

A Comparative Study of Ash Bricks and Red Bricks Based on Survey

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ABSTRACT

It is estimated that in India has more than 100,000 brick kilns producing about 250 billion bricks annually, consuming about 35 million tons of coal annually. The brick industry is growing as the demand for bricks is increasing in the towns and villages due to the fast economic growth, urbanization and prosperity. It is alarming to note that 300 mm depth of fertile top soil in India will be consumed for burnt clay brick production in about 60 years. The objective of this paper is to aware us about the harms of using red bricks as a construction material. In India more than 65% of our electricity demand is fulfilled by coal based thermal power plants, in the process of generating electricity through coal based thermal power plants, a large amount of fly ash is generated as residue. If this fly ash residue is exposed to open air, it would be a big threat to our environment, but luckily we got an option to turn this ash residue into useful construction material by the use of bed waste, fly ash etc and this type of bricks is known as *fly ash bricks*, due to rise in pollution day by the day author has analysed that there is need to aware the people about the harms of using red bricks. During the survey it is analysed there is more no. Of red bricks manufactures in the district as compared to ash brick in near the residential areas which are legally not permitted; it is the strict order of the government that bricks plants must be situated about a range of 50km away from the residential areas. Everyday tons of waste is originated from different companies and factories but it is our luck that we are using this waste material in the construction work which will beneficial for mankind as well as environment. The main motive of this paper is to promote the usage of ash bricks(ecofriendly bricks) On the other side, our country needs approximately 250 billion bricks per year for all kind of construction works, to make 60

billion bricks, 185 million tons of top soil is needed. Ultimately near about 7500 hectares of very fertile land is deliberately eroded to meet the demand of clay bricks for construction every year. This devastating act is slowly killing our environment and we will be left with no fertile land for agriculture in near future, deforestation also occurs in search of soil source for clay brick manufacturing. This paper is based on the local survey conducted under the district 'DURG' (Chhattisgarh).

Keywords: Ash & Red Bricks, Site Survey

1. INTRODUCTION

Brick is one of the most important materials for the construction industries. The conventional method of bricks production has brought undeniable shortcomings. The consumption of earth-based materials as clay, shale and sand in brick production resulted in resource depletion, environmental degradation, and energy consumption. Virgin resources are mined from riverbeds and hillsides to service brick industry leaving mines areas unreclaimed. Environmental degradation accompanies such mining activities with air pollution and remains after the mines cease operations, leaves scars on the landscape. The brick was anciently produced by mixing the virgin resources, forming the bricks, drying them and then firing them [1]-[2]. The current trend in bricks manufacturing has major emphasis on the use of post-consumer wastes and industrial by-products in the production process. Most of the researches went through enhancing the clay brick quality and properties by mixing the clay with various recycled wastes as foundry sand, granite sawing waste, harbour sediments, sugarcane baggase ash, clay waste and fine waste of boron, sewage sludge, waste glass from structural wall and other different wastes [3]-[4]. More researches were held in developing bricks from wholly

waste materials without exploiting any sort of natural resources, in order to achieve sustainability. They used entirely wastes in bricks making like waste treatment residual, granite waste, paper sludge, straw fibers, waste treatment sludge, fly ash and with few other wastes[5]-[6]. The conventional method of bricks making has caused serious environmental contamination represented by the enormous emissions of green house gases (GHG) resulted in unusual climate changes as smog, acid rain and global warming. Furthermore, energy as fuel and electricity showed a drastic consumption during the traditional manufacturing of bricks led to highly economical expenditures. As a result, vast forests are in current deforestation in order to utilize their woods and trees as source of energy in the firing stage of bricks production. Hence, recycling the wastes in the bricks production appears to be viable solution not only to environmental pollution but also economical option to design of green building. However, the chronicle problem of (GHG) and energy consumption has not yet been tackled properly as most of the previous works were mainly focused on recycling the wastes traditionally in the bricks. Several researches addressed the amount of (GHG) emission and their impacts on the context as well as the energy consumption [6]-[7]. Few researches took the initiative in developing eco- friendly bricks in an economical environmental concern [8]-[9]. Energy requirement for the developing countries in particular area get energy from coal. The disposal of the increasing amount of thermal waste from coal-fired thermal power plant, this disposal of the thermal waste is called as *fly ash*, which is composed of the non combustible mineral portion of coal consumed in a coal fuelled power plant. Fly ash is a powdery substance obtained from the dust collectors in the electrical power plant that use coal as a fuel [10]. Fly ash bricks are made of lime, fly ash gypsum and sand. These can be extensively used in all building constructional activities similar to that of common burnt clay bricks. The fly ash bricks are comparatively lighter in weight and stronger than common clay bricks. Since fly ash is being accumulated as waste material in large quantity near thermal power plants and creating serious environmental pollution problems, its utilization as main raw material in the manufacture of bricks will not

only create sample opportunities for its proper and useful disposal but also help in environmental pollution control to a greater extent in the surrounding areas of power plants. In view of superior quality and eco-friendly nature and government support the demand for Fly Ash Bricks .About 150 million ash bricks have been manufactured and used in house consumption. All the plant use similar processes called FAL G Technology by using fly ash, cement/lime and gypsum to manufacture fly ash bricks. These bricks are water cured, thus avoiding the need of firing or steam curing of the bricks [11].

2. COMPARISION BASED ON SURVEY

As section 1 introduction author discussed about the advantage and disadvantage of ash and red brick's and also about its effect to environment and mankind. On the basis of basic technical knowledge which is studied only in theories, so the author had try to know the real value, properties, condition and effects of brick in the present and real world. The survey is based on the experience from 10 manufacturers of ash bricks and 10 manufacturers of red bricks, Author had classified the bricks in the comparative form, which is conducted under the district "DURG" Chhattisgarh (INDIA).

2.1 Materials used for preparing

Red bricks

- Coal powder
- Field soil
- Coal factory waste (powder)
- Rice husk
- Sand

Ash bricks

- Gravels
- Gypsum
- Lime
- Sand
- Bed waste

Fly ash (with composition of silica 40%, alumina 7.8%, magnesium and some amount of mercury)

2.2 Technique and machine used

Red bricks

In the formation of these bricks mould of dimension 20x10x10cm are used. After moulding clay bricks are dried under the sunlight than it is ovened in kilns by the use of cow dung, coal and wood at 1100C. Than the bricks are left undisturbed for 30 days.

Ash bricks

By the use of semi auto and automatic machines, in these types of machines there is a arrangement of hydro pressing with a pre attached mould. Approx 10 labours are required to use this machine and the machines outputs 10000 bricks in 8-9 hours. After the formation 3 curing is done till 15 days to provide strength to bricks.

2.3 Drying of bricks

Red bricks

They are left undisturbed in kilns at high temperature for 20 days and are cured 2 times in 7 days under sunlight.

Ash bricks

They are dried in sun light for 3 days and are cured 3 times till 15 days as more the curing more the strength.

2.4 Testing of bricks

Red bricks

No test is done

Ash brick

Compressibility test - 80-120 tons
Water absorbing test - 13-14%

2.5 Market of bricks

Red bricks

This type of brick is mostly used in rural areas, due to its less per brick cost and it is easily affordable by low to high class family.

Ash bricks

Due to its eco-friendly nature it has a very good value in market but due to its high price it can't be afforded by low class family.

2.6 Demand of bricks

Red bricks

These bricks had decreasing demand nowadays because of its poor compressive strength and high water absorbing capacity and may conduct good amount of electricity while seepage on rainy season.

Ash bricks

These bricks have huge demand throughout the India because of its high compressive strength and low water absorption property and are highly fire resistant.

2.7 Profit per bricks

Red bricks

Red bricks cost Rs 3/- per bricks which is further divided into Rs1.25 to manufactures and Rs 1.75 to labours and transportation.

Ash bricks

Ash bricks costs Rs 5/- per brick which is further divided into Rs 1.75 to manufactures and Rs 3.25 to labours, materials and transportation

2.8 Types of labour in bricks manufacturing unit

Red bricks

In this unit unskilled labours are required who work on the daily wages. Production depends upon the number of labour (approx. 20-25 labours).

Ash bricks

In this unit a skill operator is required to operate the machine and rest for the transportation of bricks tray from one sector to another (approx 12 labours).

2.9 Effect of bricks in environment

Red bricks

Red bricks are composed by dumping mixture of materials in mould which is a manual process and it requires a high temperature for baking which is processed by the use of wood, coal and dry grass. The soil required units formation may result in the removal of top layer of soil.

Ash bricks

Ash bricks are composed by applying high pressure on the pre attached mould which does not require usage of coal and wood for baking .Thus it is ecofriendly in nature.

3. CONCLUSION

Based on my survey if I am a customer, I will prefer ash bricks because the same number of bricks will cover more area than red bricks, it is highly fire insulation, due to high strength, practically no breakage during transportation and use, due to its uniform size of bricks mortar required for joints and plaster reduced almost by 50%, it has lower water penetration seepage of water through bricks is considerably reduced. These bricks do not require soaking in water for 24 hours, sprinkling of water before use is enough and on the other side red bricks has many disadvantages such as it has high water absorbing capacity, good conductor of heat and has less compressive strength.

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