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EXPERIMENTAL INVESTIGATION ON LIGHT WEIGHT BRICK WITH FOAMING AGENT

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Abstract -*An Experiment Investigation has been carried out to study the effect of Fly ash, cement, Foaming agent used in concrete Bricks. Recycling is akey concept of modern waste management by using this products in bricks by varying percentage. An Fly ash,Cement, Foaming agent Mixing ratio are following as 50:45:5, 50:40:10, 50:35:15, It is observed at 7, 14, 21days test for Crushing Strength test and Water Absorption test is carried out where it indicates the higher strength compared to other normal brick.*

***Key Words*:Cellular light weigh brick ,protein based foaming agent,Crushing Strength and Absorption test.**

1. INTRODUCTION

This world is changing day by day. Technologies are also changed with time. Technological advancement leads business process in all new different dimensions. Country like India is growing rapidly. Infrastructure Development is in big bane. Development forms and methods are also changed due to change in technology. In case of a conventional construction of a building or any structure, the main source of raw material is Sand bricks or Stones or wooden sheets as a wall. The new concept for making wall has been developed that is Cellular Lightweight (CLB) Bricks. It is a light weight, water resistant, fire- proof, sound proof and environment friendly. The main feature of this bricks is light in weight. Cellular Lightweight bricks are made of fly ash, cement, and foaming agent. These can be extensively used in all building constructional activities similar to that of common burnt clay bricks. The bricks are comparatively lighter in weight and stronger than common clay bricks. Since fly ash is being accumulated as waste material in large

2. MATERIALS USED

2.1 FLYASH

The abundant production of fly ash from coal based thermal power plants as waste products becoming problem for their disposal and it is also hazardous to the environment. . In the present experimental investigation glass fibers in different volume fractions with 5% ,10% and 15% replacement of cement by fly ash has been used to study the effect on compressive strength, split tensile strength, flexural strength of brick. For each mix standard sizes of cubes, cylinders and prisms as per Indian Standards were cast and tested for compressive strength , split tensile strength and flexural strength at age of 7days and 28 days as per Indian Standards.

We should use fine fly ash(may be use pond ash), which is available in thermal power plants. This raw material is one hundred percent (100%) suitable for CL bricks production.

2.2 CEMENT

Cement is a binder, a substance used in construction that sets, hardens and adheres to other materials, binding them together. Cement is seldom used solely, but is used to bind sand and gravel (aggregate) together. Cement is used with fine aggregate to produce mortar for masonry, or with sand and gravel aggregates to produce brick. Cements used in construction are usually inorganic, often lime or calcium silicate based, and can be characterized as being either hydraulic or non-hydraulic, depending upon the ability of the cement to set in the presence of water (see hydraulic and non-hydraulic lime plaster).

2.3 FOAMING AGENT

Foaming Agent is that thing which contains thickener to form suitable kind of bubbles, necessary porosity for Light weight bricks. The formed bubbles are that much strong that they last till brick becomes set. With the help of foaming agents a blanket of tiny bubbles formed.

Foaming agent is like a surfactant, if it is present in small amounts, it facilitates formation of foam, due to it the colloidal stability becomes enhance by coalescence of bubbles. Sodium laureth sulfate is a kind of detergent which is commonly found in various products of personal care. This is less expensive and it is very effective kind of foamer.

2.4 Water

Drinkable water without dirt or deleterious materials was used in the mixing.

3. EXPERIMENTAL PROCEDURE

3.1 Moulded

The moist specimen was placed in a metal mould box with dimension; 230mmx100mmx90mm after which it

was compressed using a manually operated moulding Hand.

3.2 Foaming agent Preparation

Put require amount of foaming agent liquid taken in 5%,10%,15%,20%,25%.Prepare the drilling machine and bucket. The foaming agent liquid and required amount of water adding in bucket.

The foam are generated from the bucket and it mixed with driller machine to the cement and flyash mortar.

The foam is dense and containing small uniform shape bubbles. The bubbles in the foam do not disperse like soap bubbles but when mixed with the cement fly ash mixture it forms a homogenous mixture. The bubble in the foam gets trapped in the cement fly ash mixture making the brick light weight.

Figure 1 Processing of foaming agent

3.3 Mixing

Through mixing of the material is essential for the production of uniform brick. The mixing should ensure that the mass becomes homogeneous, uniform in color and consistency compressed bricks so that other higher quantities could be predicted. The proportion of raw materials is generally is the ratio 55% of cement and balance 45% is added for different ratio of flash and foam as to added

Table -1: Mixing Proportion Table

Preparation of Mixing Proportion			
Ratio	Cement	Fly ash	Foaming agent
50:45:5	1.575	1.080	5
50:40:10	1.575	0.960	10
50:35:15	1.575	0.840	15

3.4 Casting of Brick

Mixing of materials was done in a clean tray before a predetermined water content (attained after conducting the compaction test) was added. Table 1 demonstrates the quantity of each sample used in the production of each batch. The carefully batched materials were initially mixed before adding water. Further, mixing was done until a wet homogenous material was obtained into the moulded and after which it was compressed using a manually operated moulding Hand.

After compacting, the compressed bricks were covered with plastic sheets under ambient conditions with the sole aim of reducing rapid evaporation of moisture which could cause dry shrinkage, cracks and other undesirable defects on the bricks. The compressed bricks were cured for 7, 14, 21days before investigating their properties and suitability for masonry applications.

3.5 Testing of Brick: The study sorts to determine the suitability of using eggshells to improve the properties of compressed bricks. Tests conducted comprised of the crushing tests, water absorption resistances characteristics. The dry density of the bricks was also explored. In all, five bricks specimens with good appearance were randomly selected from each batch for each test as stipulated by most standards. All experimental studies were conducted after curing the compressed bricks for 7, 14, 21 days.

Crushing Strength: The test was to determine the strength development of specimens with varying eggshells at both primary and secondary curing ages (7, 14 and 21 days curing ages). Compressive strength is arguably the most important requirement a walling unit for both load and non-load bearing walls must have. The compressive strengths of brick specimens generally

Water Absorption : The bricks, when tested in accordance with the procedure laid down in IS 3495 (part 2),after immersion in cold water 24 hours, shall have average water absorption not more than 20 percent by mass up to class 12.5 and 15 percent by mass for higher classes

Table-2: CrushingStrength And Water Absorption

Ratio	Compressive Strength (N/mm2)			Water absorption
	7 Days	14 Days	21Days	
50:45:5	3.91	4.78	6.08	5.09
50:40:10	4.3	5.21	6.52	5.99
50:35:15	4.58	5.65	6.95	6.09

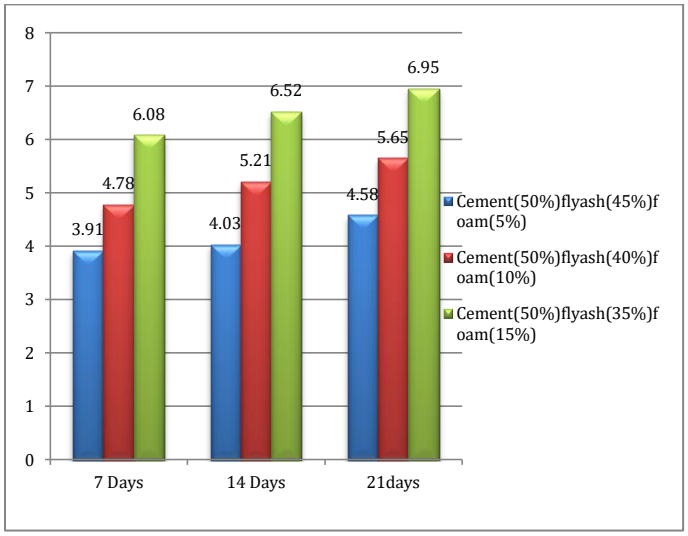

Fig -2: Crushing Strength Flow Chart

Fig -3: crushing strength

Efflorescence Test : The bricks when tested in accordance with the procedure laid down in IS 3495 (Part 3), shall have the rating of efflorescence not more than 'moderate' up to Class 12.5 and 'slight' for higher classes. The liability to efflorescence shall be reported as'nil', 'slight', 'moderate', 'heavy' or 'serious'. Result of this brick The tested brick in result are 30 % its are'moderate'.

Hardness test: In this test a scratch is made on brick surface with a hard thing. If that doesn't left any impression on brick then that is good quality brick. Result of this Not impression on brick.

Size and shape test: In this test randomly collected 20 bricks are staked along length wise, width wise and height wise and then those are measured to know the variation of sizes as per standard. Bricks are closely viewed to check if its edges are sharp and straight and uniform in shape. A good quality brick should have bright and uniform colour throughout. Result of this brick Small changes for sharp and straight edges.

Soundness test: In this test two bricks are held by both hands and struck with one another. If the bricks give clear metallic ringing sound and don't break then those are good quality bricks. Result of this brick Metallic ringing sound are created on tested brick.

Structure test: In this test a brick is broken or a broken brick is collected and closely observed. If there are any flows, cracks or holes present on that broken face then that isn't good quality brick. Result of this brick Flows and cracks or holes are not present in the broken brick.

4. RESULTS AND DISCUSSIONS

A sensitive balance capable of weighing within 0.1 percent of the mass of the specimen and a ventilated oven. The results of all the tests carried out on light weight bricks and also the technical aspects are presented and discussed in this chapter

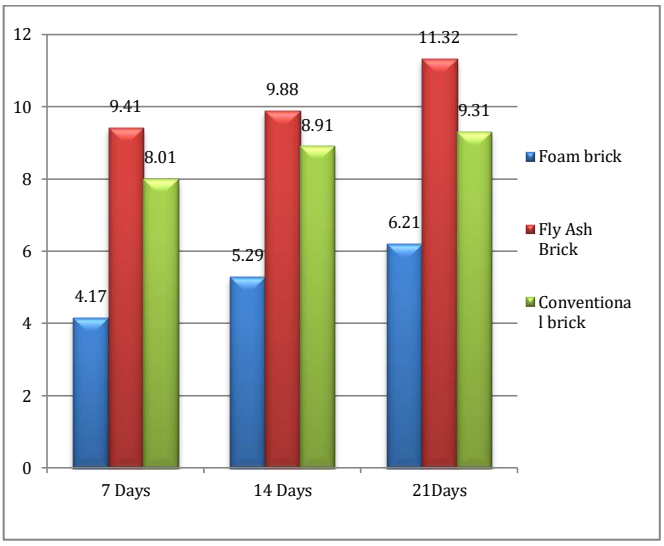

Fig-4: Comparison of Crushing Strength Flow Chart

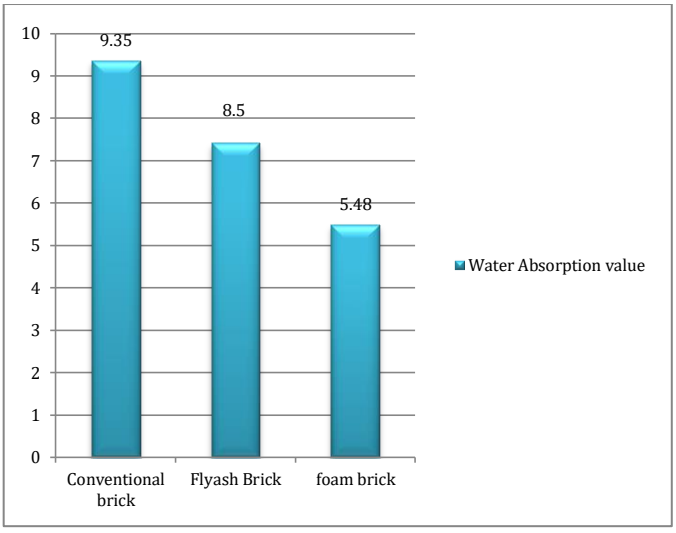

Fig-5: Comparison of Water absorption Flow Chart

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