

**PARTIAL REPLACEMENT OF FINE AGGREGATES OF
CONCRETE BY
COCONUT SHELL POWDER AND CEMENT WITH RHA**

DISSERTATION II

Submitted by

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In partial fulfillment for the award of the degree of

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IN

STRUCTURAL ENGINEERING

(CIVIL ENGINEERING)

Under the Guidance of

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DECLARATION

I, Ratandeep kumar(Regd. No.11612101), hereby declare that this thesis report entitled **“PARTIAL REPLACEMENT OF FINE AGGREGATES OF CONCRETE BY COCONUT SHELL POWDER AND CEMENT BY RHA”** submitted in the partial fulfilment 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:
kumar

Ratandeep

Place:

CERTIFICATE

Certified that this project report entitled “**PARTIAL REPLACEMENT OF FINE AGGREGATES OF CONCRETE BY COCONUT SHELL POWDER AND CEMENT BY RHA**” submitted by “**RATANDEEP KUMAR**” registration number 11612101 of Civil Engineering Department, Lovely Professional University, Phagwara, Punjab who carried out this project work under my supervision.

This report has not been submitted to any other university or institution for the award of any degree.

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ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my guide (Mr. Ashfaq malik),who gave me the golden opportunity to do this wonderful project on the topic(PARTIAL REPLACEMENT OF FINE AGGREGATE WITH COCONUT SHELL POWDER AND CEMENT WITH RHA),which also helped me in doing a lot of Research and I came to know about so many new things I am really thankfull to him .

Secondly i would like to thank my parents and friends who helped me a lot in finalizing this project within the limited time frame.

India is generally most broadly utilized concrete as development material to build up the Infrastructure like,highway,buildings,bridge,etc.but the natural segment of the solid are constrained. So there is have to find a reasonable substitution for the natural aggregates.coconut is the one of the materials which can supplant with the coarse and fine totals and availabilities of coconut in india is ideal,by utilizing the coconut shell powder we can lessen the transfer issues of the coconut squanders and additionally we can find the suitable swap for common segments.

Another hand india having not a decent measure of generation of cement,and RHA containing cementitious properties,so RHA can be a decent swap for bond.

ABSTRACT

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Chapter-1

Introduction

Concrete is generally most broadly utilized development material in India with yearly measure of utilized surpassing 100 million cubic meters. Concrete is the blend of coarse totals, fine totals, bond and water. Presently days there are shortage of regular asset is enormous issue. The measure of material of cement is constrained. So there is many waste material are utilized to supplant as a solid material. Coconut shells likewise one of the waste materials which can supplant as a totals in a solid for coarse total and additionally fine totals. So I am will utilize mostly supplant coconut shell powder with fine total in concrete. India is the third biggest maker of coconut on the planet. Every year generation of coconut is 21.89 billion nuts (2012-13). Coconut contributes more than Rs.10000 centers every year to GDP. Coconut shell (CS) which is the loss from coconut is having huge transfer issue. It is accessible in vast amounts all through the waterfront part of India. It speaks to over 60% of the aggregate waste volume. Bamgboye and Jekayinfa lamented that 90% of coconut was disposed of as waste and either consumed in the outside or left to settle in squander lakes. This strategy the coconut preparing ventures squander as indicated by him delivering fundamentally to CO₂ and methane outflows. The biggest accessibility of coconut shell makes it a reasonable and reliable option for total in concrete. This will have two preferred standpoint of waste administration and in addition contamination control.

In another hand ,Blended concrete is created by utilizing rice husk fiery debris for satisfying the expanding requirement for building material.Rice husk cinder is a profoundly responsive pozzolan. Rice husk fiery debris mostly utilized a substitution of silica rage or as an admixture in assembling of minimal effort concrete block.but it can be use as bond substitution in concrete.

1.2 History Of concrete With Coconut Shell Powder:-

The coconut shell is the containing the tones measure of waste material in India, world shrewd India is on third place for generation of coconut l.

Table 1: TOP FIVE COCONUT PRODUCER COUNTRIES

Sr. No.	Country	Coconut Production (Metric tons) Total	% of World
1	Indonesia	18,000,000 m/t	30.0%
2	Philippines	15,862,386 m/t	26.4%
3	India	10,560,000 m/t	17.0%
4	Brazil	2,888,532 m/t	4.8%
5	Sri Lanka	2,000,000 m/t	3.3%

As indicated by above given table India every year delivering a high measure of coconut , so its happen a high measure of coconut shell additionally, in earlier days individuals use to consume the coconut shell which containing the destructive figure which very affected our condition yet in the wake of beginning utilizing coconut shell in concrete the coconut squander is completely used now days its assistance to make solid light weight, conservative and it's likewise decrease the possibility of contamination happen because of consume the misuse of coconut shell .

1.3 Advantages and Disadvantages of cement With Coconut Shell Powder:-

Focal points:-

1. Light weight concrete than ordinary cement.
2. Reduce shot of natural contamination by consuming of coconut shell
3. Economical underway.
4. High compressive quality.
5. High split elasticity
6. High flexural quality.
7. Suitable swap for restricted characteristic assets of fine total

Hindrances:-

1. Non avabilities at all place

2. Some times its more exorbitant than typical FA.
3. Manufacturing and putting ought to be done precisely.

CHAPTER-2 REVIEW OF LITRATURE

2.1 Concrete With Coconut Shell Powder and RHA:-

India is the main third nation of creation coconut in high sum on the planet, so the misuse of coconut is the most serious issue for India which is accessible in high sum, the transfer procedure of this waste can deliver high contamination in our environment.so utilization of coconut shell powder in cement can lessen the transfer work and diminish the contamination which can happen amid transfer work of coconut shell, as indicated by old audit coconut shell can enhance the different property of show it can make solid light weight, it can enhance compressive quality, split elasticity in utilizing as a part of different shape.

B. Damodhara Reddy et al., (2014)[1], In this exploration ,normal coarse totals are supplanted by the coconut shell. In this trial considered four sorts of test by supplanting 25%, half, 75% and 100%. Each kind of test content deferent properties when its supplant by 25%. It create properties equivalent to ostensible blend however when supplant by 50 % its substance lightweight properties and it can be utilized as a part of casing structures as a filler material in encircled structures, flooring tiles, warm protecting cement.

Kalyanapu Venkateswara Rao et al. (2015)[2]

In this trial ponder is done on the properties of the coconut shell concrete by lead the different trial for typical cement and by supplanting the different measure of coconut shell and after that look at the all outcome for various measure of test supplanted the properties are said beneath in table

Table 2: CONDUCTED CONCRETE TEST RESULTS

S.N.	Compressive Strength, MPa			Split Tensile Strength, MPa			Water Absorption(%)	Permeable void (%)	Sorpitivity (mm/sec ^{1/2})
	3	7	28	3	7	28			
days	3	7	28	3	7	28			

1	15.1	23.4	37.3	1.7	2.5	3.7	0.431	9.67	0.124
2	14.7	24.9	38.1	1.74	2.52	3.6	0.51	8.45	0.126
3	14.9	23.9	37.1	1.79	2.9	3.7	0.45	8.92	0.123

Table 3: 10% REPLACEMENT OF CS AS COARSE AGGREGATE

S.N.	Compressive Strength, MPa			Split Tensile Strength, MPa			Water Absorption(%)	Permeable void (%)	Sorptivity (mm/sec ^{1/2})
	days	3	7	28	3	7			
1	16.6	26.67	36.7	1.45	2.31	3.6	2.43	10.7	0.134
2	16.83	27.43	37.0	1.40	2.2	3.5	2.43	13.42	0.135
3	17.10	27.14	36.8	1.43	2.27	3.4	2.429	11.29	0.133

Table 4: 20% REPLACEMENT OF CS AS COARSE AGGREGATE

S.N.	Compressive Strength, MPa			Split Tensile Strength, MPa			Water Absorption (%)	Permeable void (%)	Sorptivity (mm/sec ^{1/2})
	days	3	7	28	3	7			
1	17.34	25.01	34.7	1.32	1.96	3.5	4.22	13.71	0.156
2	18.02	25.42	34.9	1.28	1.98	3.2	4.45	13.72	0.163
3	18.47	24.78	32.8	1.33	2.34	3.33	4.6	13.25	0.159

In the wake of looking at ordinary solid properties and coconut shell concrete the conclusion is if the measure of coconut is increment in solid then compressive and tractable diminishing and water ingestion and penetrability is perfect..

Neetesh Kumaret et al., (2014)[3], In this exploration coconut shell powder is somewhat supplanted as fine total and afterward examination is improved the situation concrete,maximum rigidity is gotten at 20% CSP recorded. Rate of diminishing rigidity is roughly steady from 20% to 30% and from 30% to 40%. Flexural quality of CSP composites increments from 20 % to the 30 % of CSP filled. Flexural quality is least for the 40% and rate of decrement in quality for 30-40% is more prominent than rate of augmentation in flexural quality for the 20-

30%. The substance organization of coconut shell powder having Lignin (29.4%), Cellulose (26.6%), Pentosans (27.7%), Solvent Extractives (4.2%), Moisture (8%), Uronic Anhydrides (3.5%) and Ash (0.6%).The coconut shells gathered from neighborhood assets were pounded into little pieces physically by utilizing hammer. At that point little pieces changed over into powder by same strategy. The

gathered powder was then sieved to various strainer sizes. Mechanical properties of coconut shell powder epoxy tar are significantly influenced by the how much volume filled by coconut shell powder. Tests gave are on the 20 %, 30 %, 40 % coconut shell powder filled, from thickness perspective it is watched that thickness of 20% CSP filled is not as much as the other filled. When we go from 20% to 30 % thickness bend increments step by step and when it goes to 40% from 30%, it builds more quickly than other so from 30-40% rate of increment in thickness is most extreme.

Amarnath Yerramala et al.,(2012),[4] In this exploration, The new state execution of the CS cements was similar with control concrete. The cements had low droop the droop estimations of the cements were between 20-26mm. The droop diminished with increment in CS rate ,

the compressive qualities of the considerable number of cements for 1, 7 and 28 days of curing. The quality of the considerable number of cements expanded with curing age. Control concrete picked up 31 percent and 50 percent over its 28 day compressive quality at one day and 7 days of curing individually. Quality of the CS cements expanded 24-42 percent at one day and 38-84 percent following 7 days of curing than its relating 28 day qualities individually. This perception recommends that as CS rate expanded the 7 day quality pick up likewise

expanded with comparing 28 day curing quality. The CS cements, particularly 15 % (M3) and 20% (M4) substitution level the cements neglected to keep up same quality pick up, which had initial 7 days of curing. The split rigidities of the cements were between 0.8 - 1.4 MPa at 7 days of curing. The control solid (M1) achieved 32 percent of its 28 day split elasticity. The CS cements had higher quality improvement than control concrete at 7 days of curing when contrasted with comparing demoulded quality. Greatest quality pick up was for M3 concrete with 70 percent of its 28 day split rigidity almost same quality pick up was watched for M4 concrete.

Alif Syazani Leman et al.,(2016),[5] In this exploration ponder done is..coconut shell powder as a filler included inside the solid will enhance the properties of cement. The testing were leading by sieving the coconut shell powder utilizing the strainer measure 10mm, 5.0mm, 2.36mm, 1.18mm, 600 m, 300 m, 150 m and dish.

Figure 1 demonstrates the information acquired and were contrasted and sand. higher level of component that can be seen are Carbon and Potassium Oxide which is 10.00% and 1.21% separately. Other component that are contained inside coconut shell powder were under 1.00%. coconut shell powder comprises of molecule measurement which is 600 m and beneath. The majority of the molecule is under 150 m which regards be utilized as filler.

Figure 1: Particle Size Distribution Of Coconut Shell Powder Compared With Sand

Kalyanapu Venkateswara Rao et al.,(2015)[6],In this research,the work done is, The measure of from work received for solid fledgling was 150x150x150mm. The solid was Mixed with different segment in their individual rate, put and compacted in three layers after legitimate blending by hand. The specimens were remolded following 24 hours and kept in a curing tank for 3, 7 and 28 days as required. For the compressive quality test, a stacking rate of 2.5 kN/s was connected according to Seems to be: 516– 1959. The test was led on 150mm 3D

shape examples at 3, 7 and 28 days. Each specimen was weighed before putting into the devastating machine to learn its thickness. Compressive quality = Crushing Load (kN)/Effective Area (mm²). The quality of the considerable number of cements expanded with curing age. Control concrete picked up 31 percent and 50 percent over its 28 day compressive quality at 3 days and 7 days of curing separately.

Table 6: sorts of solid blocks

S.N.	Type of Concrete Mix	No. of Cubes
1	M30 Grade	24
2	100% Coarse Aggregate	24
3	10% Coconut Shells + 90% Coarse Aggregate	24
4	20% Coconut Shells + 80% Coarse Aggregate	24
5	10% Coconut Shells + 10% Fly ash	24

Ajim S Shaikh et al.,(2015)[7],The normal dampness substance and water ingestion of smashed coconut shell was observed to be 4.20% and 24% individually. The coconut shell totals have higher water retention on account of higher porosity in its shell structure ,The particular gravity under SSD state of coconut shell and squashed rock was observed to be 1.05 and 2.82 respectively,The total effect esteem (AIV) and total pounding esteem (ACV) of coconut shell totals are much lower contrasted with pulverized stone total which demonstrates that this totals have great absorbance to shock,The new solid thickness and solidified solid thickness following 28 days (under SSD condition) utilizing coconut shell was observed to be in the scope of 1975-2110kg/m³ and 1880-1930kg/m³. The 28 days compressive quality of coconut shell concrete was observed to be 22.81 and 21.80 for 25% and half substitution by coconut shell

total under full water curing and it fulfills the necessity for auxiliary lightweight cement.

Jacob Oyeniya AFOLAYAN et al.,(2015)[8] The investigation of the properties of coconut shell total cement has been helped out through experimentations, examination and talks of the appropriateness of coconut shell total. Accordingly from the trial comes about coconut shell has great potential as coarse total in lightweight concrete and additionally an incomplete substitution of traditional coarse total in concrete. Along these lines, in view of examination the accompanying conclusion can be drawn:

I. The compressive quality of the coconut total solid shows affectability to the measure of coco nut total utilized. The solid 3D shapes created from 16mm total size gave high compressive quality contrasted and that of 10mm and 12mm separately.

ii. The compressive quality of coconut shell total cement at 28 day test was 16N/mm² which fulfilled the necessity of lightweight cement.

iii. The coconut shell total cement has a thickness going from 1542 Kg/m³ to 1782Kg/m³ which is inside the lightweight solid thickness as indicated Appendix XI

iv. In all cases the thickness of the solid created diminished with increment in the rate supplanting of customary coarse total with coconut shell total as appeared in Appendix XI.(e, f, g, h and j)

v. Concrete with 25% to half coconut shell incorporation can at present give the base 28-day 3D square quality estimations of 23N/mm² and 20 N/mm² expected for solid blend 1:2:4 separately.

Tomas U. Ganiron Jr et al.,(2013),[9] During,This early examination found that expansion of coconut shell as spartial total substitution lessens the solid workability inferable from its shape and rougher surface. In any case, it is fascinating to take note of that substitution of normal coarse total by coconut shell brought about the expansion of compressive quality contrasted with traditional solid blend. By the by, combination of a lot of coconut shell produces harsher blend which makes challenges create thick solid in this way upsets the quality execution.

Chandu Gummadi et al.,(2016),[10] In this research,The result got from CSA,SF and OPC blend demonstrates that the normal thickness diminish with rate swap for 0% is 2025.5 kg/m³ for 35% substitution is 2359.12kg/m³,the compressive quality and elasticity is diminish with the expansion in level of OPC with CFA

and SF, the ideal 28 days quality for OPC, CSA, SF blend is recorded at 20% substitution 25.44 N/mm², and rigidity is 3.531 N/mm².

N Kaarthik Krishna¹, S Sandeep¹, K M Mini² According to this exploration, The present work investigates the appropriateness of utilizing Rice husk cinder as a substitution of bond in part. The appropriateness of rice husk fiery remains as a cementitious material was surveyed by leading the physio-substance investigation of the fixings and the impact of RHA on solid properties (new state and solidified state). From the synthetic investigation directed on RHA it was discovered that it contains almost 80% silica. To survey the new stage properties, the workability esteems as far as Slump (mm), Vee – Bee Degrees (sec.) and compaction factor for fluctuating RHA level of solid blend at a temperature of 320 C were done and the outcomes were examined. Solidified properties like compressive quality, split elasticity and flexural quality properties were assessed. To check the effectiveness of test regarding water retention, a water assimilation contemplate was led. From the exploratory examination it was discovered that ideal substitution of Rice Husk powder in bond was close to 10% as far as workability and quality. The utilization of Rice husk fiery remains in concrete as a substitution for bond can diminish the emanation of green-house gasses to a bigger degree which naturally expands the likelihood for increasing more number of carbon credits.

SSNigeria, According to this research, From the examinations completed, the accompanying conclusions can be made: The ideal expansion of RHA as incomplete trade for bond is in the range 0-20%. The compacting factor estimations of the solid decreased as the level of RHA expanded. The Bulk Densities of cement lessened as the rate RHA substitution increased. The Compressive Strengths of cement decreased as the rate RHA substitution expanded.

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Concurring Improvement in Fresh Concrete Properties:-

Because of expansion of rice Husk powder, concrete ends up plainly strong and more plastic and along these lines licenses simpler putting and completing of concrete, It likewise expands workability of cement.

Expanded chloride and sulfate protection/mellow acids, Reduced warmth of hydration – prompting negligible split arrangement in higher evaluations of concrete, The mass thickness of RHA concrete is lessening with increment in RHA content, Due to expansion of RHA it is watched that early quality pick up is marginally expanding with expansion of 05%, 7.5%, 10.5% and 15% RHA in typical cement at 7 days, But in 28 days tests comes about it is discovered that with expansion of 12.5% RHA in ordinary solid quality is running parallel or

more than of ordinary cement. In this way 12.5% RHA is the ideal substance for getting about equivalent quality at 28 days, As the substitution of bond by RHA in solid builds, the workability of solid increase, Replacement of bond with Rice Husk Ash prompts increment in the compressive quality enhances the workability and accomplished the objective quality at 12.5% swap for the review of concrete, the compressive and elasticity RHA Concrete is like the customary solid, Thus RHA concrete perform great condition perspective.

Ade Sri Wahyuni et al. [2] completed an exploratory research on the execution of cement with rice husk powder, ocean shell slag and bamboo fiber expansion. The point of that examination was to explore the elasticity of cement with 0.50% expansion of bamboo fiber in light of concrete weight. To build the quality of cement, the blend of rice husk fiery debris (RHA) and ocean shell powder (SSA) was utilized as incomplete substitution of fine total. Their supplanted was separated into four distinct rates in particular 10%, 20%, 30% and 40% in view of the heaviness of fine total. The exploratory work comprised of throwing 13 unique sorts of cement to be thought about in term of part elasticity at 28 years old and 90 days. All in all, the rigidity of bamboo fiber strengthened cement is tantamount to that of Normal Concrete. It was clear from the diagram that the elasticity of 20% supplanted by RHA was higher than that of ordinary cement by age of 28 days.

M. Jamil et al. [11] tentatively concentrated the Pozzolanic commitment of rice husk slag in cementitious framework. Substitution rates of RHA utilized as a part of different past examinations were picked self-assertively like 5%, 10%, 20% et cetera to decide the aggregate impact of RHA. However, the one of a kind filler impact or pozzolanic impact of RHA in cementitious framework was yet to be researched completely by established researchers. The investigation was completed to locate the most extreme pozzolanic (concoction) commitment of RHA in cementitious framework regarding substitution rate. The assurance was investigative and in view of the hydration response of concrete and the pozzolanic response of RHA with the hydration item. They accomplished 42.5N/mm² compressive quality at 20% Replacement contrasted with 37.1 N/mm² Compressive quality of ordinary cement.

S.N. Raman et al. [17] did a trial inquire about on high-quality rice husk cinder concrete consolidating quarry tidy as a halfway substitute for sand. The trial work attempted to assess the appropriateness of quarry tidy as a halfway substitute for sand in high-quality cement (HSC) containing rice husk fiery debris (RHA). Two evaluations of HSC blends, to accomplish 60 MPa and 70 MPa at 28 days, were composed with and without the fuse of RHA. Quarry clean was then utilized as a part of the blends containing RHA as a fractional substitute for sand, in amounts extending from 10% to 40%. They accomplished compressive quality higher at 10% substitution contrasted with compressive quality of typical cement. Essentially, 10% RHA was utilized to supplanted the bond in the rest of the blends with blends contains quarry clean as a trade for sand at 10%, 20%, 30%

and 40% separately diminish the compressive quality at that point utilize just RHA.

Divy chopra[7] tentatively learned about Strength, porousness and microstructure of self-compacting concrete containing rice husk fiery debris. Self-compacting concrete (SCC) was described by deformability and isolation protection. It streams under its own weight while staying homogeneous in sythesis. The impact of supplanted concrete substance with rice husk powder (RHA) as supplementary cementitious materials (SCM's) in SCC and watching new stream (droop stream, V-Funnel, U-box, L-Flow), mechanical quality (compressive and split pliable) and toughness properties (porosity and fast chloride porousness test) at 7, 28 and 56 d. Solid examples were set up with 0,10, 15 and 20% RHA supplant bond. 20% RHA supplanted indicated least determined workability. An expansion of around 25% quality at 7 d, 33% at 28 d and 36% at 56 d was seen with RHA substance of 15% RHA when contrasted with control blend. Most extreme split elasticity was 3.8 N/mm² at 28 d and 4.0 N/mm² at 56 d for 15% RHA substitution. The incorporation of RHA as halfway supplanted to bond enhanced the quality properties and solidness properties that stayed inside limits up to 20% supplanted.

Hwang Chao-Lung et al. [8] did the exploration deal with impact of rice husk fiery debris on the quality and sturdiness attributes of cement. The work examined the impacts of including remaining rice husk fiery debris (RHA) from South Vietnam, created when consuming rice husk pellets in the heater, to concrete. To enhance pozzolanic reactivity, RHA was ground for 1 h.

Chapter-3 OBJECTIVE

- ☐ An sparing solid that is light weight and shows better workability
- ☐ Effective waste – retention from condition

ss CHAPTER 4

SCOPE

- Use for enhance workability of cement..
- the common totals are restricted and henceforth expensive so it can be a swap for them.
- coconut shell is concedering maxium measure of aggregate agreculture squander ,so we can reduce the loss and in addition contamination which can creat by coconut shell consuming.

Chapter-4 RESEARCH METHDOLOGY

- testing material
- mix design and calculations
- casting and curing
- testing
- analysis of result

Chapter-5 DISCUSSION

RESULT AND

SIEVE ANALYSIS OF COARSE AGGREGATE

Select sample = 5 kg
Used apparatus - sieve sets, tray, weight machine, sample of CA

SIEVE SIZE	WEIGHT RETAINED GRMS	IN	%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 correspond 20mm single size.

WATER ABSORPTION TEST OF COARSE AGGREGATE

SPECIFIC GRAVITY OF COARSE AGGREGATE

Select sample (W1) = 500 grms.

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

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:-

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

Result:-

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

Select sample (W1) = 500 grms.

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

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

Weight of water in pycnometer with CA ($W_4 = W_3 - W_2$) = 297 grms.

Weight of oven dry sample (W_5) = 495 grms.

Formula:-

$$\text{Water absorption} = (W_1 - W_5) / W_5 \%$$

Result:-

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

AGGREGATES IMPACT VALUE TEST OF CA

Initial sample weight (w_1) = 500 grms.

Number of stock applied for each layer = 25 stocks

Weight retained on 2.36 mm sieve (W_2) = 58.5 grms

Formula:-

$$\text{Impact value} = W_2 / W_1 \%$$

Results:-

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

LOSS ANGLES ABRASSION TEST OF CA

Weight of sample selected (W_1) = 5000 grms

Weight retained from 1.7 mm sieve (W_2) = 4420 grms

Number of rotation applied with 15 ball = 500 rotation

Formula:-

$$\text{Loss angles abrasions} = W_1 - W_2 / W_1$$

Results:-

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

AGGREGATE CRUSHING VALUE TEST

Weight of sample (W_1) = 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	% retained weight	% 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 found the sample laid in zone 3rd.

SPECIFIC GRAVITY OF FINE AGGREGATE

Select sample (W1) = 500 grms.

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

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

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

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

Formula:-

$$\text{Specific gravity} = \frac{W5}{W1} \times \frac{(W4 - W2)}{(W3 - W2)}$$

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:-

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

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

Standard consistency of cement =30%

SPECIFIC GRAVITY OF CEMENT

Description	Trial1	Trial2
1. Mass of empty bottle 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. Specific gravity of cement $S = \frac{W4(W3 - W1)}{(W4 + W3 - W5)(W2 - W1)}$	3.15	3.00

Mix calculations:

Volume of concrete = 1 m³

Volume of cement = mass of cement/sp. gravity of concrete *
(1/1000) = 0.111 m³

Volume of water = 0.140 m³

Volume of aggregates = 0.743 m³

Mass of CA = 0.743*0.56*2.74*1000 = 1140 KG

Mass of FA = 0.743*0.44*2.74*1000 = 896 KG

➤ STRENGTH OF COMPRESSION

Compressive quality of cement with supplanting of fine total with coconut shell powder is expanding with the expanding measure of coconut shell up to 20%,the most extreme compressive quality is established at the 20 % replacement.Compressive quality of cement with supplanting of Cement with RHA is expanding with the expanding measure of RHA up to 20%,the greatest compressive quality is established at the 20 % substitution.

➤ Strength of tensile

Part elasticity of cement with supplanting of fine total with coconut shell powder is expanding with the expanding measure of coconut shell up to 20%,the most extreme part rigidity is established at the 20 % replacement.strength of cement with supplanting of Cement with RHA is expanding with the expanding measure of RHA up to 20%,the greatest Splitting elasticity is established at the 20 % substitution.

CHAPTER 6

CONCLUSION

By investigation of different letrature audit ,and examination of test conveyed ,I get the coconut shell and RHA both are sutable substitution respectly for fine totals and cement,this will likewise most ideal approach to use the waste product,the 20% swap for both is giving most elevated quality for elastic and compressive quality.

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