend extents. Physico-mechanical properties of the created blocks were concentrated by suggested guidelines. The consequences of the SBA–QD–L blocks were contrasted and physico-mechanical properties of financially accessible consumed mud and- flyash blocks. It was seen that SBA–QD–L blocks are lighter in weight, energy effective and meet compressive strength necessities of IS 1077:1992. The blocks additionally fill the need of strong waste administration and imaginative maintainable development material. The blocks can be utilized in neighborhood development particularly for non-load-bearing dividers.

Mr. A. Mohamed Mansoor et al. (2017) portrayed in India, blocks are typically comprised of mud, and a re for the most part delivered in conventional, sloppy limited scopeI ndustries. Block making burns-through biggermeasure of earth whic h prompts top soil evacuation and land corruption. To stay away from this ecological dangers an endeavor was made to consider the conduct of blocks made utilizing, squander materials from sugarcane modern waste. Reusing of such waste as crude m aterial choices might contribute in the weariness of the na tural assets and decreasein garbage removal costs. In this p roject we pick sugarcane bagasse debris (SBA) and press mud in customary Portland concrete (OPC) settled blocks. The bric k was made of size 25cm x 12cm x 6.5cm. The squares were named as 4, 6 and 8 then it is added with SBA and press mud by weight of dry soil, then, at that point the blocks followed by restoring f or time of 28 days. The test like compressive strength, water assimilation test, shape and size test as per Burea u of Indian guidelines (BIS) particulars by additionally thinking aboutthe expense.

Ali.M.Hassan et al. (2018) proposed sugarcane bagasse and wheat straw are among the horticultural squanders that are bounteously accessible in Egypt. The current examination investigates the capability of joining these two squanders into the creation of protecting terminated mud block. It centers around thepracticality of utilizing them in terminated dirt block blends with a rate substitution up to 5% by weight. Physical, mechanical and warmproperties of the bricksfired at 1250 oC for 2 hours were tried by standard techniques. The outcomes demonstrated that amounting to 5% of squanders with 0.5% polystyrene dabs (by weight) to standard combination of blocks diminished the thickness and furtherdeveloped the block warm protecting properties. Despite the fact that consolidating the squanders has come about into a reduction in the mechanical properties, the blocks actually consent by the base norm for compressive strength. All in all, the fuse of these two wastes at 5% level with 0.5% polystyrene into terminated dirtbricks produced insulating fire blocks with adequate properties while giving simultaneously an elective method of arranging the sugarcane bagasse and wheat straw waste.

Manish C Detroja et al. (2018) introduced the fundamental target of this examination is to explore the usage capability of bagasse creation deposits in dirt block. In India every year 90 million tons of bagasse creates and anticipated expanding rate in future. The endeavor has been made for delivering lightweight blocks with expanding level of bagasse by weight. The impacts of bagasse expansion on the mechanical properties of the blocks were examined The explored results shows mix of mud, fly debris and bagasse is light weight and meets compressive strength necessities of IS 1077.Application of bio-item sugarcane bagasse debris (SBA) as a main crude material for the production of blocks wasstudy. The blocks are creating utilize the quarry dust (QD) as a substitution to regular stream sand and lime as a fastener. Sugarcane Bagasse Ash (SBA) as a foremost crude material was portrayed utilizing X-beam fluorescence (XRF), canteen – gravimetric investigation (TGA), X-beam diffraction and examining electron microscopy (SEM). XRFaffirm SBA as a cementations material.

Rafid Shams Huq et al. (2018) proposed worry for practical innovation has expanded examination exercises on the creation of more sturdy developments materials. Lately, Rice Husk Ash (RHA) has effectively been utilized as beneficial material in concrete, working on both strength and sturdiness because of its high pozzolanic movement. In any case, the adequacy of RHA relies enormously upon itsquality which whole relies upon its creations cycle which are yet to be set up totally. Be that as it may, the focal point of this paper isn't recognizing the best creation measure yet to investigate the viability of one of the potential employments of RHA in the development business. Blocks of various level of RHA (15%, 25%, 35%) were made and tried for Water Absorption, Crushing Strength, Los Angles Abrasion Value and Aggregate Impact Value. It was seen that despite the fact that porosity increments due RHA, it is as yet adequate to utilize RHA in block.

A.A.M. Damanhuri et al. (2020) introduced dirthas been utilized as fundamental material in creation of blocks anyway the utilization of waste materials in block fabricating has been presented for protection of lessening mud assets, just as forestalling natural and environmental harms brought about by quarrying and exhaustion of crude materials. Blocks that accessible in certain areas have lowquality, low compressive strength, higher water assimilation and lopsided surfaces Therefore in this investigation, rice husk debrishas been used for the readiness of blocks in incomplete substitution of dirt. The examples were projected with various substitution levelsof mud differing as 0%,

5%, 10%, 15%, and20% with rice husk debris. The examples were tried for water assimilation and compressive strength appropriately to Malaysian Standard EN 1008:2010 for 2 hours. Trial shows that inordinate expansion of rice husk debris hashigher water retention and low compressive strength as rice husk debris rate builds rice husk debris attributes prevail. The holding between the mud molecule and the rice husk debris particles is feeble. By adding 10% of ricehusk debris by weight is the best block properties which 6.80 MPa of compressive strength and 16.30% of water assimilation. The water ingestion of RHA block created didn't surpass 20% thus elevated to be halfway substitution of mud.

Conclusion:

Sugarcane bagasse and rice straw are among the rural squanders that are plentifully accessible. The current examination explores the capability of fusing these two squanders into thecreation of protecting terminated dirt block. It centers around the attainability of utilizing them in terminated dirt blockblends with a rate substitution up to 5% byweight. Physical, mechanical and warm properties of the blocks terminated at1250 oC for 2 hours were tried by standardstrategies. The outcomes demonstrated that amounting to 5% of squanders with 0.5% polystyrene dots (by weight) to standard combination of blocks decreased the thickness and further developed the block warm protecting properties. Despite the fact that consolidating the squanders has come about into a lessening in the mechanical properties, the blocks actually consent by the base norm for compressive strength. All in all, the consolidation of these two squanders at 5% level with 0.5% polystyrene into terminated mud blocks delivered protecting fire blocks with satisfactory properties while givingsimultaneously an elective method ofarranging the sugarcane bagasse and rice straw waste.

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