

PARTIAL REPLACEMENT OF COARSE AGGREGATE WITH COCONUT SHELL AND CEMENT WITH RHA

Submitted by

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IN

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CERTIFICATE

Certified that this project report entitled "PARTIAL REPLACEMENT OF COARSE AGGREGATE WITH COCONUT SHELL AND CEMENT WITH RHA " submitted individually by student of School of Civil Engineering, Lovely Professional University, Phagwara , carried out the work under my supervision for the Award of Degree. This report has not been submitted to any other university or institution for the award of any degree.

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DECLARATION

I, Vivek kumar kashyap (Regd. No.11609447), hereby declare that this thesis report entitled “PARTIAL REPLACEMENT OF COARSE AGGREGATE WITH COCONUT SHELL AND CEMENT WITH RHA” submitted in the partial fulfillment of the requirements for the award of degree of Master of Civil Engineering, in the School of Civil Engineering, Lovely Professional University, Phagwara, is my own work. This matter embodied in this report has not been submitted in part or full to any other university or institute for the award of any degree.

Date:
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CHAPTER-1

ABSTRACT

This empowers the utilization of these 'apparently' squandered items as development materials in minimal effort lodging. It is additionally anticipated that would effectively encourage lodging designers in putting these materials in house development. Furthermore, in another hand coconut shell substitute for the coarse totals, the transfer of coconut squander is a major issue for condition, so by utilizing of RHA and coconut shell we can use the loss and in addition.

Chapter- 2

Introduction

Concrete is the main building material utilized as a part of structural designing structures which can form into any shape and size. Planning of crude materials of cement isn't just making the expansion of materials yet additionally driving incredible air contamination by their production, Fine and Coarse total are two primary fixings utilized for the creation of cement and has no option in the common development industry, It is unavoidable either to scan for another material or somewhat supplant them by some different materials, look for any such materials, which can be utilized as an option or as a supplementary for coarse total should prompt worldwide manageable advancement and most minimal conceivable natural effect, To conquer this impact numerous analysts have made endeavours to utilize squander material which lessens the transfer issue, barometrical contamination and enhance the mechanical properties of concrete, Here are a portion of the waste materials that can be utilized as a part of making cement, for example, coconut shells powder, coconut shell and so on, Use of coconut shells powder in the solid to incompletely supplant Fine totals separately is received which will empower the solid development industry to maintain, Hence these can be utilized as sparing building total materials diminishing the issues of ecological contamination and transfer of waste .

1.1 Concrete:

Yearly generation speaks to one ton for each individual on the planet. It is unimaginably flexible, and is utilized as a part of all real development ventures. Totals are utilized as a part of cement for certain reasons. Totals ordinarily make up around 60 % to 75 % of the volume of a solid blend, and as they are

the minimum cost of the materials utilized as a part of cement, the financial effect is noteworthy.

ADVANTAGES OF RHA

- RHA gives high compressive quality to the solid.
- RHA gives long sturdiness to the solid.
- It additionally helps in chopping down the contamination in condition.
- RHA can be utilized as an incomplete substitute for Portland bond in indistinct frame and as an admixture in elite cements and high quality.
- It additionally forces the cost of cement.

S.No	State	Productivity (Nuts/Hectare)	Area (Lakh Hectare)	Production (Million Nuts)
1.	Tamil Nadu	14,872	4.65	6917.25
2.	Kerala	7,486	7.97	5968.01
3.	Karnataka	9,745	5.17	5041.15
4.	Andhra Pradesh	14,997	1.21	1828.46
5.	West Bengal	12,656	0.29	370.83
6.	Odisha	6,399	0.50	324.93
7.	Gujarat	9,328	0.31	295.03
8.	Maharashtra	6,676	0.28	187.47
9.	Bihar	9,273	0.15	141.42
10.	Assam	6,753	0.20	136.61



Fig1: Coconut shells



Fig. Rice husk ash

CHAPTER-3

Scope:-

- Use for improve work abilities of concrete.
- The natural aggregates are limited and hence costly so it can be replaced for them.
- Waste way to utilizes the waste of agriculture's and solve the disposal problem of waste

Chapter- 4

Research Objectives

- Economical concrete.
- Light weight concrete.
- Waste absorption from environment.

CHAPTER- 5

Literature Review

1.Harshit Varshney “Utilization of Rice Husk Ash in concrete as cement replacement”

In this work diverse tests were executed as droop test, compaction factor, pressure test and split ductile test to locate the reasonable rate substitution of concrete by RHA. Pressure and split tests were performed for 7days and 28 days of curing and result demonstrates some variety in the two tests in each extent. In the wake of performing tests, the outcomes propose that up to 15% trade of RHA for bond is reasonable for making concrete. The workability of cement made with 5% RHA has observed to be diminished with expanded w/c proportion when contrasted with typical cement and compacting factor additionally discovered diminished with expanded w/c bond proportion when contrasted with ordinary cement. The compressive quality of cement expanded with increment the level of RHA up to 15% following 7 and 28 days curing and discovered diminished after 15% of RHA.

2.Parag S. Kambli, Sandhya R. Mathapati

In this examination, three diverse cement blends to be specific M20, M35 and M50 review with various mix of normal material CS content in the extent 0%, 10%, 20%, 30% and 40% will be supplanted. Six examples will be set up for each solid blend. The parameters will be tried are compressive quality conduct of 3D shape examples for 7 and 28 days. The principle objective is to empower the utilization of these „seemingly“ squander items as development materials in minimal effort lodging. It is additionally anticipated that would effectively encourage lodging designers in putting these materials in house development.

In this Research consider the conclusions were utilizing the coconut shell as total in cement can lessen the material cost in development on account of the ease and plentiful horticultural waste. Coconut Shell Concrete can be utilized as a part of rustic territories and spots where coconut is rich and may likewise be utilized where the traditional totals are exorbitant. Coconut shell concrete is additionally delegated auxiliary lightweight cement. Attempting to supplant total by coconut shell mostly to make solid structure more monetary alongside great quality criteria. From one block count mass measure of shell substitution can be assessed and lessens over all development cost. This can be helpful for development of minimal effort lodging society.

3.B.Damodhara Reddy, S.Aruna Jyothy, Fawaz Shaik “Experimental Analysis of the Use of Coconut Shell as Coarse Aggregate”

The task paper goes for investigating flexural and compressive quality attributes of with halfway substitution utilizing M30 review concrete. The venture additionally expects to demonstrate that Coconut shell total is a potential development material and all the while lessens the earth issue of solid..Beams are threw, tried and their physical and mechanical properties are resolved. The principle objective is to support the utilization of these „seemingly“ squander items as development materials in minimal effort lodging.

In this investigation, they supplanted coarse total with coconut shell, by volume. Examples were thrown by supplanting 25%,50%,75% and 100% of coarse total with coconut shells. Tests were directed on the thrown examples following 28 days as said in the IS code. Tests for workability, flexure, pressure and split elasticity were directed and comes about were acquired. Coconut shell concrete has better workability in light of the smooth surface on one side of the shells and the littler size of coconut shells. So they could utilize coconut shell concrete in cements where high workability is attractive. The flexural quality of CSC is around 5.36N/mm², 4.32N/mm², and 2.4N/mm² for examples supplanting

25%,50%,100%, obviously total individually. In any case, if there should be an occurrence of 100% substitution of coarse total flexural quality was not gotten as the example flopped under its self weight. Its relating compressive qualities were gotten as 24N/mm²,22.62N/mm²,14.93N/mm² and 5.48N/mm². The part rigidity of CSC was acquired as 2.48N/mm²,2.22N/mm²,1.27N/mm² and 0.495N/mm² individually. From the above outcomes they can see that in CSC where 25% of the coarse total is supplanted, indicates properties like the ostensible blend and half supplanted CSC demonstrates properties like light weight solid which can be utilized as filler materials in confined structures, flooring tiles, warm protecting cement and so on.

4.Parag S. Kambli, Sandhya R. Mathapati (March 2014)

This has required research into elective materials of development. The task paper goes for examining compressive quality attributes of cement created utilizing squashed, granular coconut as substitutes for traditional coarse total with fractional substitution. The principle objective is to support the utilization of these 'apparently' squander items as development materials in minimal effort lodging. It is additionally anticipated that would effectively encourage lodging designers in putting these materials in house development.

From the exploratory outcomes and exchange, the coconut shell has potential as lightweight total in concrete. Additionally, utilizing the coconut shell as total in cement can lessen the material cost in development in light of the ease and plenteous rural waste. Coconut Shell Concrete can be utilized as a part of rustic ranges and places where coconut is copious and may likewise be utilized where the ordinary totals are exorbitant. Coconut shell concrete is likewise named basic lightweight cement.

5.Amarnath Yerramala, Ramachandrudu C “Properties of Concrete with Coconut Shells as Aggregate Replacement”

Increment in CS rate diminished densities of the cements. With CS rate increment the 7 day quality pick up likewise expanded with comparing 28 day curing quality. In any case, the general quality diminished with CS substitution when contrasted with control concrete. Moreover, fly powder as bond substitution had negative impact when contrasted with comparing CS concrete and fly fiery remains as total substitution had comparative execution as that of relating CS supplanted concrete. Like compressive quality, the split elasticity likewise diminished with increment in CS substitution. Moreover, for 28 days of curing expansion of fly fiery remains as bond substitution diminished general split rigidity of CS concrete and fly slag expansion as total supplanting demonstrated no significant contrast with comparing CS supplanted concrete (M4). The outcomes showed that, regardless of CS rate substitution there was great connection between compressive quality and split rigidity. The condition proposed by Raphael, 1984 for ordinary cement was over anticipating at bring down qualities for CS cements. Increment in CS substitution porous voids additionally expanded. With 10% CS substitution the porous were 30 percent higher than control concrete. So also, the penetrable voids were 88 percent higher than control concrete for 20% CS substitution. Expansion of fly fiery debris as bond supplanting expanded porous voids with comparing CS concrete (M4). Be that as it may, expansion of fly fiery remains as total substitution diminished porous voids. The retention attributes demonstrate that the underlying 30 min assimilation esteems for every one of the cements were lower than limits usually connected with great quality cement. The greatest assimilation was 2.3% for the solid having 20% CS and 25% fly slag as bond substitution. Fly slag as bond substitution expanded water ingestion and fly fiery debris as total substitution did not demonstrate any stamped distinction with relating CS supplanted concrete. Retention of the cements was higher than control concrete for all CS cements. The most extreme sorption was

0.18mm/s0.5 for the solid having 20% CS and 25% fly slag as bond substitution. Like assimilation, fly fiery remains as bond substitution expanded sorption and fly cinder as total substitution did not demonstrate any checked contrast with relating CS supplanted concrete.

6. Sudisht Mishra “Effect of Rice Husk Ash on Cement Mortar and Concrete”

In this work distinctive tests were executed as droop test, compaction factor, pressure test and split ductile test to locate the appropriate rate substitution of bond by RHA. In ostensible blend M20 review concrete and 1:4 bond mortar RHA was included as an admixture from 7.50% to 17.50% with a uniform variety of 2.5%. Amid damaging test, compressive quality of mortar 3D squares and bounce back mallet quality of solid specimens discovered expanded with most extreme variety of 67.85% and 39.65% for 10% RHA. Greatest varieties of versatile modulus were 55.87% trailed by 27.94% for 12.50% and 10% RHA blended specimens. Compressive quality of solid specimens indicated most extreme increment 3.08% between RHA 7.50% to 10.00% which diminished further for higher level of RHA. Lessening in water ingestion, from comes about acquired from 6 tests cement and 3 tests on mortar tests, it is watched that up to 10% RHA with cement and mortar improves all properties (Figures 2a to c) and it is watched that 12.5% of Rice Husk Ash by mass of bond as the ideal measurements to be included solid creation of M20 especially when the husk is singed under field condition to use the effortlessly accessible and ease assets for advancement of solid structure regarding economy, sturdiness and quality. So best appropriate level of rice husk fiery remains according to handle condition 10.00% for ideal quality and sturdiness.

7.Sourav Ghosal, S. Moulik

The successful lodging strategies manage lessening in cost of development and also giving quality to structures. Fundamentally rock, sand and bond are utilized as a part of the readiness of ordinary cement. While the utilization of horticultural result i.e. rice husk as an incomplete supplanting with the traditional fine totals is relied upon to effectively encourage lodging designers in building development. Rice husk is created in around 100 million tons for every annum in India. Twenty kg of rice husk are gotten from 100 kg of rice. It contains natural substances and 20% inorganic material. Cinder from rice is acquired because of burning of rice husk at reasonable temperature. Appropriate use of it intends to spare nature, urges the Government to discover arrangements with respect to transfer to landfills of waste materials, and gives new learning to the temporary workers and designers on the most proficient method to enhance the development business by utilizing rice husk, to maintain great item execution and to meet reusing objectives. The rice husk fiery remains solid expects to get ready light weight auxiliary solid which may diminish impressively the self heap of structures and allows vast precast units to be dealt with. The fundamental target is consequently to empower the utilization of these 'apparently' squander items as development materials in minimal effort lodging. The different essential properties of rice husk concrete are checked on in this paper.

, it can be all around inferred that RHA can be utilized as bond in lightweight auxiliary solid planning. Manageable use would protect regular materials for future. To pick green development, RHA is a correct decision, as it doesn't deliver natural contamination and quickens speed of development.

8.Sourav Ghosal and S.C.Moulik

The utilization of a horticultural result i.e. coconut shell as a halfway supplanting with ordinary coarse totals is relied upon to effectively encourage lodging engineers in building development. Natural effect can likewise be decreased by making practical utilization of this waste. The coconut shell expects to plan light weight solid which may decrease impressively the self-heap of a structure and allows extensive precast units to be dealt with. The coconut shell is more impervious to acidic, salty and soluble assault. The trademark properties of cement, for example, compressive quality, split elasticity, flexural quality, affect protection, bond quality utilizing the blend made by supplanting coarse totals with coconut shell were investigated in this paper.

From the survey of the above research work embraced by the different specialists, it can be reasoned that coconut shell can be utilized as coarse totals in light weight solid planning. Practical use of this horticultural result would save the regular totals for future. India is the third most noteworthy maker of coconut after Philippines and Sri Lanka. Consequently this waste ought not to be dumped all over; rather it ought to be used in a legitimate way in order to destroy ecological perils and a compelling substitute of solid total. To decide on green development, utilization of coconut shell as coarse totals is a correct decision, since coconut shell plans to deliver light weight concrete and would help in expanding the speed of development. Till now, just the investigation seeing coconut shell as total in concrete is examined. Yet, inquire about with respect to the utilization of green coconut (delicate coconut) shell and developed coconut husk as fine or coarse totals in solid planning ought to be done as such as to use these huge and under-used farming squanders in mass development in infrastructural division. It is along these lines, in light of the fact

that after the utilization of sweet water, the green coconut shells are basically tossed and dumped all over causing good conditions for methane outflows, the most strong green house gasses for the climate. Compelling use these rural squanders won't just take care of their transfer issue yet additionally ensures the neighborhood condition. Henceforth, there is the need to examine the plausibility of green coconut shells and developed coconut fiber as the totals for solid arrangement later on inquire about customized.

9.Apeksha Kanojia¹, S.K. Jain²

For maintainable advancement, these materials ought to be utilized admirably and option materials should be looked to supplant customary total. In the meantime because of quick industrialization, generation of waste material is expanding step by step. Its transfer has turned out to be genuine issue.

10.OBILADE, I.O.

From the examinations completed, the accompanying conclusions can be made:

The ideal expansion of RHA as halfway swap for concrete is in the range 0-20%.

The compacting factor estimations of the solid lessened as the level of RHA expanded.

The Bulk Densities of cement lessened as the rate RHA substitution expanded.

The Compressive Strengths of cement lessened as the rate RHA substitution expanded

11.Akogu Elijah Abalaka, Obumneme Godwin Okoli,

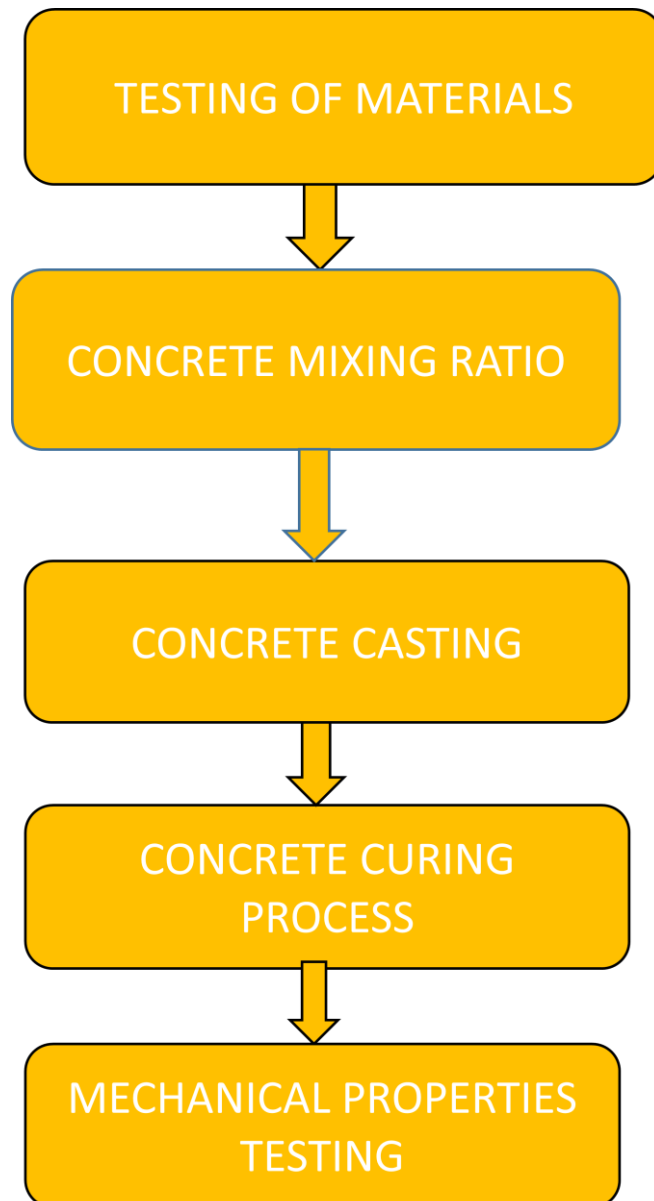
Concrete at water-bond (w/c) proportion of 0.30 and 0.35 containing rice husk fiery debris (RHA) at a low particular surface presoaked with break even with weight of water was cured in water and surrounding air (uncured). The RHA was presoaked in measure up to mass of water before blending to diminish water request in new cement for the most part connected with concrete containing RHA. The point was to decide the ideal customary Portland bond (OPC) supplanting with RHA coming about because of the reactivity of presoaked RHA and the impacts of presoaked RHA on strength properties (coefficient of water ingestion and sorptivity) of cement at 90 years old days. At w/c proportion of 0.30, OPC supplanting with 20% RHA brought about higher compressive quality contrasted with control for both water cured and uncured solid shapes. Changes in sturdiness properties of cement coming about because of the utilization of presoaked RHA were recorded.

The outcomes have demonstrated that presoaked RHA isn't just responsive in concrete, yet that 20% of bond can be supplanted by the presoaked RHA at low particular surface. The ideal rate OPC supplanting with presoaked RHA recorded in this investigation by and large concurs with different examinations utilizing dry RHA. It likewise demonstrates that the rate RHA substitution content without quality misfortune is additionally reliant on the w/c proportion of the solid blend. The outcomes have likewise demonstrated that the droop of new cement can be expanded without an expansion in plasticizer content by utilizing presoaked RHA. Moreover, the outcomes have shown that the standard decrease of droop of new cement related with the utilization of RHA in cement can be definitely diminished by presoaking RHA in approach mass of water

before blending. Enhancements in toughness properties of cement at 5% RHA content have additionally been appeared.

Chapter- 6

Research methodology



Chapter- 7

Result and Conclusion

SIEVE ANALYSIS OF COARSE AGGREGATE

Select sample = 5 kg

Used apparatus-sieve sets ,tray, weight machine, sample of CA

SIEVE SIZE	WEIGHT RETAINED IN GRMS	%WEIGHT RETAINED	%WEIGHT PASSING	CUMMELATIVE WEIGHT RETAINED
20	20	0.4	99.6	0.4
16	2990	59.8	39.8	60.2
12.5	1630	32.6	7.6	92.8
10	260	5.2	2	98
6.3	90	1.8	99.8	99.8
4.75	10	0.2	0.2	100
PAN	0	0	0	100

Result-After compare this table with IS-383 table I found the aggregate corropnd 20mm single size.

SPECIFIC GRAVITY OF COARSE AGGREGATE

Select sample(W1) =500 grms.

Weight of pycnometer +water (W2)=1516grms.

Weight of pycnometer + sample + water(W3) =1813grms.

Weight of water in pycnometer with CA (W4=W3-W2) = 297grms.

Weight of oven dry sample (W5)=495grms.

Formula:-

$$\text{Specific gravity} = W5/(W5-W4).$$

Result:-

$$\text{Specific gravity} = 2.5$$

WATER ABSORPTION TEST OF COARSE AGGREGATE

Select sample(W1) =500 grms.

Weight of pycnometer +water (W2)=1516grms.

Weight of pycnometer + sample + water (W3) = 1813 grms.

Weight of water in pycnometer with CA (W4 = W3 - W2) = 297 grms.

Weight of oven dry sample (W5) = 495 grms.

Formula:-

$$\text{Water absorption} = (W1 - W5) / W5\%$$

Result:-

$$\text{Water absorption} = 1.01\%$$

AGGREGATES IMPACT VALUE TEST OF CA

Initial sample weight (w1) = 500 grms.

Number of stock applied for each layer = 25 stocks

Weight retained on 2.36 mm sieve (W2) = 58.5 grms

Formula:-

$$\text{Impact value} = W2 / W1\%$$

Results:-

$$\text{Impact value} = 11.7\%$$

LOSS ANGLES ABRASSION TEST OF CA

Weight of sample selected (W1) = 5000 grms

Weight retained from 1.7 mm sieve (W2) = 4420 grms

Number of rotation applied with 15 ball = 500 rotation

Formula:-

$$\text{Loss angles abrasions} = (W1 - W2) / W1$$

Results:-

$$\text{Loss angles abrasions} = 11.6\%$$

AGGREGATE CRUSHING VALUE TEST

Weight of sample (W1) = 3000 grms

Each 1/3 layer filled in cylinder with number of blows = 25

Load applied = 40 T

Weight retained on 10 mm after load applying (W2)=480 grms

Formula:-

$$\text{Aggregate crushing value} = \frac{W2}{W1}\%$$

Result:-

$$\text{Aggregate crushing value} = 16 \%$$

SIEVE ANALYSIS OF FINE AGGREGATES

Selected sample weight = 2000 gm

Sieve size	Weight retained	% weight retained	% Passing weight	% cumulative weight
4.75	32	1.6	98.4	1.6
2.36	308	15.4	83	17
1.18	540	27	56	44
0.60	338	16.9	27.1	60.9
0.30	266	13.3	14.8	74.2
0.15	504	25.2	2	99.4
0.075	10	0.5	1	99.9
Pan	2	0.1	0	100

Results:-

After comparing this table with IS -383 ,I founded the sample laid in zone 3rd.

SPECIFIC GRAVITY OF FINE AGGREGATE

Select sample(W1) =500 grms.

Weight of pycnometer +water (W2)=1516grms.

Weight of pycnometer + sample + water(W3) =1815grms.

Weight of water +pycnometer (W4) = 1516grms.

Weight of oven dry sample (W5)=496grms.

Formula:-

Specific gravity = $W5/W1 - (1815-1516)$.

Result:-

Specific gravity = 2.30

WATER ABSORPTION TEST OF FINE AGGREGATE

Select sample(W1) =500 grms.

Weight of pycnometer +water (W2)=1516grms.

Weight of pycnometer + sample + water(W3) =1810grms.

Weight of water+pycnometer= 1516grms.

Weight of oven dry sample (W5)=480grms.

Formula:-

Water absorption = $(W1-W5)/W5\%$

Result:-

Water absorption= 4.16%

NORMAL CONSISTENCY OF CEMENT

S.NO	%Water	Initial reading	Final reading	Height not penetrated(mm)
1	20	40	38	2
2	24	40	37	3
3	28	40	10	30
4	30	40	5	35

Stand

ard consistency of cement =30%

SPECIFIC GRAVITY OF CEMENT

Description	Ttial1	Trial2
1.Mass of empty bottel W1 gm.	67	67

2.Mass of bottle +Water W2 gm.	161	164
3.Mass of bottle +kerosene W3 gm.	144	137
4.Mass of cement W4 gm.	50	50
5.Mass of bottle +cement+kerosene W5 gm	181	175
6.S.G of cement $S = \frac{W4(W3-W1)}{(W4+W3-W5)(W2-W1)}$	3.15	3.00

- As per the studies coconut shell helps in formation of light weight concrete.
- Successfully RHA can partially replace cement without much effect on its properties.
- Disposal of waste materials can be solved by utilizing it in the concrete mix.
- It helps in production of economic concrete.