Strength Behaviour of Cement Concrete By Supplementing The Cocount Shell & Egg Shell Powder

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Abstract- *Present construction era, cost of building materials are raising day by day, use of alternative material is a partial replacement of cement & coarse aggregate, fine aggregate is become prominent, The waste materials used such as coconut shells, eggshells, thermal ash, foundry sand etc.The use of waste materials with pozzolonic properties in concrete production is a becoming famous the assessment of the pozzolonic activity of cement replacement materials is becoming increasingly important because of the need for more sustainable cementing products. Coconut powder and egg shell powder is used as partial replacement in concrete ranges of 5%, 10 %, 15 %, 20% for M25 grade. Strength tests were carried out to assess the feasibility of using coconut shell powder and egg shell powder as partial replacement of cement in concrete. After casting the concrete cubes we will correlate the results and prepared report for the feasibility of usage in new advancement in concrete.So here in our thesis we will use coconut shell powder, eggshell powder as replacement for fine aggregate and fly ash as for cement. We will produce M25 grade concrete cubes and conduct various strength tests on cubes and compare those results and make a single point conclusion by using this manuscript. Number of trial mixes is required to select desired optimum replacement of aggregate by coconut shell powder, eggshells powder waste material. So in our project is replacing the coconut shells and eggshells powder on concrete to achieve the required strength of concrete.*

I. INTRODUCTION

Concrete is the widely used number one structural material in the world today, high cost of cement, used as binder, in the production of mortar, sand blocks, lan-crete bricks and concrete has led to a search for another alternative. The overall relevant for concrete in virtually engineering practice and building construction works cannot be overemphasized. The increasing concern of resource depletion and global pollution has challenged many researchers and engineers to seek and develop new materials relying on renewable resources. These include the use of waste products and waste materials in structural construction. Many of these by-products are used as aggregate for the production of lightweight concrete.Cement and concrete is the most common building materials in the world. huge popularity is a resulting of several improvements such as general availability, wide applicability and low cost. These advantages are also accompanied by a great environmental depletion and burden. Thousand billions of tons of raw materials are mined and processed each year leave a mark on the environment. Moreover, during the production of Portland cement large quantities of CO2 are released into the atmosphere and enormous amount of energy are required. Portland cement is one of the most important ingredients of concrete. With the recession raised globally coupled with the market inflationary trends, the constituent materials used for these civil engineering projects had led to a very high cost of construction. To a huge extent, On concrete as major construction material. The versatility, strength and durability of cement are of utmost priority over other construction materials. The basic materials for concrete are: cement, fine aggregate, coarse aggregate and water, the overall cost of concrete production depends largely on the availability of these constituents. Reduction in construction costs and the ability to produce light-weight concrete structures (LWC) are added advantages. The primary aim is to determining the suitability of partial replacement of cement with coconut shell Powder (CSP) and Egg shell powder (ESP) in concrete.

II. LITERATURE REVIEW

Praveen Kumar.R, et.al., (2015) Shows that the Experiment is explained that the egg shell powder is replaced 10%,20% and 30% by cement in concrete in addition with 5%,10%,15% of weight of cement. The egg shell powder replacement is sufficient enough for getting higher strength. The flexural strength of the egg shell concrete increaseswith the addition of egg shell powder. The Split tensile strength of the egg shell powder concrete decrease with theaddition of egg shell powder. This can be increase s used with reinforcement.

Shaik Mastan et.al., (2015) Explained that the experimental study is an attempt to find the optimum usage of fly ash and egg shell powder in normal concrete by replacing the river sand 7%, 14%, 21%, 28%, &35 % by weight at

various proportions. Fly ash & egg shell powder could be very conveniently used in structural concrete.

Olanito et.al., (2015) Shows that the experiment is explained that using a mix design ratio of 1:2:4 and water binder ratio of0.63 concrete cubes were casted using varying Ordinary Portland Cement: Palm Kernel shell ash & Ordinary Portland cement: coconut shell ash ratios of 100:0, 90:10, 80:20, 70:30, 60:40, & 50:50 respectively, Reducing the production cost and the environmental pollution caused by the dumping of the agricultural waste.

Niya Eldhose et.al., (2015)Explained that the experiment is explained that the replacing the cement by egg shell powder (ESP) 5%, 10%, 15% andFine aggregate by Crumb Rubber (CR) 2.5%, 5%, 7.5%&10%. The compressive strength of concrete decreased with increase in varying percentage of Crumb rubber Result of Replacing cement by 5% ESP in 10% Crumb Rubber replaced concrete shows increase in both flexural and split tensile strength

III. OBJECTIVES OF REPLACEMENT CEMENT

The objectives of this study are as follows:

a) To establish the best mix proportion of the partial replacement of egg shell powder for cement in concrete by the value of strength per weight ratio of sample specimen.
b) To improve the feasibility of the partial replacement of above material in concrete by determining its compressive strength and split tensile strength.
c) Based on the test results, to suggest most approximate level of adding egg shell powder, coconut shell powder & fly ash

IV. SCOPE OF THE STUDY OF EGG SHELL POWDER:

Usage of cement can be diminished significantly if eggshell powder used as a partial replacement without compromising performance characteristics of concrete including durability. The scope of study is to establish to achieve the objectives and this study will be mainly concentrated on experimental works. Experiments regarding compression strength and split tensile strength on the partial replacement of ESP, CSP in cement concrete will be carried out in order to study the behavior of concrete. All testing methods and procedures are specified according to Indian code books

V. LIST OF MATERIALS USED

a) Cement (53 grade)
b) Fine aggregate
c) Coarse aggregate
d) Coconut shell powder (CSP)
e) Egg shell powder(ESP)
f) Fly ash

VI. METHODOLOGY& EXPERIMENTAL WORK

a) Formulation of problem
b) Materials selection
c) Tests on materials
d) Compassion of obtained results
e) Conclusions

VII. COMPRESSION TEST RESULTS

Combined replacement of materials average compressive strength results of cement concrete cubes

S.NO	CUBE ID	% OF REPLACEMNT(C+E+F)	AVERAGE C.C @ 7DAYS
1	CEF-1	0	**20.45**
2	CEF-2	5	**21.23**
3	CEF-3	10	**21.83**
4	CEF-4	15	**21.89**
5	CEF-5	20	**21.89**

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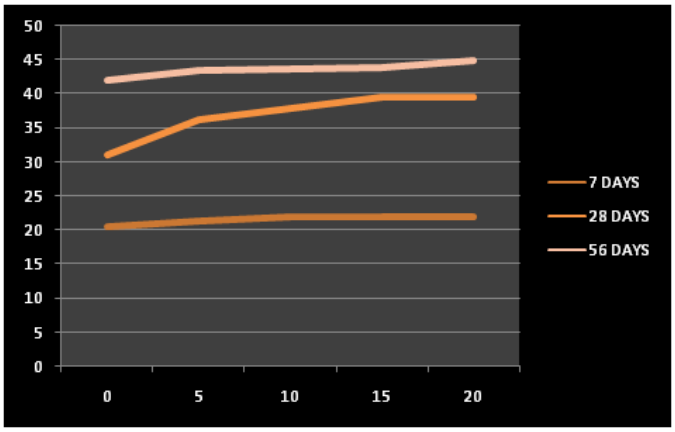
S.NO	CUBE ID	% OF REPLACEMNT(C+E+F)	AVERAGE C.C @ 28DAYS
1	CEF-6	0	**31.00**
2	CEF-7	5	**36.12**
3	CEF-8	10	**37.75**
4	CEF-9	15	**39.42**
5	CEF-10	20	**39.49**

S.NO	CUBE ID	% OF REPLACEMNT(C+E+F)	AVERAGE C.C @ 56 DAYS
1	CEF-11	0	**41.98**
2	CEF-12	5	**43.43**
3	CEF-13	10	**43.76**
4	CEF-14	15	**43.87**
5	CEF-15	20	**44.97**

COMBINED GRAPH :

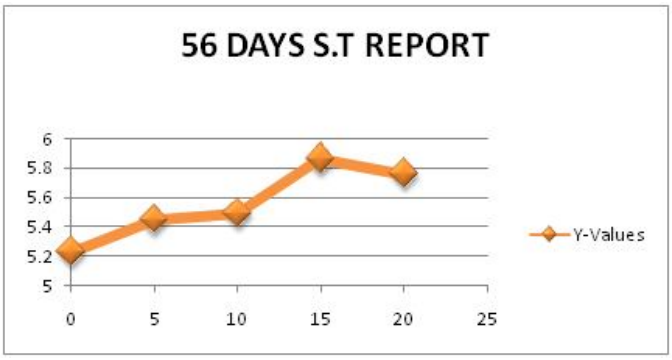


B) SPLIT TENSILE STRENGTH RESULTS:

SPLIT TESNILE STRENGTH REPORTS:

S.NO	C-ID	% of replacement of (CSP+ESP+FA)	28 DAYS
1	CEF-A	0	3.07
2	CEF-B	5	3.26
3	CEF-C	10	3.11
4	CEF-D	15	3.41
5	CEF-E	20	3.45

S.NO	C-ID	% of replacement of (CSP+ESP+FA)	56 DAYS
1	CEF-F	0	5.23
2	CEF-G	5	5.45
3	CEF-H	10	5.49
4	CEF-I	15	5.86
5	CEF-J	20	5.76



ULTRASONIC PULSE VELOCITY TEST REPORTS FOR CUBES:

S NO	CUBE ID	% REPLACEMENT OF (ESP+CSP+FA)	Obtained average velocity(m/s)	Quality of Concrete
1	CEF-1	0	3821	Good
2	CEF-1	5	4245	Good
3	CEF-1	10	4287	Good
4	CEF-1	15	4891	Excellent
5	CEF-1	20	4896	Excellent

S NO	CUBE ID	% REPLACEMENT OF (ESP+CSP+FA)	Obtained average velocity(m/s)	Quality of Concrete
1	CEF-6	0	3567	Good
2	CEF-7	5	4123	Good
3	CEF-8	10	4298	Good
4	CEF-9	15	4876	Excellent
5	CEF-10	20	4878	Good

S NO	CUBE ID	% REPLACEMENT OF (ESP+CSP+FA)	Obtained average velocity(m/s)	Quality of Concrete
1	CEF-11	0	3123	Good
2	CEF-12	5	4444	Good
3	CEF-13	10	4743	Excellent
4	CEF-14	15	4574	Excellent
5	CEF-15	20	4134	Good

C) Flexure test: We are also conducted flexure test on beams satisfactory results are obtained by conducting .

DISCUSSIONS & RESULTS

- CEF-1 posses 20.45 Mpa for genuine concrete mix
- CEF-2 Posses 21.23 Mpa for blended concrete mix
- CEF-3 shows slight increment in the compressive strength

- CEF-4 also giving same compressive strength with slight varies
- CEF-5 gave a good compressive as CEF-4
- Lke that we analyzed the report from the three curing reports of the cubes with ID –CEF-7,CEF-8,CEF9,having good compressive strength report compared to all the Cube reports.
- Finally from the compressive strength reports it shows the replacements of blend is very cost effective and giving good compressive strength results when it replaced
- But in this experimental work EGGSHELL powder making is a late process and bringing form outdoor is difficult
- Coconut powder making from grinding is easy but storage and sieving is very hard while doing
- Fly ash is good admixture to the concrete mix .over all by this coconut powder and fly ash mixing is easy .egg shell powder in not a sufficient one to do these high strength concretes.
- Split tensile strength results giving a satisfactory results at 28 days and 56 days
- The tensile property of concrete is little bit increment at some mixing dosages
- After completion of the UPV test results are also gave a excellent report at 56 days report at 15 % replacement of CEF.
- Based on flexure it shows very good results at ages 28 , 56 days but one thing from the result the flexure values are decreased when after ten percentage replacements.
- But overall replacements with CEF shows very satisfactory reports