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FLOATING CONCRETE USING THERMOCOL BEADS AND EGG SHELL POWDER

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Abstract -*This paper presents preparation of floating concrete with the partial replacement of cement by egg shell powder and coarse aggregate by thermocol. In present world construction cost as well as the pollution caused by carbon dioxide emission is severe and it result in global warming.. In order to reduce the emission of carbon dioxide and to reduce cost of construction cement is replaced by egg shell powder and coarse aggregate by thermocol. In this study5%, 10% and 15% of cement is replaced by egg shell powder. Compressive strength Properties are experimentally. Compressive strength for 7 and 28 days of age were compared with conventional concrete; from the results obtained, the percentage giving optimum strength is determined and used in the preparation of floating concrete. Concrete cube and with coarse aggregate replacing 10%, 25%, 50%, 75%, 90% by thermocol are casted.*

Key Words: Thermocol beads, egg shell powder

1. INTRODUCTION

Many innovations are taking place in construction industry. Most of the researches are in the field of concrete technology. Concrete is the widely used construction material.so continuous efforts are made to prepare cost effective concrete. Floating concrete is an innovative concrete having density less than water. Floating concrete help to reduce cost of construction to a greater extent. Thermocol, pumice stone, glass beads etc… can be used for the preparation of floating concrete.

1.1 Objectives

The main objective of this study is to investigate the suitability of egg shell powder and thermocol as partial replacement of cement and coarse aggregate in concrete. The followings were also considered.

- To determine the feasibility of using egg shell powder as a partial replacement of cement.
- To study the behaviour of floating concrete with varying percentage of EPS beads.
- Checking mechanical properties of concrete using EPS beads.
- To examine the possibility of floating concrete as a replacement for conventional concrete.

1.2 Material Uesd

Ordinary Portland cement of 53 grade confirming to is used in this study. M sand confirming to grading zone II of IS 383-1970 is used as fine aggregate. Crushed stones were used as coarse aggregate. The maximum aggregate size of coarse aggregate was 20 mm. Coarse aggregate was in surface saturated dry condition. Thermocol beads are round in shape and has diameter 4mm-8mm. Egg shell are sieved through 90 micron sieve. The water shall be clean an free from deleterious matter. It shall meet the requirements stipulated in is 456:2000.

2. MIX PROPORTION AND METHADOLOGY

The mix proportioning for M20 grade concrete used in the present work. It is designed as per IS 10262:2009 standards. Specimens are prepared according to the mix proportion and by replacing cement with egg shell powder of different proportion.

Table -1: mix proportion

Mix proportion			
Cement	370	1	
Fine aggregate	569.5	1.54	
Coarse aggregate	950.7	2.57	
Water	186		

Here we determine the strength for M20 grade concrete using ordinary Portland cement (OPC) with 0%, 5%, 10% and 15% of egg shell powder. All the specimen are caste with cube of size 150X150X150mm size and are kept for curing for 7 and 28 day, de mould it .The concrete cube will be tested for compressive strength for 7 and 28 days curing using standard specimen.

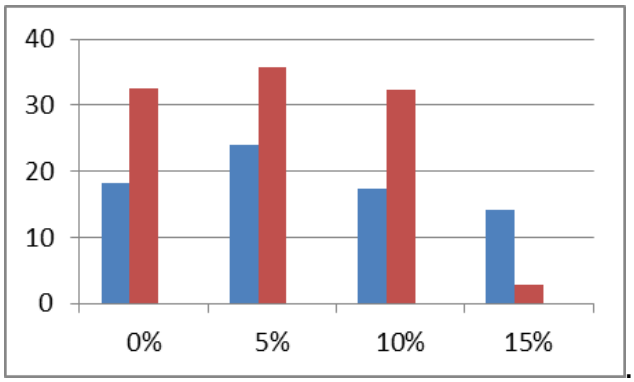

Chart -1: 7 and 28 day compressive strength

Here also 5% of cement is replaced with eggshell powder. 0%, 10%, 25%, 50%, 75% and 90% of coarse aggregate is replaced with EPS beads. Compressive strength is the capacity of a material or structure to withstand compressive loads. It is measured in *K*N/mm2.

The Compressive strength of 3 cubes on each day was tested. Three sample cubes were casted with the designed mix proportion. It was checked for 7 day and 28 day. The compressive strength is taken as the average value of these three values. The obtained values are as shown in the table below. It was found to be compatible with target mean strength.

The split tensile strength of 3 cylinders on each day was tested. Three sample cubes were casted with the designed mix proportion. It was checked for 28 day. The split tensile strength is taken as the average value of these three values. The obtained values are as shown in the table below. It was found to be compatible with target mean strength.

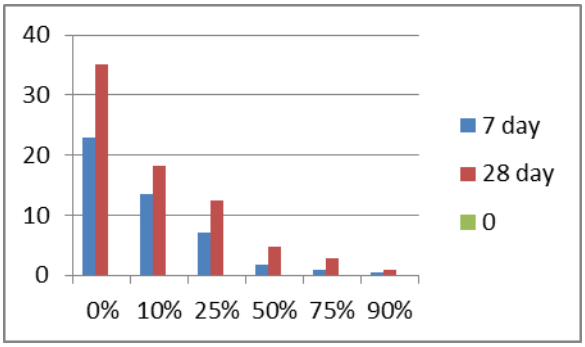

Fig -1:7 and 28 day compressive strength

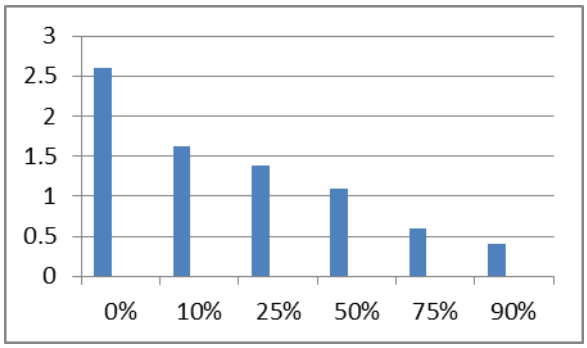

Fig -2: split tensile strength

3. CONCLUSIONS

This Project investigates the properties of the light weight concrete by using a EPS Beads. In this technique the EPS Beads are used for preparation of the floating concrete. Since thermocol is used for the preparation of floating concrete there is a greater reduction in strength. In our project 5% of cement is replaced by egg shell powder in order to increase the strength. The compressive strength of concrete made with 5% replacement of cement is more than conventional concrete. 10%, 25%, 50%, 75%, 90% of coarse aggregate is replaced by thermocol beads on volume basis. On 90% replacement of coarse aggregate the concrete floats. Compressive and flexure strength are determined for various percentage. But the only disadvantage is gradual reduction in strength. In future, the strength of floating concrete can be increased by using admixtures.

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