

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

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Abstract: *Million tons of E-waste is being generated annually all over the world. But only 12.5% of e-waste is recycled and the remaining e-waste is landfill or burn. Once the electronic instruments becomes a waste it is disposed in landfills, which is harmful for nature and animals this is does not decompose in the environment. E-waste is principally composed of fibreglass and copper. Use of e-waste in concrete as replacement of aggregate cement could be an important step toward development of sustainable (environmentally friendly, energy-efficient and economical) infrastructure systems. When e-waste is crush to small size particles, it is make a good bond with cement, e-waste is react with soil and it release a harmful substances like Lead, Cadmium, Chromium Such type of material are affect the soil productivity. In burning of e-waste release a harmful gases in the environment like carbon. For the solution for this problem we use a e-waste in Precast pannal to reduce the e-waste. Coconut shell is a natural waste which is thrown by people in anywhere so we use that in a precast wall as a course aggregate.*

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

1. INTRODUCTION

Electronic instruments are use in our daily life from morning to sleep, now a days electronic instruments demand is still increasing in very heigh rate. as of today annual production of the electronic is worldwide estimate is reach a value of USD \$124.94 billion by 2030. unit and the demand. Is the rise considerably in every year. We generate around 40 million tons of electronic waste every year, worldwide. That's like throwing 800 laptops every second. From which only 12.5% is recovered and the rest often end up landfill. Ewaste is psolid material and also a non-degradable component in which provides the hazardous properties to the landfill. We live in an era of technology, so electronic waste is a concern. The constant need for the most recent high-tech products has also become one thing contributing to a large amount of waste in the world today. electronic waste.

E-waste is a term used to cover various forms of electrical and electronic equipment. Whether a new or an old item, it's still trashing if the owner doesn't use it for other uses.

This has even become a global pandemic, mainly because of the use that increases the toxicity over time. Both human health and the environment are at risk, so each category of waste like this needs to be handled immediately.

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

Cement may be a binder, a substance utilized in construction that sets and hardens and may bind different materials along. The foremost vital forms of cement are used as an element within the production of mortar in masonry, and of concrete, that may be a combination of cement and a mixture to create a robust building material.

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

Water is used for making and curing concrete should be free from injurious substances such as acid, oil, alkali, sugar, organic materials or other elements deleterious to concrete .Portable water is suitable for making concrete.

2.5 Fine aggregate

Fine aggregate is the inert or chemically inactive material, most of which passes through 4.75 mm IS sieve and contains not more than 5 % coarse material. Fine aggregate used in concrete have the function of a filler material which fills the voids in concrete generated by coarse aggregate. The filler material used in Natural River sand which is passing in 2.36mm sieve.

2.6 Sand

- It should be free from hygroscopic.
- It should have coars , angular,hard and sharp grains.
- It should not contain organic matter.
- It should be strong and durable.
- It should be chemically.

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 0.6 and molded in cube sized 150*150*150 mm³ .
4. Removing of mould: After 24 hours, the moulds are removed 0.6.
5. Curing process: concrete cubes are cured in fresh water for 7 day .
6. Testing process: After removing the moulds, concrete cubes are tested on compression testing machine. After
7. various test on cube, result are calculated. E- waste.
8. The material retained on 16 mm IS sieve was discarded.

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 20% . The check results were analyzed and compared with theoretical values, obtained from numerous codes.

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.

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.

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.

MIX DESIGN FOR M20 GRADE

Volume of cube $0.15 \times 0.15 \times 0.15 = 0.0037$

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	$9.454 \times 10^4 \times 1440$ $= 1.361 \text{ kg/m}^3$ $= 1.361 \times 3$ $= 4.083 \text{ kg /m}^3$
2	Sand	$9.454 \times 10^4 \times 1.5$ $= 1.4181 \times 10^3$	1602	$1.418 \times 10^3 \times 1602$ $= 2.271 \text{ kg/m}^3$ $= 20/100 \times 2.271$ $= 0.454$ $= 0.454 \times 3$ $= 1.362 \text{ kg /m}^3$
3	E-waste	$9.454 \times 10^4 \times 1.5$ $= 1.418 \times 10^4$ $= 3.814 \times 2.69$ $= 3$	2.69	$20/100 \times 3.814$ $= 0.762$ $= 0.762 \times 3$ $= 2.286 \text{ kg/m}^3$
4	Aggregate	$9.454 \times 10^4 \times 3$ $= 2.836 \times 10^3$	1240	$2.836 \times 10^3 \times 1240$ $= 3.516$ $= 20/100 \times 3.516$ $= 0.7032 \times 3$ $= 2.109 \text{ kg/m}^3$
5	Coconut shell	$9.454 \times 10^4 \times 3$ $= 2.836 \times 10^3$	457	$2.836 \times 10^3 \times 457$ $= 1.296$ $= 20/100 \times 1.296$ $= 0.259 \times 3$ $= 0.259 \text{ kg/m}^3$

Water Quantity	$(P/4) \times 1/100$ (Cement+e-waste +aggregate+coconut shell) $= 1.927 \text{ lits.}$
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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 day . Once twenty eight days, concrete cubes were removed from hardening tank to conduct tests on hardened concrete

4. RESULTS AND DISCUSSION

Compressive Strength Test Of 7 Days

Dimension: -150mm x 150mm x 150mm

Grade of concrete M20 : 7 Day = 5.33 N/mm²

The tested results of the samples containing e-waste, coconut shell at the respective rate of 20% with the dimension of Block 150×150×150mm. The compressive strength of the concrete block is done to find the amount of stress that the block can withstand their respective area cross section by using the universal testing machine.



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 20% .

Promoting awareness among consumers and builders about the benefits of using eco-friendly construction materials and incentivizing their adoption through green building certifications or incentives and encourage them to use the e-waste and agriculture waste in construction.

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.

Permeable voids and water absorption will increase with increase in CS replacement. E-waste can be used to replace some of the aggregates in a concrete mixture. This contributes to reducing the unit weight of the concrete. This is useful in applications requiring non bearing lightweight concrete.

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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