A STUDY ON VARIOUS PARAMETERS OF AIR ENTRAINED CONCRETE

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Abstract- *The wide use of air entrained concrete is developed nowadays due to its light weight and wide range of applications. They are mostly made using foaming agents mixed with cement. The foams will allow to entrain air in the concrete which results in air voids in the structure and make it light in weight. The air entrained concrete has various properties which can differ from normal concrete such as density, air-voids, durability, compressive strength, tensile strength and flexural strength. The air entrained concrete cement is good in lower thermal expansion co-efficient, sound insulation as a result of presence of air voids. This project focuses on the parameters of the air- entrained concrete like density, air voids ratio water absorption.*

Key words: Air entrained concrete, Light weight, Air voids durability, Compressive strength.

1. INTRODUCTION

Air entrained concrete is made by introducing air or gas into slurry composed of Portland cement or finely crushed sand filler, so that when the mix sets and hardens, a uniformly aerated cellular structure is formed. Even though it is called aerated concrete it is really a mixture of cementious materials with slurry. It is a mixture of water, cement and fine aggregate with some foaming agent. Air entrained concrete is also referred to as gas concrete, foam concrete, cellular concrete or air entrained concrete. In India we have present a few factories manufacturing Air entrained concrete The density of the Air entrained concrete is generally about 400 to 1800kg/m^3 and they are light in weight. Bricks remain one of the most important building materials in the country. Brick making is a traditional industry in India, generally confined to rural areas. In recent years, with expanding urbanization and increasing demand for construction materials, brick kilns have to grow to meet the demand. It has directly or indirectly caused a series of environmental and health problems. At a local level, in the vicinity of a brick kiln, environmental pollution from brick-making operations is injurious to human health, animals and plant life. At a global level, environmental pollution from brick-making operations contributes to the phenomena of global warming and climate change. Extreme weather may cause degradation.

II SCOPE

The scope of the project is to study the use of air entrained concrete in various areas of the building and to study the porosity and density of air entrained concrete

III OBJECTIVE

- To determine the pore size of the air-entrained concrete
- To evaluate the density of air-entrained concrete
- To do SEM analysis to determine the various physical parameters.

IV METARIALS USED

- Cement
- Fine Aggregate Aluminum powder Water

Cement

Cement is a binding material used in the preparation of concrete. It binds in the aggregate with help of water, to a monolithic matter. And also it fills the fine voids in the concrete. There are two intrinsic requirements for any cement in the concrete mix design. That is compressive strength development with time and attainment of appropriate

rheological characteristics, type and production of concrete. Vibration in the chemical composition and physical properties of cement affect the strength parameters.

Specific gravity test

-3.15 Initial setting

time – 40 mins

Final setting time -

6 hrs

Aggregates:

The particle size distribution of an aggregate as determined by sieve analysis is termed as grading of aggregate. If all the particles of an aggregate are of uniform size. Compacted mass will contain more voids, whereas aggregate comprising particles of various sizes will give a mass contains lesser voids. The particle size distribution of a mass of aggregate should be such that the smaller particles fill the voids between the larger particles. The proper grading of an aggregate produce a dense concrete and need less quantity of fine aggregate, cement, pastes. Therefore it is essential that the coarse aggregate be well grade to produce quality concrete. The grading of an aggregate is expressed in terms of percentage by weight retained or passing percentage through a series of sieves taken in order of 4.75mm, 2.36mm, 1.18mm, 600µ, 300µ and 150µ for fine aggregate and 40mm,20mm,10mm,4075mm for coarse aggregate.

Specific gravity- 2.6 Sieve analysis – zone 2

Aluminum powder:

Atomic weight-26.98 Particle size: 200 mesh

Table 1 content present in aluminium powder

Contents	Percentage
Arsenic	0.0005 %
Lead	0.03%
Iron	0.5%
Assay	99.5%

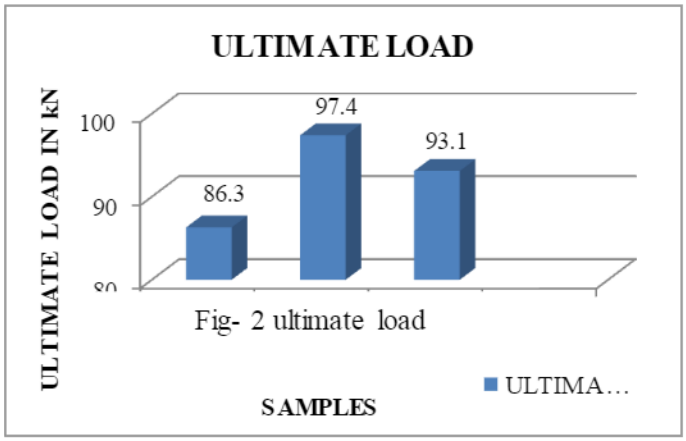

Fig- 2 ultimate load

REPATION OF SAMPLE

The sample was prepared in the mould of 100 mm x100 mm x 100 mm its allowed for oven curing

Fig 1 preparation of sample

V RESULTS AND DISCUSSION

The compressive test taken has taken. The ultimate load and compressive strength observations are given below.

Table 2 Ultimate load (kN)

S. no	Sample	Ultimate Load (kn)
1	sample 1	86.3
2	sample 2	97.4
3	sample 3	93.1

Table 3 compressive strength

S.no	Sample	Compressive strength (n/mm2)
1	SAMPLE 1	8.63
2	SAMPLE 2	9.74
3	SAMPLE 3	9.31

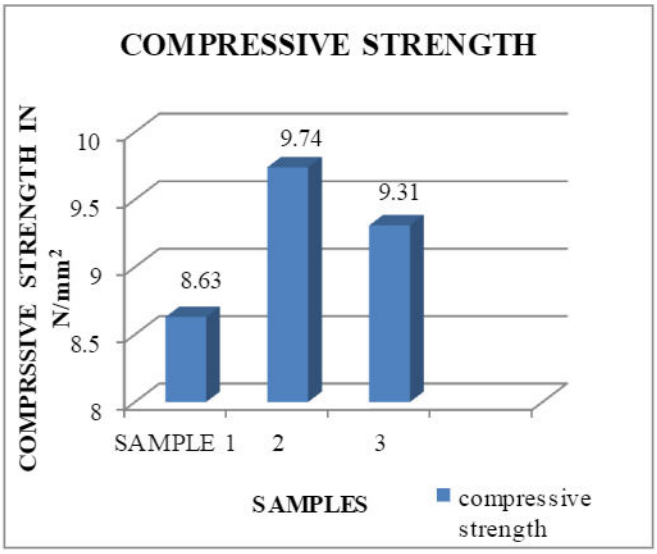

Fig 3 Compressive strength

VI SEM ANALYSIS

The SEM "scanning electron microscope" analysis were taken folling reaction are reacted inside the concreteOn adding the aluminum powdeFr to the cement the following reaction takes place,

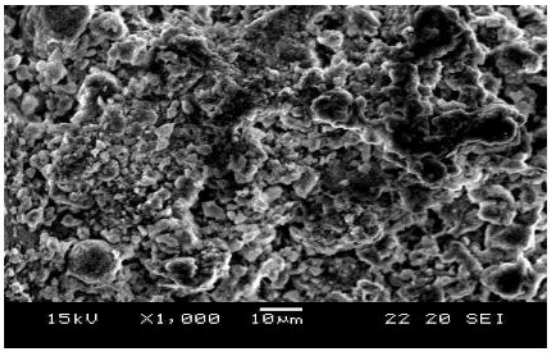

Fig-4 SEM Analysis

$2Al+3Ca(OH)_2+6H_2Ogives3CaO.Al_2O_3.6H_2O+3H_2$

Aluminium + Hydrated lime Tri-calcium hydrate + Hydrogen

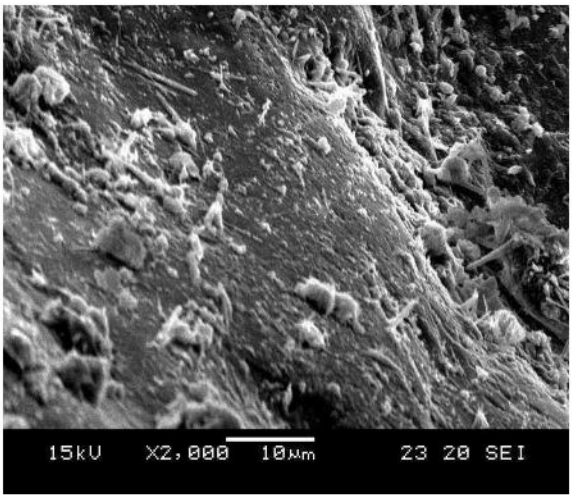

Fig 5 SEM Analysis

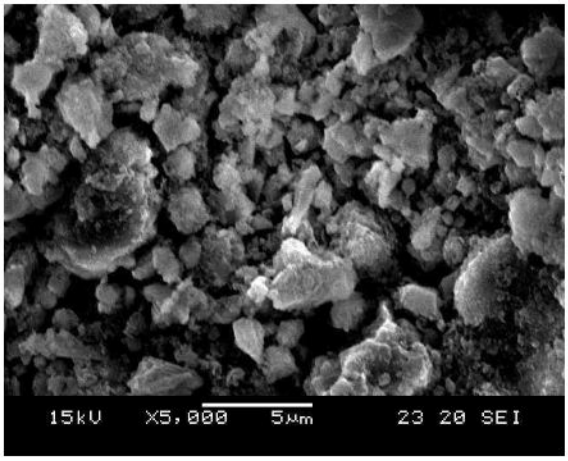

Fig 6 SEM Analysis

VI ADVANTAGES

Eco – friendly Lightweight Energy Saver Great Acoustics Fire Resistant Low Maintenance

Faster Construction

VIII CONCLUSION

Compressive strength of AAC blocks is comparatively more than traditional clay brick. These are suitable for walls in RCC framed building. Utilization of fly ash leads to the reduction in the cement consumption in the product which results in reduction of green house gases. Density - 1/3 that of traditional clay brick Helps in reducing dead load of structureFrom the test report it is observed that the pore size varies from 0.1mm to 1.2mm .The traces of unreacted aluminium powder were found in the sample. The entrapped air in the sample shows that the reduction in the density of the concrete.

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