Properties of Concrete using Eggshell Powder and Glass Powder as a Cement Replacement

A. Arunya, S. Thendral, R. Chitra

Abstract - The point of this undertaking is to forestall the contamination in the earth caused because of ill-advised transfer of the eggshell waste and glass powder by utilizing it as an added substance material in type of cinder or powder in ordinary cement of M25 level since it is utilized typically in the building destinations .This venture focuses on blend structure , material testing of element of cement, for example, concrete , fine total, coarse total and eggshell powder (ESP)and glass powder (GP). Solid 3D shapes with different preliminary rates of eggshell powder and glass powder were thrown. The glass powder and eggshell powder contains silica and calcium separately which thus contributes in calcium - silicate gel development offering raise to the great security quality between the totals and concrete glue. In this examination, the glass powder and egg shell powder were utilized at 0%, 5%, 10%, and 15% individually. The test outcomes acquired shows compelling quality increment at 10% substitution of ESP and GP.

Key words*: *Ca – Si Gel, Egg shell powder, Glass powder, Compressive strength, Water absorption study..

I. INTRODUCTION

Pressure driven Concrete is viewed as more grounded and more strong than before and being cost and vitality effective. It is otherwise called the spine to the framework improvement of a nation[1],[3],[5]. At present, the development business isn't practical chiefly because of the utilization of normal materials , the gigantic sum in outflow of green house gas from the assembling place .Nowadays solid structures are experiencing the issue of solidness because of the wastage of regular assets are squandered . In this way , there is a need to discover an elective strategy so solid industry winds up economical[2],[4],[6].The concrete creates about 5% of CO2 discharges of the world . Subsequently , at present , the whole development industry is in a hunt of a reasonable and powerful the waste item that would impressively limit the utilization of bonds and at last lessens the development cost .And additionally the side-effects, for example, egg shells , glass powders and fly fiery remains are making natural and medical issues. Accordingly, in this present examination the eggshell powder and glass powder are utilized in concrete as an incomplete substitution of bond [20],[22], [24]

A portland bond is made out of significant oxides : lime(Ca O), Silica (SiO2) , Alumina(Al2O3). The lime gives the solidarity to concrete , Eggshell are wealthy in the lime so it utilized as the substitution of folio in the solid . In development , cement is a composite structure material produced using the mix of total and a concrete folio . The most widely recognized type of solid comprise of Portland bond , mineral total (by and large rock and sand) and water.

II. METHODOLOGY

A. Materials

Following materials are utilized for the accompanying task.

B. Cement

. Customary Portland bond of 53 evaluation is to be utilized for the examination.

C. Fine Aggregate

Locally accessible stream sand fine totals are utilized in the examination.

D. Coarse Aggregate

Locally accessible coarse total are taken and sieved to the required amount of volume to the most extreme ostensible size 12 mm. Care is taken to arrive the size of coarse total running from 4.75 mm to the most extreme ostensible size of 12mm. [31],[33]

E.Powder and Glass Powder

Eggshell Powder and Glass Powder .

F. Water

Normal convenient water utilized in this undertaking. [32],[34]

G . Casting of cubes

Throwing of solid shapes Solid 3D shape examples of measurement 150mm × 150mm×150mm were thrown for the examination

H. Curing of Specimens

After de-molding the specimens place it for curing for water absorption test.

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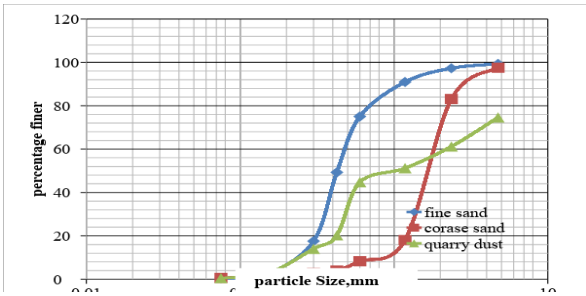

Fig. 1 Particle size distribution of soil samples

III. EXPERIMENTAL INVESTIGATION

A. Compressive Strength

The pressure testing is an exceptionally basic testing technique that is utilized to set up the compressive power or pulverize obstruction of a material and the capacity of the material to recoup after a predetermined compressive power is connected and even held over a characterized timeframe. Pressure tests are utilized to decide the material conduct under a heap. The most extreme pressure a material can support over a period under a heap (consistent or dynamic) is determined[25],[27],[29]

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Fig 2: Compression Test of cube specimen

IV. RESULT AND DISCUSSION

Table 1: 7 days and 28 days results of Compressive Strength

PERCENTAGE	COMPRESSION TEST RESULT FOR 7 DAYS (N/mm^2)	COMPRESSION TEST RESULT FOR 28 DAYS (N/mm^2)	WEIGHT (KG)
0%	13.90	28	8.810
5%	14.31	28.42	8.452
10%	15.23	29.43	8.460
15%	14.21	25.34	8.432

Table 1- Compression Test at 7 days

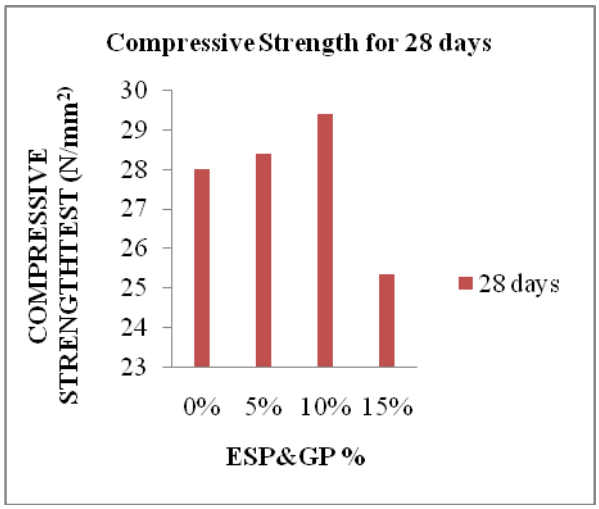

Fig 3: Compression Test at 28 days

A. Water Absorption

In water ingestion test the examples are dried in a broiler for 72 hours at 110 degree celsius and after that put in a desiccators to cool[26],[28],[30] . Promptly after cooling the examples are gauged and this considered as (W1). The material is then inundated in water for 24 hours. Examples are evacuated, at that point dry with build up free material and gauged and this considered as (W2)

V. CONCLUSION

1. The ESP and GP goes about as an amazing elective material for bond

2. The calcium (Ca) in ESP and silica gel (Si) in GP expands the pozzolonic action and Thereby gives great restricting quality in the solid examples.

3. Based on the test outcome 10% of ESP and 10% GP was established to be ideal

4. At the finish of 7 days outcome there was around 9% expansion quality in correlation with control example @ 10% substitution of ESP and GP separately
5. With increase in percentage (%) of ESP + GP there was an effective decrease in water absorption study carried out @ 28 days

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