AN EXPERIMENTAL STUDY ON COMPARISONOF ADMIXTURES USED IN RECYCLING CONCRETE

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ABSTRACT

In the construction field the need of coarse aggregate is high. On the same time many demolished concrete waste are used as land filling. To utilize the waste concrete by reclaim the coarse aggregate from the demolished concrete The aim of our project is to evaluate the use of recycled aggregate as normal coarse aggregate. In this project we are using only recycled aggregate. To increase the strength of recycled concrete by adding admixtures in recycled concrete . By studying the mechanical properties of concrete by replacing the cement with eggshell powder by 10%. The another admixture super plast 400 is added with 0.5% by the weight of cement. These admixture increase the strength of recycled concrete.

Keyword: *Fine aggregate, Cement, superplast, Coarse aggregate.*

1. INTRODUCTION

1.1 GENERAL

Globally, the concrete industry consumes large quantities of natural, which are becoming insufficient to meet the increasing demands. At the same time, utility of old structure is diminishing, so these building are demolished for the new construction. Building are demolished due to various reason i.e. reconstruction for better economic gains, natural disasters and the war – effected damages.The rate of demolition is increasing day by day and the cost of dumping is increasing due to non-availability of appropriate site nearby. Besides scarcity of land, other problems associated with the landfill option include their silting; transportation cost and public opposition. Thus , recycling has been gaining wider attention as a viable option for handling of waste concrete. One of the materials that can be recycled in the demolished structure is coarse aggregate. Utilization of recycled aggregate in concrete has been engaged due to awareness of society in natural resources protection. The application of recycled aggregate as coarse aggregate in concrete mixes has been initiated so as to make effective use of the waste materials.However the compressive strength of recycled concrete is less than the normal conventional concrete To improve the strength of recycled concrete two types of admixtures are used in this project. They are super plast and eggshell powder. Chemical admixture super plast at 0.5% of weight of cement is added and eggshell powder at 10% of weight of cement is added

1.2 OBJECTIVE OF THE INVESTIGATION

The strength of the recycled concrete is less than the normal conventional concrete. To increase the strength of recycled concrete we use admixtures. The admixtures used in this projects are super plast 400 and eggshell powder. These two admixtures are used separately. Super plast was added 0.5% of weight of the cement. The eggshell powder used in the mix were 10% of the weight of cemnt.

1. Compression test
2. Flexural strength test

2.Eggshell powder:

Chicken eggshell is a waste material from domestic sources such as poultries, hatcheries, homes and fast food restaurants. Eggshells were spread on the ground and air dried for 2 days to facilitate easy milling. After air drying the eggshells were manually broken and milled into powdery forms which were collected in polythene bags. The eggshell powder was finally sieved through 425µ sieve. Eggshell powder contains 99.83% of CaO and remaining consists of AI203, SiO2, Cl, Cr2O3, MnO and CuOs

FIGURE 1. EGGSHELL

3.SUPERPLAST:

New types of admixture are known as super plasticizers have been introduced into North America within the past several years. These admixtures can enormously increase the work ability of normal Portland cement concrete or greatly reduce its water content. superplasticizers are more expensive than conventional water- reducing admixtures. The dosage requirements vary between 0.5 and 3 percent by weight of cement, depending on the admixture used Normally the super plasticizers is added to the truck mixer after it arrives at the jobsite and at the last convenient moment before discharge. Within 5 minutes or less the slump greatly increases and at this time the users can get the most advantages from the high fluidity of the concrete. The slump then the steadily decreases during the next hour or more and it is for this reason that the super plasticizer is not added until just before use of the concrete. The rate at which the slump decreases depends on the type and amount of super plasticizer added, as shown in this article, which reports the results of a laboratory investigation of how super plasticizers affect the work ability, strength and durability of high-strength concrete.

4. RESULTS AND DISCUSSIONS

The results of compressive strength, Flexural test are discussed as follows.

4.1 COMPRESSIVE STRENGTH

The compressive strength of concrete is given in terms of the characteristics Compressive Strength of 150 mm size cubes tested after 28 Days of curing. The cubes are tested as per the guidelines given in IS 516-1979. The tests are done on an electro hydraulically operated compression testing machine.

The specimen is placed in the bearing surface of the compression testing machine and compressive load is applied on opposite faces axially, slowly at the rate of 14 MPa/minute, and the result of the tested specimens are shown below,

After 24 hours, cubes extracted from forms and stored in water (curing phase) up to the time of test. Before testing, specimens were air dried for 10 to 15 minutes. The compressive strength of the specimen, σ_{Comp} (in MPa), is calculated by dividing the maximum load carried by the cube specimen during the test by the cross-sectional area of the specimen.

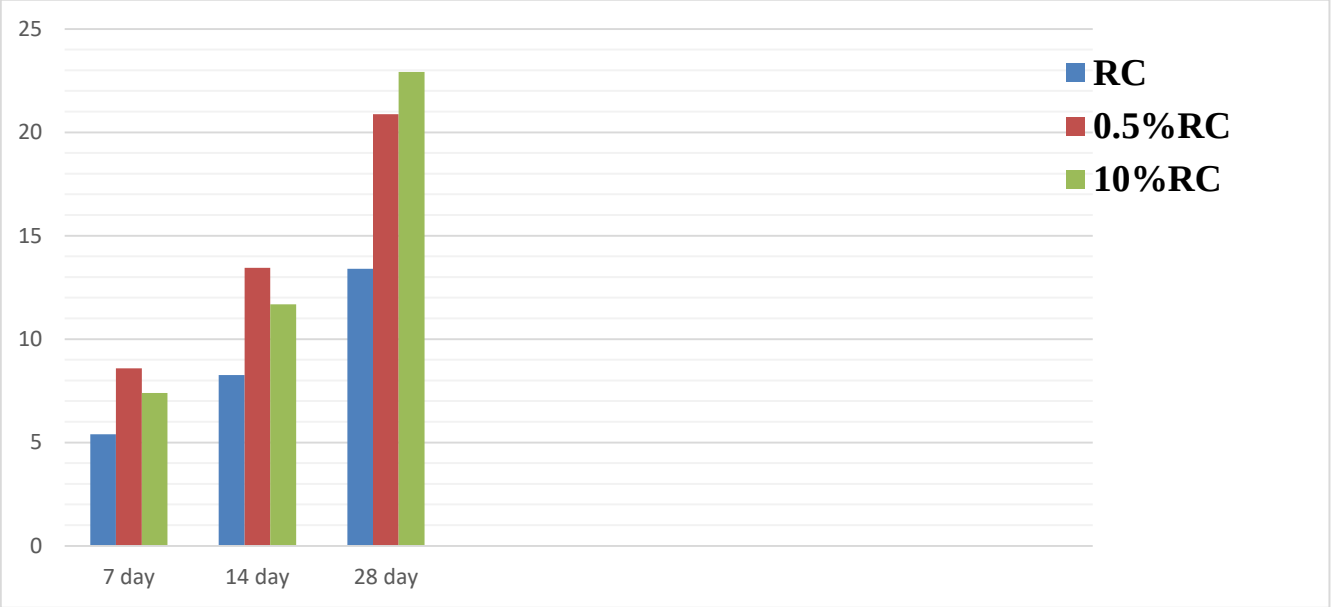

Figure 3 compressional testing values

4.2 FLEXURAL STRENGTH

The Flexural strength is one measure of the tensile strength of concrete. It is a measure of an unreinforced concrete beam or slab to resist failure in bending. After the curing period the specimen is taken out from the curing tank and wipes it clean. The dimensions of the specimen and the weight of the specimen were noted down with accuracy.

The testing machine should be provided with two rollers of 38 mm diameter on which the specimen is placed and the rollers are spaced that the between two rollers. If full contact is not obtained between the specimen and the load applying or the support blocks so that there is a gap, the contact surface of the specimen are capped. The specimen is loaded continuously and without shock at until rupture occurs. The maximum load indicated by the testing machine is recorded.

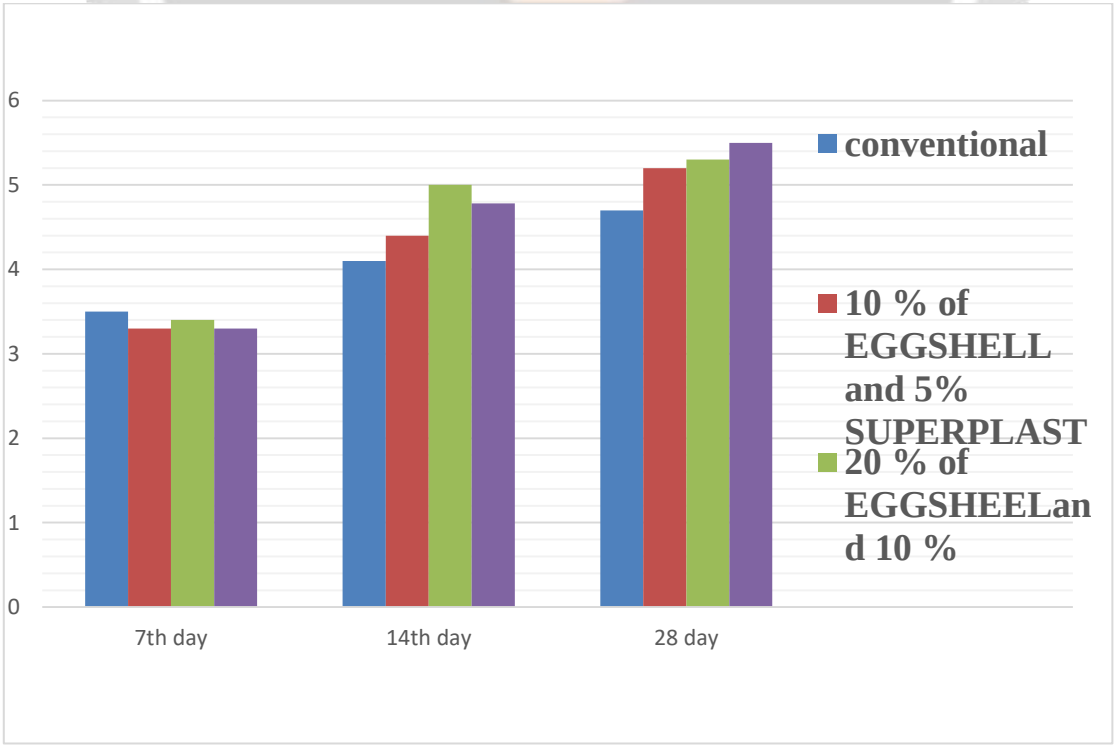

figure 4 flexural strength values

Discussion:

In this research the values of compressive strength for different replacement levels of CSFB (0%, 10%,20% and 30%) at the end of the curing periods (7 days,14 days and 28 days) are taken. These values are plotted in figs. This shows the variation of compressive strength with fine aggregate replacement at different curing ages respectively.
It is evident from figure, that compressive strength increases up to 30% replacement of sand to CSFB. The flexural strength will be decreased in 40% replacement.

5.CONCLUSION

From the test results observed, the following conclusion have been drawn:

Recycled concrete is prepared with replacement of normal coarse aggregate by recycled aggregate which was reclaimed from old demolished concrete. A comparative study is made between normal recycled concrete and recycled concrete with adding admixtures in this project. From our experimental study it is evident that the recycled concrete gives less compressive strength than ordinary cement concrete. By adding admixtures in recycled concrete increases the compressive strength of the concrete. Using of recycled concrete is economy and stop wasting of demolish concrete.

6. REFERENCES:

1. Concrete technology A.M. Neville, J.J. brooks tata Mc Graw Hill Education Private limited; New delhi.
2. Advanced concrete technology; Zongiin Li.
3. Concrete technology theory and practice; M L Gambir ; tata Mc Graw hill education private limited ; New delhi.
4. Concrete technology theory and practice; M.S Shettey; S. Chand & company limited; New delhi.
5. IS 456 – 2000 Indian standard codes.
6. I.S 10262 – 1982 Indian standard codes.
7. L.Evangelista And J.De Brito “Mechanical Behavior of concrete made with fine recycle concrete aggregate”, CCC structural journal, volume: 107, Issue:01, January 2007.