International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.01, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

PARTIAL REPLACEMENT OF COARSE AGGREGATE WITH COCONUT SHELL: REVIEW

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ABSTRACT

The high cost of traditional development material influences economy of structure. With expanding worry over the exorbitant misuse of natural aggregates, manufactured lightweight aggregate delivered from natural waste is a suitable new wellspring of structural aggregatematerial. The employments of basic review lightweight concretelessensignificantly the self-load of a structure and allow bigger precast units to be taken care of. As of late in the ecological issues, confinements ofnearby and regular access or sources and transfer of waste material are increasing incredible significance. Today, it turns out to be more hard to discover a common asset. Utilization of the waste materials not just aides in getting them used in cement, concrete and other development materials, however additionally has various backhanded advantages, for example, diminishment in arrive fill cost, sparing in vitality, and shielding condition from conceivable contamination impact. It additionally helps in decreasing the cost of solid assembling. In the present work, coconut shell as partial substitution for coarse aggregate in concrete is considered. The solid with ground coconut shell was observed to be study as far as its protection in water, acidic, antacid and salty. Thickness of coconut shell is in the scope of 550 - 650 kg/m3 and these are inside as far as possible for lightweight aggregate. The characteristic properties of cement, for example, compressive strength, flexural strength, impact resistance, bond strength and split tensile strength utilizing the mix made by replacingcoarse replacement with squashed coconut shell aggregate were assessed in the present review.

Keyword:coarse aggregate,Coconut shell, light weight concrete.

I. INTRODUCTION

Framework advancement over the world made requests for constructionmaterial. Concrete is the head structural designing material. Concrete assembling includes utilization of ingredients like concrete, aggregate, water and admixtures. Among every one of the ingredients, aggregate frame the real parts. Two billion of aggregateare created every year in the United States. Generation is required to increment to additional than billion tons for every year by the year correspondingly; the utilization of the essential total was 110 million tons in the UK in year 1960 and came to almost 275 million tons by 2006. Utilization of natural aggregate in such a rate prompts

an inquiry about the protection of natural aggregate sources. What's more, activity related with aggregate extraction and handling is the central cause's ecological concern. In light of this in the contemporary structural building construction, utilizing elective materials set up of regular aggregate in solid generation makes concrete as reasonable and earth benevolent construction material.Concrete is the vital civil engineering material. Its manufacturing involves utilization of ingredients like cement, sand, aggregates, water and required admixtures. Demand of construction material is increased due to infrastructural development across the world. Now time has come to think of some alternative materials for sustainable use in concrete mix. Day by day mount and type of waste materials has increased accordingly creating environmental issues.Coconut is grown in more than 93 countries. South East Asia is regarded as the origin of coconut. India is the third largest, having cultivation on an area of about 1.78 million hectares.Coconut shell is one of the waste material can also be used as an aggregate in concrete due to some reasons like large scale cultivation of coconut in coastal region of India including Kerala, Andhra Pradesh, Goa, Kokan, etc. due to tough made tissue, shell is not decomposed easily and remain as solid waste for years.

Coconut shell being a hard and not effortlessly debase material if squashed to size of sand can be a potential material to substitute sand. At exhibit, coconut shell has too been singed to create charcoal and actuated carbon for food and carbonated drink and filtering mineral water use. Nonetheless, the coconut shell is still under used in a few places. The chemicalsynthesis of the coconut shell is like wood. It contains 33.61% cellulose, 36.51% lignin, 29.27% and cinder at 0.61%.

II.OBJECTIVE

- To find economical solution for high cost construction material.

III.LITERATURE REVIEW

J.P. RIES (2011) studied that Lightweight aggregate (LWA) plays important role intoday's move towards sustainable concrete, Lightweight aggregates contributes to sustainable development by lowering transportation requirements, optimizing structural efficiency that results in a reduction in the amount of overall building material being used, conserving energy, Reducing labor demands and increasing the survive life of structural concrete.

AMARNATH YERRMALLA (2012) et al studied the strength of coconut shells(CS) replacement and different and study the transport properties of concrete with CS as coarse aggregate replacement. They concluded that

a. Increase in CS percentage decreased densities of the concrete.

b. With CS percentage increased the 7 days strength gain also increased with corresponding 28 days curing strength.

VISHWAS P. KULKARNI (2013) studied that Aggregates provide volume at low cost, comprising 66 percent to 78 percent of the concrete. Conventional coarse aggregate namely gravel and fine aggregate is sand in

concrete will be used as control. While natural material is coconut shell as course aggregate will be investigate to replace the aggregate in concrete.

Lightweight concrete is typically made by incorporating natural or synthetic lightweight aggregates or by entraining air into a concrete mixture. Coconut shell exhibits more resistance against crushing, impact and abrasion, compared to crushed granite aggregate. Coconut shell can be grouped under lightweight aggregate. There isno need to treat the coconut shell before use as an aggregate except for water absorption. Coconut shell is compatible with the cement. The 28-day air-dry densities of coconut shell aggregate concrete are less than 2000 kg/m3 and these are within the range of structural lightweight concrete. Coconut shell aggregate concrete satisfies the requirements of ASTM C 330.

IV.TESTING METHODOLOGY

Test is carried out for finding compressive strength by using following experimental procedure.

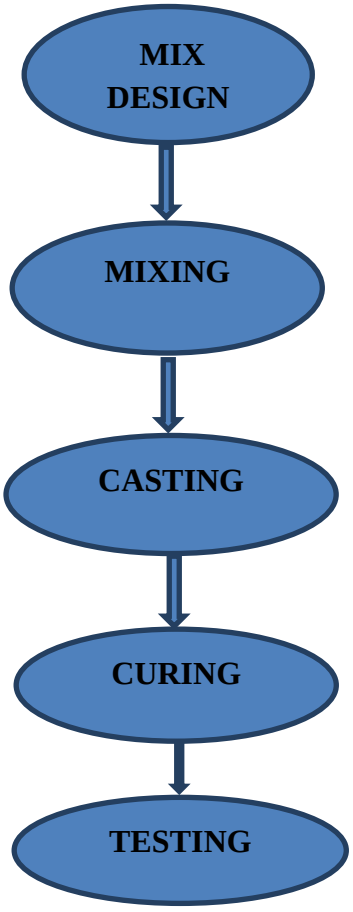

FIG.1: TESTING PROCEDURE

Cubes are cast with different percentage replacement of coarse aggregate with coconut shell such as 10%,20% and 30% replacement and test are performed on these cubes to find the behavior of cubes and its strength properties. Control cubes are also cast to find the difference between strength values of cubes with and without replacement. Beams are also cast to find the flexural properties of the specimen cast. The different tests are done on the beams specimen and like cube control beams are also cast to find the strength values differences.

FIG.2: COCONUT SHELLS BEFORE CUTTING

FIG.3 COCONUT SHELLS AFTER CUTTING

V.CONCLUSION

To expand the speed of development, improve green construction environment we can utilize lightweight concrete. The likelihood exists for the partial substitution of coarse aggregate with coconut shell to deliver lightweight concrete. Coconut shell shows more protection against crushing, impact and abrasion, contrasted with pulverized rock aggregate. Coconut shell can be assembled under lightweight aggregate. There is no compelling reason to treat the coconut shell before use as an aggregate aside from water retention. Coconut shell is good with the cement. The 28-day air-dry densities of coconut shell aggregate concrete are under 2000 kg/m^3. Coconut shell aggregateconcrete fulfills the necessities of ASTM C 330.

The studies show that overall cost of construction will reduced. The maximum compressive strength in control mix M20 is 21.28 N/mm^2 at 28 days, while the minimum strength at same days is 14.23 N/mm^2. Thus compressive strength decreased as percentage of coconut shell is increased. Therefore coconut shell can be used where light weight concrete is required. Proper bonding between coconut shell and cement is not possible because of surface area of coconut shell aggregate.In future, we can increase strength of coconut shell concrete by adding admixtures.

REFERENCE

[1] Adeyemi AY.,(1998) ,“ An investigation into the suitability of coconut shell as aggregates in concrete production” ,Journal of Environment, Design and Management.

[2] J. P. Ries, J. Speck, (2010), “Lightweight Aggregate Optimizes theSustainability of Concrete”, Concrete Sustainability Conference, NationalReady Mixed Concrete Association.

[3] Gunasekaran K, Kumar PS, (2008),“Developing lightweight concrete usingAgricultural and Industrial Solid Wastes”, Proceedings of Innovative World ofConcrete’08, 4th International Conference &Exhibition + ICI Silver Jubileecelebration.

[4] Vishwas P. Kulkarni, Sanjay kumar B. Gaikwad, “Comparative study on coconut shell aggregate withconventional concrete”, IJIET, Volume 2, Issue 12,June 2013, pp 67-70

[5] Amaranth Yerramala, Ramchandrudu C, “Properties of concrete with coconut shell as Aggregate replacement”, ISSN: 2278-7461, www.ijeijournal.com Volume 1, Issue 6 (October2012) PP: 21-31