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Replacing Fine Aggregate and Course Aggregate With Used of Coconut Shell and E-Waste in Precast Pannal Wall

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Abstract: Electronic waste or e-waste defines rejected electrical or electronic devices. Secondhand electronics which are destined for recover, resale, salvage, recycling, or disposal are also considered e-waste. Electronic waste is an emerging concern posing serious contamination problems to the human and the environment. E-waste disposal is a typical task for whole over the world. Utilization of E-waste materials is a partial solution to environmental and ecological problems. Due to large amount of concrete use as the construction material availability of raw material is being questioned. Therefore, other replacing materials are needed to be finding out. E-waste is used as one such alternative for aggregate in concrete.

Coconut trees are widely cultivated in the southern states of India, especially Kerala. Coconut shells as a concrete is gaining importance possible reduction of waste sustainable alternative for. The properties of concrete aggregate were investigated substitute for coarse aggregates in especially in this region in terms of products in the environment and finding a non-renewable natural stone aggregates. using crushed coconut shell as coarse in an experimental study. Coarse crushed coconut shells in three different and 100%. Workability, compressive splitting tensile strength of the above with normal concrete properties. The promote the use of coconut shell as coarse aggregates.

Keywords: E-Waste, Coconut shell, Cement (PPC).

1. INTRODUCTION

E-waste is a popular, informal name for electronic products nearing the end of their "useful life." Computers, televisions, VCRs, stereos, copiers, and fax machines are common electronic products. Many of these products can be reused, refurbished, or recycled. There has been an upgrade to this E-waste garbage list to include gadgets like smartphones, tablets, laptops, video game consoles, cameras, e-bikes, and many more. India had 1.012 billion active mobile connections in January 2018. Every year, this number is growing exponentially.

Coconut shell has sensible sturdiness characteristic, high toughness & abrasion resistant properties. Literature study shows 10% replacement is optimum.
The properties of coconut shell and coconut shell aggregate concrete are examined and the use of coconut shell aggregate in construction is tested. Moisture content and water absorption were 4.20% and 24% respectively and these values are more compared to conventional aggregate. Coconut shell exhibits more resistance against crushing.

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2. MATERIALS AND PROPERTIES

2.1 Materials

2.1 E-Waste

Waste Electrical and Electronic Equipment including all components, sub-assemblies. Electronic waste, consists of discarded old computers , TVs, refrigerators, radios basically any electrical or electronic appliance that has reached its end of life.

2.2 Coconut shell

Coconut shell has sensible sturdiness characteristic, high toughness & abrasion resistant properties.
Literature study shows 10% replacement is optimum.

2.3 Cement

Portland Pozzolana cement (PPC) of 43 grades was used in this project. The increasingly popular in the construction industry due to its advantages, including reduced labor costs, improved quality of finishes, and reduced noise pollution. It is responsible for binding the aggregate particles together.
There are variable grades of cement available in our market, for this study Portland Pozzolana Cement of grade 43 is used i.e. PPC 43.

2. 4 Water

This is the least expensive but most important ingredient of concrete. The quantity and quality of water is required to be looked in to very carefully. In practice very often great control on the properties of all other ingredients is exercised, but the control on the quality of the water is often neglected.

2.5 Fine aggregate

Fine aggregates are defined as the material that passes through a 4.75mm sieve and retained on a 75-micron sieve. They are commonly used in construction works as a filling material, bedding material, and in the production of concrete, mortar, and asphalt. The Indian Standard code IS 456:2000 gives the specifications for fine aggregates in construction works.

2.6 Sand

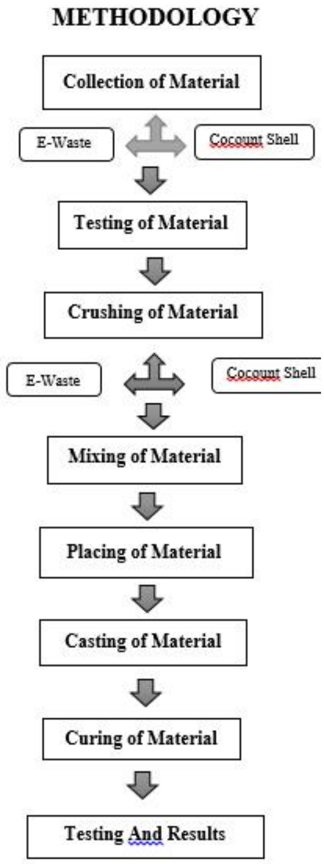
Sand is a granular material composed of finely divided mineral particles. Sand has various compositions but is defined by its grain size. Sand grains are smaller than gravel and coarser than silt. Sand can also refer to a textural class of soil or soil type.

Fig 1: Before Crushing of E -Waste

Fig 2: After Crushing of E-Waste

Fig 3: Before Crushing of Cocount Shell

Fig 4: After Crushing of Cocount Shell



3. METHODOLOGY

1. Collection of material: coconut shell, e- waste, cement, coarse aggregate, fine aggregate, and water are collected for preparing concrete..
2. Weighing and mixing process: Materials are weighed in proper ratio as per design and after then mixed in proper way.
3. Molding process: concrete mix (M20) is prepared with w/c ratio of
4. 0.6 and molded in cube sized 150*150*150 mm3 .
5. Removing of mould: After 24 hours, the moulds are removed 0.6.
6. Curing process: concrete cubes are cured in fresh water for 7 day and 14 days.
7. Testing process: After removing the moulds, concrete cubes are tested on compression testing machine. After
8. various test on cube, result are calculated. E- waste.
9. The material retained on 16 mm IS sieve was discarded.

4 Mix Design

M-20 grade of concrete was designed by I.S 456 (2000). The natural coarse aggregate were Replaced by coconut shell and E-waste in the percentage of 40%. The check results were analyzed and compared with theoretical values, obtained from numerous codes.

5 BATCHING AND MIXING

Weigh Batching was practiced with the assistance of electronic weigh balance. Batching was done as per the combination proportions. Mixing process was exhausted tilting mixer. It absolutely was mixed for 2-3 minutes, after addition of water.

6 PLACING AND COMPACTION

Cubes are clean and oiled to prevent the formation of bond between concrete and moulds. Place the fresh concrete in cubes in three layers, tamping each layer for 25 times. The entrapped air in concrete is removed by table vibrator. Something unbroken on the table gets vibrated.

7 CASTING

1st a layer of coarse aggregate were unfold on clean receptacle. Then the fibres were separated manually and unfold. Over the fibres fine aggregate were unfold and dry mixed foe two min.50% of the water was other first and mixed properly. Then by adding remaining water.

8 DEMOULDING

After placing fresh concrete in moulds, it absolutely was allowed to set for 24 hours. It absolutely was marked with some permanent identification mark i.e.A1, A2, A3, etc. Concrete cubes are currently unbroken in hardening tank for 7 and 14 days. concrete cubes were removed from hardening tank to conduct tests on hardened concrete.

Mix Design for M20 Grade

Volume of cube 0.15*0.15*0.15= 0.0037

Sr. No.	Materials	Calculation (Wt. of volume/Ratio)	Volume	Required material for 3 cube
1	Cement	(0.0052/1+1.5+3) $=9.454\times 10^4$	1440	$9.454\times 10^4\times 1440$ $= 1.361$ kg/m^3 $= 1.361\times 3$ $= 4.083$ kg /m^3
2	Sand	$9.454\times 10^4\times 1.5$ $=1.4181\times 10^3$	1602	$1.418\times 10^3\times 1602$ $= 2.271$ kg/m^3 $= 40/100\times 2.271$ $= 0.908$ $= 0.908\times 3= 2.725$ kg /m^3
3	E-waste	$9.454\times 10^4\times 1.5$ $=1.418\times 10^4$	2.69	$1.418\times 10^3\times 2.69$ $= 3.814\times 10^3$ kg/ m $= 40/100\times 3.814\times 10^3$ $= 1.525\times 10^3\times 3$ $= 4.576\times 10^3$ kg/m^3
4	Aggregate	$9.454\times 10^4\times 3$ $=2.836\times 10^3$	1240	$2.836\times 10^3\times 1240$ $= 3.516$ $= 40/100\times 3.516$ $= 1.406\times 3$ $= 4.218$ kg/m^3
5	Coconut shell	$9.454\times 10^4\times 3$ $= 2.836\times 10^3$	457	$2.836\times 10^3\times 457$ $= 1.296$

				= 40/100× 1.296 = 0.518× 3 = 1.55 kg/m^3

Water Quantity	(P/4)× 1/100 (Cement+e-waste +aggregate+coconut shell) = 4.183 lits.

4. RESULTS AND DISCUSSION

A concrete mix grade of M20 is aimed; the design mix proportion is obtained by Indian Standard method of mix design. The mix proportion obtained is 1:1.5:3 with w/c ratio 0.6. E-waste and coconut shell was added in amount of 40% .

9.1 Compression Strength of Conventional Concrete Cubes Cured in Water:

GRADES OF CONCRETE	COMPRESSIVE STRENGTH (N/mm^2)	
	7 Days	**14 Day**
M20	**4.36**	**7.78**

5. CONCLUSION

E-waste and coconut shell aggregate concrete may be an alternative to the conventional concrete. Increase in proportion of Replacement of coconut shell and e-waste reduces compressive Strength of concrete. Use of waste materials results in the formation of lightweight concrete. Use of such waste materials not only cuts down the cost of construction, but also contributes in safe disposal of waste materials.

Use of these E-waste and coconut shell aggregate in the new concrete reduces the environmental pollution as well as providing an economic value for the waste material. Usage of these waste aggregates can not only preserve the finite raw materials, but also reduce energy consumption and overall construction costs.

6. REFERNCE

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