ANALYZE EFFECT OF HIGH VOLUME FLY ASH BRICKS – REVIEW

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ABSTRACT:

In the rapidly growing today's world development of new building materials and use of industrial waste is given the top precedence in the building exploration at a very high rate. This is important for achieving maximum disposal of wastes. Thermal power plants generate the fly ash in large quantities. In this paper analyze the effect of high volume fly ash. With different waste material taking different proportions has been used to evaluate low cost brick with respect to minimum clay content as the natural resource soil is optimizing day by days so fly ash brick is used which is the best replacement of clay brick. The bricks were dried in normal environment for 2 days then bricks kept in oven for various temperatures and for the burning of bricks the controlled temperature maintained at oven 110^0C, 200^0C, 300^0C and in normal kilns temperature of clay bricks. After removal from oven the bricks were tested in compression testing machine and water absorption test as per given in Indian standards. The aim of this paper was to make economical brick with respect to the conventional bricks and green bricks to maintain environmental balance, and avoid problem of fly ash disposal.

Keywords: Fly ash, lime, compressive strength, soil.

INTRODUCTION:

Burnt clay bricks are being used extensively in the India and are the most important building construction material. But excessive use of clay is hurtful to society as all the bricks kilns in India requires good quality clay of agricultural field and uses a weight of 3 kg. Per brick. The total clay taken out from agricultural field per day was over 300mllion tonnes for 10000 crore bricks (Er. Rinku Kumar et al, 2014). And, clay available in somewhat regions is poor in quality and property and costly which have forced engineers to search for better material able of reducing the expenditure on construction. So it is advantageous and economically as well as

ecologically to use industrial waste product such as fly ash for making bricks since helps to save precious top agricultural soil. It meets the social intent of disposing industrial waste i.e. fly ash which otherwise is a pollutant and annoyance having botheration of disposal.

About 80 thermal power plants in India are sources of fly ash where around millions of tonnes of coal are used are used annually. India currently generates 100 million tonnes of fly ash every year. This produces 30-40 million tones of fly ash unused every year (Ravi Kumar et al, 2014). This disposal will need thousands hectares of storage land, which may cause further ecological disequilibrium. In fact, this waste material is just disposed off in the kind of aqueous slurry on the adjoining sectors. This type of disposal not only converts useful agricultural land to waste ones but also processes a menace to the environment Therefore, using fly ash as a building material has assumed great value like never before.

In the Production of conventional brick involves a firing process that generates atmospheric pollution which is a issue arising out of these activities plays vital role in the search for innovative, environment friendly building material that combine higher capability and quality with property in the building process with improved thermal resistance. The technology for producing fly ash bricks is easily accommodative by existing clay brick factories. And, it requires less man power and less area for material processing than in case clay bricks production. Fly ash bricks reduce up to 30% the use of cement mortar during laying and plastering, reducing the cost of construction.

LITERATURE REVIEW:

The study shows behavior of fly ash bricks by taking different proportions of fly ash, cement, lime, gypsum and sand. In this study three types of fly ash bricks in the different percentage of cement such as 3%, 5% and without cement are designed and then various tests such as compressive strength test, water absorption test, efflorescence, weight test were performed in order for comparison with conventional brick. In the experimental study it is found that the compressive strength of fly ash brick containing 5% cement is 152.1 kg/cm2 which is more than that of class 1 conventional bricks by 40% approximately. For this composition of fly ash, cement, lime, gypsum and sand efforts has been made by making different proportions. (Ravi Kumar et.al 2014).

The study based on mixing of various proportions of fly ash in clay material (5-50%by weight in ratio of dry fly ash to wet clay, at a step of 5% each) 16 bricks of each proportion are

prepared. The manufacturing process uses similar to equipment, techniques in clay brick factories. The fly ash bricks produced were up to 10.60% lighter than clay bricks. The fly ash bricks manufactured from fly ash possessed compressive strength more than 5N/mm2 which is more than normal clay bricks. As per IS requirement it absorb less quantity of water which is under I.S. requirement, it has reddish colour similar to that of normal clay bricks. (Aakash Suresh Pawar et.al 2014).

The investigation based on finding out the optimum mix percentage of fly ash brick. However the brick specimen of size 230mmx110mmx90mm were cast for different mix percentage of fly ash (15 to 60%), fly ash (2%), lime (5 to 30%) and Quarry dust (45 to 55%), compressive strength for different mix proportions were studied. The result shows the variation of compressive strength for different mix proportions of materials as mentioned above at curing stages. From the results it was stated that, the maximum optimized compressive strength is obtained for excellent mix percentage of fly ash-15% lime-30% Gypsum-2% Quarry dust -53% (A. Sumathi et.al 2014-2005).

The studied focus on the results of testing and the advantages gained by fly ash bricks whose ingredient is 100% fly ash over conventional clay bricks. The fly ash bricks were fires at temperature of 1000^0C-1300^0C for few hours. The density of fly ash bricks is 28% less than that of normal clay bricks. Comparatively 265 bricks per tonne can be made from clay bricks, while 365 bricks per tonne can be forms from fly ash bricks. (Obada Kayali 2005).

The researcher studied sugar-cane baggase is a fibrous waste product of the sugar clarifying industry along with ethanol vapor. In paper, baggase ash takes advantage of by changing it with fly ash and lime in fly ash bricks. Trial bricks of size (923 X 100 X 75) mm were tested with different proportions of 0%, 10%, 20%, 30%, 40%, 50%and60% with restoration of fly ash and 0%, 5%, 10%, 15%and 20% with restoration of lime. These bricks were tested in compression test and water absorption test as per Indian Standards. The aim of this research was to make economical and green bricks to maintain environmental equilibrium, and avoid problem of ash disposal. (Apurva Kulkarni et.al, 2013).

Author represents the result of class fly ash can be used as major ingredient in the production of lightweight building bricks. Scaled down pressed down were made from varying proportions of fly ash, sand, hydrated lime, sodium silicate and water. Bricks of three definite fly ash ratios were used namely 50/50.70/30and 90/10, content. Also two type of sand were used,

silica sand and common sand. Thus resulting in twenty four different types of fly ash bricks. (M.Chester et.al).

In the research fly ash was collected from the thermal power plant (Eklahre) in nashik Maharashtra. The mixture of clay available at the site and the fly ash with different percentages by weight are prepared. These mixtures are used to make the bricks of clay and fly ash with different proportions. These bricks are air dried in open atmosphere for 4-5 days as per conventional method. The firing of brick is done for fourteen days in a traditional way as is done in and around dhule region. At the end of fourteen days, the kiln is allowed to cool as per conventional method. The bricks are taken out from the kiln and stacked in the testing lab for water absorption, density, and compressive strength as per IS procedures. (Jayant L. Patil, 2013).

Study on the troubles or hazards in clay brick and fly ash brick. The Fly ash brick is possessed of fly ash, Quarry dust, and cement. QFAC brick made of fly ash was found to be an ecofriendly material secures the environment through conservation of topsoil, reduction in carbon emission, and utilization of waste product like fly ash and quarry dust. The compressive strength of QFAC bricks was 15% higher than that of clay bricks. The flexural strength of QFAC brick was found to be twice that of clay brick. The average water absorption of QFAC brick was as low as 10%. (Balaraju Sivagnanaprakash et.al, 2014).

The study on the potential for using class F fly ashes from Queensland as major ingredient in the manufacturing of common residential building bricks. Scaled-down pressed bricks were made by varying proportions of fly ash, sand, hydrated lime, sodium silicate and water. Both fired, oven-dried and air-cured bricks were tested for their properties including compressive strength, tensile strength, water absorption and durability. In this author determine the results and effects of changeable ingredients with these different proportions as discussed. Recommendations and conclusions as whether or not the fly ash bricks can perform satisfactorily alongside the clay brick are included. (Andreas Nataatmadja, 2015).

The study on the compressive strength and water absorption characteristics of fly ash bricks made of lime, local sandy soil and fly ash. The experiments were conducted both on hand moulded and pressure moulded fly ash bricks. It was observed that none of the Lime-Soil-Flyash bricks fulfill all the requirements of standard codes. While some of the bricks satisfy the provisions in respect of strength only the Lime-Flyash (40:60) bricks fulfill the requirement of

Indian Standard Code in respect of compressive strength as well as water absorption characteristics (Tabin Rushad S et.al, 2011).

Author study the fly ash, lime, gypsum bricks are much preferred to conventional clay available in the vidarbha region .this fact has been founded by the authors through spacious research work. Need of the hour is to give proper technical support to the manufacturers of the fly ash bricks and to provide proper facilities to monitor the quality of these bricks so as to make them popular and acceptable to the consumers.(R.R Dighade et.al, 1999).

The Researcher studied on improvement of mechanical properties of fly ash summarize by adding a binder. Added sodium silicate as a binder to the different weight portions of fly ash, sand, gypsum and lime mixture and then compacted. These compacts were treated in normal water at different temperatures for seven days then compressive strength and microstructure for the different compacts were investigated. It was observed that the compressive strength of the fly ash compacts increased with addition of sodium silicate. (Ranjit Kumar Panda et.al, 2012).

METHODOLOGY:

Manufacturing of low cost and light weight environment friendly bricks firstly the material required for the bricks making is collected from nearby areas of the college agricultural black cotton soil from the nearby land then the unprocessed fly ash is collected from the nearby plant, processed fly ash , jute fiber, hydrated lime, etc. These materials are mixed with the various proportions and various percentages for the making of low cost bricks. Fly ash-soil with the varying percentages (50/50), (60/40), (70/30), (80/20), (90/10) then Fly ash-soil-Hydrated Lime with the various percentages (70/15/15), (50/25/25/), (70/10/30), (60/10/30), (50/10/40), (70/20/10), (60/30/10), (50/40/10), (30/68/2), (20/76/4), (10/87/3).

After optimization of the percentages of the various material is fly ash-soil-hydrated lime(70-20-10)for the low cost brick the raw material for the per one brick of 3 kg of size 19x9x9 (the standard size of brick)are dry mix properly for 10 Minutes then sufficient amount of water is added into the dry mix then the material is mixed throughout uniformly after this the mixture is allowed to place into the mould in one by one layer with compaction oiling is to be done to the mould before placing the material into it to easily remove the brick after 30 min then the brick is allowed to dry in the normal room temperature or sun drying as per the requirement of the proportion for minimum 2 days after that the bricks are placed into the oven for the oven drying at varying temperature and varying number of days of curing.

The bricks removed from the oven are allowed to cool for some time then there dry weights are taken by the weighing machines and the various tests are taken on the bricks soundness test, water absorption test, Compressive strength test, shape and size test, hardness test these tests are done as per the Indian standard.

This paper represents the new technique of brick manufacturing with the help of which we can manufacture a light weight, economical and environment friendly brick than the conventional brick which reduces the major problem of fly ash disposal and we can save the agricultural land for the farming.

CONCLUSION:

- The low cost bricks alternately reduce the cost of building.
- These bricks are environment friendly as it uses the industrial waste i.e. fly ash which is having major problem of disposal
- Reduction in percentage of soil is beneficial to save the agricultural soil.
- Bricks consume less energy during the manufacturing process and do not emit greenhouse gases.
- Best replacement fly ash bricks use as a best replacement for traditional bricks.

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