

“A study on Waste Glass and Coconut shell based Concrete”

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Abstract— Concrete is the chief structural building material. Concrete manufacturing include utilization of fixings like bond, aggregates, water and admixtures. Among every one of the fixings, aggregates frame the significant part. More than 50000 billion tons of total are delivered every year on the planet. Utilization of natural aggregates in such a rate prompts a question about the safeguarding of natural total sources. What's more, operation related with aggregates extraction and preparing is the primary reasons for environmental concern. The most broadly utilized fine total for the making of concrete is the natural sand mined from the riverbeds. Nonetheless, the accessibility of stream sand for the planning of concrete is ending up plainly rare due to the exorbitant non-logical techniques for mining from the riverbeds, bringing down of water table, sinking of the scaffold docks, and so on are getting to be plainly normal. The present situation requests ID of substitute materials for the stream sand for making concrete. As of late in the environmental issues, confinements of neighborhood and natural get to or sources and transfer of waste material are increasing incredible significance. Today, it turns out to be more hard to locate a natural asset. Utilization of the waste materials not just aides in getting them used in bond, concrete and other development materials, additionally has various backhanded advantages, for example, lessening in land fill cost, sparing in vitality, and shielding condition from conceivable contamination impact. It likewise helps in decreasing the cost of concrete manufacturing. In light of this in the contemporary structural designing development, utilizing elective materials set up of natural total in concrete generation makes concrete as economical and environmentally cordial development material. In this exploration, the impact of coconut shell and waste glass as halfway substitution of coarse total on the properties of concrete was contemplated. The trademark properties of concrete, for example, compressive strength, water absorption of different blends were checked on in this work.

Keywords— Concrete, natural aggregates, environmental issues, cost of concrete manufacturing, compressive strength, water absorption.

I.INTRODUCTION

In a developing country like India a huge amount of industrial waste and agricultural waste is polluting the environmental. With a view to the above, this study aims at utilization of waste materials like coconut shell and waste glass in concrete construction industry for value added application i.e. waste management. Use of such waste materials not only helps in getting them utilized in cement, concrete and other construction materials, but also has numerous indirect benefits such as reduction in land fill cost, saving in energy, and protecting environment from possible pollution effect. It also helps in reducing the cost of concrete manufacturing. With increasing concern over the excessive exploitation of natural aggregates, synthetic lightweight aggregate produced from environmental waste is a viable new source of structural aggregate material. In addition use of such wastes can improve the properties of construction materials as well. Moreover, the production of cement and other concrete raw materials has increased dramatically over the past 80 years due to a continuous increase in demand for concrete. In view of this, the significance of this study is to show that the replacement of aggregates in concrete by coconut shells and waste glass leads to economy in the concrete utilization sector.



Fig.1 Coconut Shell



Fig.2 Coconut shell as aggregates

The use of such waste materials in concrete can be an important step towards sustainability of the construction industry by ensuring a scenario having less environmental impacts. Further we know pozzolanic materials like glass are materials of current use in concrete. Their main purpose is usually the mitigation of Alkali Silica Reaction (ASR), especially deleterious in concrete structures, which is achieved by the development of a faster pozzolanic reaction, conferring additional strength to mortars and concretes. Similarly Coconut shell being a hard and not easily degrade material if crushed to smaller size can be a potential material to partially substitute coarse aggregates in concrete. The concrete with ground coconut shell was found to be durable in terms of its resistance in water, acidic and alkaline surrounding.

II.LITERATURE SURVEY

In a creating nation like India an immense measure of mechanical waste and horticultural waste is dirtying the environmental. With a view to the over, this review goes for use of waste materials like coconut shell and waste glass in concrete development industry for esteem included application i.e. squander administration. Utilization of such waste materials not just aides in getting them used in bond, concrete and other development materials, additionally has various circuitous advantages, for example, decrease in land fill cost, sparing in vitality, and shielding condition from conceivable contamination impact. It additionally helps in decreasing the cost of concrete manufacturing. With expanding worry over the unnecessary abuse of natural aggregates, manufactured lightweight total delivered from environmental waste is a practical new wellspring of basic total material. Also utilization of such squanders can enhance the properties of development materials too. In addition, the creation of bond and other concrete crude materials has expanded drastically in the course of recent years because of a persistent increment sought after for concrete. In perspective of this, the noteworthiness of this review is to demonstrate that the substitution of aggregates in concrete by coconut shells and waste glass prompts economy in the concrete use segment. The utilization of such waste materials in concrete can be a vital stride towards supportability of the development business by guaranteeing a situation having less environmental effects. Facilitate we know pozzolanic materials like glass are materials of current use in concrete. Their fundamental reason for existing is typically the alleviation of Alkali Silica Reaction (ASR), particularly harmful in concrete structures, which is accomplished by the advancement of a quicker pozzolanic response, presenting extra strength to mortars and concretes. Likewise Coconut shell being a hard and not effectively debase material if pulverized to littler size can be a potential material to somewhat substitute coarse aggregates in concrete. The concrete with ground coconut shell was observed to be strong as far as its resistance in water, acidic and antacid encompassing.

III. PROBLEM DEFINITION

- 1) The main objective of the study is to use the waste materials (coconut shells and glass waste) in place of coarse aggregates.
- 2) Analysis of properties of Conventional concrete blocks with CS + WG Concrete block.
- 3) Also its impact on the economic growth of the construction industry and to explore the use of replaced materials.
- 4) Study on effect of change in percentage of coconut shells and waste glass (in combination) on properties of concrete will also be deemed as an important part of present experimental investigation.
- 5) To find economical solution for high coast aggregate material like sand and gravel and hence making concrete construction more sustainable.
- 6) To prepare lightweight concrete by using coconut shell and waste glass as course aggregate.
- 7) Utilization of waste glass in the concrete construction sector, hence eliminating the need of land fill disposal of this non-biodegradable waste.

IV. PROPOSED APPROACH

Material Required:

- 1) **Cement**- Portland cement cement of 53 grade conforming to Indian Standard IS:269-1976* was use throughout ordinary experimental program.
- 2) **Fine Aggregate** –Sand is naturally occurring granular material composed of finely divided rock and mineral particals .Normally fine aggregate is used for preparing concrete. Fine aggregate most of which passes 4.75 mm IS sieve is use. Naturally available from tapi river.
- 3) **Coarse Aggregate**-crushed hard basalt chips of maximum size 20mm were used in the concrete mixes.
- 4) **Water**-portable water confirming to IS456-2000 11 was used for casting and curing.
- 5) **Coconut Shell**-coconut shell is obtained from temple. They are sun dried for minimum 20 day before using and crushed manually. The size of coconut shell is 20 mm by using IS Sieved.
- 6) **Waste Glass**-waste glass is obtained from photo frame shop, glass shops; IT is crushed manually or mechanically. The size of waste glass particals is 20mm.



Fig.3 Actual Lab Work

Methodology:

Mix Design for M30 Grade Concrete

- 1) Grade of Concrete-M30
- 2) Method Use-Is Code Method
- 3) Target Mean Strength (Ft)=Fck+Ts+30+1.65*6=39.9n/Mm²
- 4) Water Cement Ratio=0.38
- 5) Compacting Factor=0.9

Table 1: Test on materials

	Material	Test	Result
1	Cement	A) Specific gravity	3.15
		B) Setting time 1)Initial setting time 2)Final setting time	50min 190min
		C) Fineness	2.7 %
2	Fine Aggregate	A) Specific gravity	2.63
		B) Water absorption	0.95%
		C) Fineness modulus	4.45
3	Coarse Aggregate	A) Specific gravity	2.6
		B) Water absorption	0.495%
		C) Fineness modulus	2.56
4	Coconut shell	A) Specific gravity	1.70
		B) Water absorption	2.23%
		C) Fineness modulus	6.48
5	Waste glass	A) Specific gravity	2.19
		B) Water absorption	0.39%
		C) Fineness modulus	2.36

V. RESULT ANALYSIS**Table 2: Conventional concrete test results**

Sr.No	Compressive strength			
	3 days	7 days	14 days	28 days
1	15.1	22.23	26.22	37.3
2	14.7	21.23	27.55	34.77
3	14.9	20.89	25.77	36.44

Table 3: 5% replacement of CS+WG AS Coarse aggregate

Sr.No	Compressive strength			
	3 days	7 days	14 days	28 days
1	12.2	20.23	24.12	36.22
2	13.4	19.18	25.55	33.18
3	13.6	19.20	23.18	34.17

Table 4 : 10% replacement of CS+WG AS Coarse aggregate

Sr.No	Compressive strength			
	3 days	7 days	14 days	28 days
1	9.18	15.80	19.89	30.18
2	9.28	16.28	20.18	29.20
3	10.20	17.88	19.88	29.80

Table 5: 15% replacement of CS+WG AS Coarse aggregate

Sr.No	Compressive strength			
	3 days	7 days	14 days	28 days
1	10.18	18.89	21.22	33.89
2	11.20	17.22	22.32	32.33
3	10.90	17.30	21.42	33.18

VI. CONCLUSION

In the contemporary structural building development, economy of any development extend relies on its development, headway and supportability. Utilizing elective material set up of natural total in concrete generation makes concrete as supportable and environmental well disposed development material. Utilization of strong can accomplish economy in development. This review reasoned that utilization of coconut shell and waste glass in concrete not just aides in getting them used in concrete additionally has backhanded advantages, for example, diminishment in land fill cost and shielding condition from conceivable contamination impact. The review presumed that the utilization of coconut shell and waste glass up to 5 and 10% substitution of total gives the better outcome or close about strength contrast with traditional concrete piece. By utilizing the coconut shell and waste glass in concrete as substitution of total, The concrete is light weight. The cost of total is high as analyze waste glass and coconut shell. In future, we can expand strength of coconut shell and waste glass concrete by including admixtures.

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