POND ASH BRICKS

[1]Suraj Burele, [2]Dr. Arif Khan,
[1]Mtec Scholar, [2]Principal,
[1]Department of environmental engineer,
[1]NCET, Nagpur, India.

Abstract : The project is an innovative approach towards manufacturing a brick using materials which are considered as waste and are discarded. Pond ash, stone crusher dust and grit are used in a suitable combination with cement forming a strong, economic and durable brick. The properties are compared with conventional burnt clay bricks and fly ash bricks. The aim is to utilize waste and residual materials constructively, in order to reduce environmental pollution as well as the requirement to manufacture fresh raw materials, without compromising with the standard characteristics of the brick. The thesis provides a detailed description of all the literatures reviewed, testing data and procedures involved in the project and figurative and analytical representation of the observations. The rate per brick is calculated and a detailed mix design and costing chart depicts its cost efficiency. Overall a brick is successfully manufactured, which fulfills all the requirements of a new, economic, efficient masonry unit. The pond ash brick and fly ash brick are light in weight, with less absorption, high performance, high tensile strength and more durability. The bricks produced were about 28% lighter than clay brick. In this project work an attempt is made to find out the possibility of using pond ash instead of burnt clay brick and conventional cement bricks with utilization of industrial waste by replacing fly ash with it.

IndexTerms - Pond ash, crushed sand, grit, fly ash, cement.

I. INTRODUCTION

The construction industry is the second largest industry in India next to agriculture. As per the record of Indian government budget 2017 is 2184.66 billion. The construction industry in India contributes 8% to national GDP (Gross Domestic Production) in 2010-11 is 308 billion With increasing thrust on developing infrastructure and attractive construction industry is booming and resulting rapid growth in near future. Another new concept- Green building refers to both construction and the use of processes that are environmentally responsible and resource efficient throughout the building life cycle. For this life cycle waste and residual materials from different processes are used. Any country's economic and industrial growth depends on the availability of power. In India also, coal is a major source of fuel for power generation. About 60% power is produced using coal as fuel. In thermal power plants, coal is burnt to heat the water in order to generate steam, which is in turn used to run the turbines. Ash is a byproduct of power generation with coal. Indian coal is having low calorific value (3000-3500 Kcal) and very high ash content (30-45%) resulting in huge quantity of ash is generated in the coal based thermal power stations. During 2005-06 about 112 million tonne of ash has been generated in 125 such power stations. With the present growth in power sector, ash generation has reached 175 million tons per annum in 2012. Any coal based thermal power station contains the following residues after processing.

Key Definations

Fly Ash: This kind of ash is extracted from flue gases through Electrostatic Precipitator in dry form. This ash is fine material and possesses good pozzolanic property.

Bottom Ash: This kind of ash is collected in the bottom of boiler furnace. It is comparatively coarse material and contains higher un burnt carbon. It possesses zero or little pozzolanic property.

Pond Ash: When fly ash and bottom ash or both mixed together in any proportion with the large quantity of water to make it in slurry form and deposited in ponds where in water gets drained away, the deposited ash is called as pond ash.

Mound Ash: Fly ash and bottom ash or both mixed in any proportion and deposited in dry form in the shape of a mound is termed as mound ash.

I. RESEARCH METHODOLOGY

In the past, fly ash and pond ash produced from coal combustion was simply entrained in flue gases and dispersed into the atmosphere. This created environmental and health concerns. Worldwide, more than 65% of fly ash and almost entire pond ash produced from coal power stations is disposed of in landfills and ash ponds. The recycling of ash has become an increasing concern in recent years due to increasing landfill costs and current interest in sustainable development. Thus, utilizing it constructively is an innovative step in engineering research and management. Fly ash brick (FAB) is a building material, specifically a masonry unit. Owing to the high concentration of Calcium Oxide in fly ash, the brick is described as "self-cementing". The manufacturing method saves energy, reduces mercury pollution, and roughly costs 20% less than traditional clay brick manufacturing. The very high popularity and utilization of fly ash brick overshadows the potential of pond ash as a material for generation of masonry units. Having similar physical and chemical properties as fly ash, pond ash utilization in building materials also have many advantages like cost effectiveness, environmental friendliness, increase in strength and also conservation of natural resources and materials. Other environmental benefits to recycling ash include reducing the demand for virgin materials that would need quarrying and cheap substitution for materials such as Portland cement. Similarly, stone crusher units and quarrying sites leave a residue known as Stone Crusher or Quarry Dust. It retains all properties of the parent stone and thus using it as a raw material in the pond ash brick further increases durability and heat resistance of the brick. Being a waste material which in spite of being used in construction of roads is discarded in large quantities, it fulfills the purpose of cost effectiveness and environmental friendliness of the project. Using grit further helps withholding capacity of brick. Making

a brick using such materials directly reduces the quantity of expensive cement used in bricks, without compromising with overall standard requirements. These bricks thus may also replace conventional burnt clay bricks in construction works.

WORK DONE -The procedure involved complete manufacturing of an innovative brick using waste and discarded raw materials along with cement. The main steps involved testing the materials and the brick as per Indian Standard code of specifications, developing its mix design and costing. The detailed step-by-step procedure is as follows: RAW MATERIALS- The project utilizes the waste and residual materials obtained from thermal power plants and quarries and the first step included obtaining these materials from their respective sites. The raw materials used in the brick were collected from the stated plants at the respective rates as depicted in Table

Sr. No.	Material	Source	Rate
1	Fly Ash	Koradi Thermal Power Plant, Koradi	Rs. 445 per ton
2	Pond Ash	Reliance Power Plant, Butibori	-
3	Stone Crusher Dust	Telgaon, Hingna	Rs. 185 per ton
4	Cement	Market	Rs. 250 per bag (50 kg)

Advantages Of Pond Ash

1. It is durable.
2. Low energy consumption.
3. It is economical and ecofriendly.
4. It has low water absorption tendency.
5. No emission of green house gases

Disadvantages Of Pond Ash

1. Needs skilled labor .
2. Need lot of care while manufacturing.

II. OBJECTIVES

a. To determine efficient use of waste pond ash for manufacturing bricks.
b. Determining the strength of bricks by performing several tests.
c. Comparison of pond ash brick with conventional clay bricks from various aspects.
d. To determine the need of pond ash brick in modern construction.
e. To study the use of pond ash as a construction material.

III. CONCLUSION

The bricks are successfully casted using pond ash, stone crusher dust and grit in cement and on the basis on the thorough analysis it can be concluded that the bricks are-

- Safe in design
- Adequate in strength
- Durable
- Economic
- Environmentally friendly
- Light in weight

Additionally, the project creatively uses materials which might otherwise have to be discarded, thus contributing in waste reduction along with reducing cost of generation of new raw materials for construction units.

IV. REFERENCE

1. Piyush Kant Pandey And Raj Kumar Agrawal Utilization Of Mixed Pond Ash In Integrated Steel Plant For Manufacturing Superior Quality Bricks Indian Academy Of Sciences Bull. Mater. Sci., Indian Academy Of Sciences Bull. Master. Sci., Vol. Bengaluru October 2002 Vol.25, No. 5, Pp. 443–447.
2. Ritwik Sarkar Nar Singh Swapan Kumar Das
   Sage Journals, Waste Management And Research Malaysia December 2007 25: 566-571
3. Murali Mohan Vaka[1], Rajendra Prasad Padamata[2], Sujatha V[2], And Sarveswararao S Fly Ash Utilization And Development Of Low Density Red Clay Bricks Materials Engineering And Sciences Division, Aiche Conference Utah Nov 2007.
4. K. Vidhya Ans S. Kandasamy Experimental Investigations On The Properties Of Coal-Ash Brick Units As Green Building Materials Int Journal Of Coal Preparation And Utilization UK Jan 2016 Volume 36 2016 Isssue 6.
5. SEMSI YAZICI And HASAN ¸SAHAN AREL Effects Of Fly Ash Fineness On The Mechanical Properties Of Concrete Sadhana – Indian Acadamy Of Sciences India June 2012 Vol. 37, Part 3, Pp. 389–403.
6. Arumugam K, Ilangovan R, James Manohar D. A Study On Characterization And Use Of Pond Ash As Fine Aggregate In Concrete INTERNATIONAL JOURNAL OF CIVIL AND STRUCTURAL ENGINEERING Volume 2, No 2, 2011 ISSN 0976 – 4399
7. Gaurav Kantibhai Patel1 , Prof. Jayeshkumar Pitroda Pond Ash And Foundry Sand: Opportunities For Development Of Eco-Friendly High Strength Concrete International Journal Of Engineering Trends And Technology (IJETT) Volume 9 Number 6 - Mar 2014
8. Prof. P. P. Bhangale. Study Of Pond ASH (BTPS) Use As A Fine Aggregate In Cement Concrete "- Case Study, International Jornal Of Latest Trends In Engg. And Technology Vol 2, Issue 2, March 2013.
9. Bharathi Ganesh, H. Sharada Bai, R. Nagendra And B.K. Narendra Characterization Of Pond Ash As Fine Aggregate In Concrete International Conference On Advances In Architecture And Civil Engineering (AARCV 2012), 21st – 23rd June 2012 119 Paper ID SAM189, Vol. 1