EXPRIMENTAL INVESTIGATION ON CONCRETE BY USING E-WASTE PLASTIC (Remote, TV etc.,)

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Abstract:- *In this experimental work the behavior of shredded waste plastic in concrete was investigated. compressive strength and flexural strength of concrete with waste plastic has been found out. concrete is a building material made from mixture of gravel sand ,cement and water. The investigation was carried out to find the properties of concrete by using compression and flexural using M20 grade of concrete . The proportion for shredded waste plastic replacement is 0 to 8% ,where included in the mixing proportion by using different loading the investigation may be determine.For this three trial mixes with varying proportions of f e-waste has been chosen. We calculated the strength results of cubes, beams, cylinders at the age of 7days and 28 days.*

Keywords: *- Jute fibre, Compressive strength, Split tensile strength, Flexural strength.*

1.1 General

Electronic waste or e-waste describes discarded electrical or electronic devices. Used electronics which aredestined for reuse, resale, salvage, recycling or disposal are also considered as e-waste. Informal processing of electronic waste in developing countries may cause serious health and pollution problems, as these countries have limited regulatory oversight of e-waste processing. Electronic scrap components, may contain contaminants such as lead, cadmium, beryllium, or brominated flame retardants. Even in developed countries recycling and disposal of e-waste may involve significant risk to workers and communities and great care must be taken to avoid unsafe exposure in recycling operations and leaking of of materials such as heavy metals from landfills and incinerator ashes One of the new waste materials used in the concrete industry is the recycled e plastic. For solving the disposal of large amount of recycled plastic material, the reuse of plastic in concrete industry is considered as the most feasible application. Recycled plastic can be used as coarse aggregate in concrete. However it is important to underline that reusing of waste is not yet economical advantages, due to high cost of transport in these effect on the total costs of production .Moreover, it is important not to neglect other costs, directly referable to the kind of waste, due, in particular, to the need of measuring gas emission, during firing, and the presence of toxic and polluting elements.

1.2 Present study Execution:

In this present study, various materials are used to prepare the concrete mix. Mix proportion of this Study is 0.5:1:1.74:2.95.Three trial mixes with varying proportions of e-waste plastic had been used.

- Mix C0 = Cement + F.A+C.A
- Mix C1 =Cement+F.N+(C.A+2%e-waste)
- Mix C2 =Cement+F.N+(C.A+4%e-waste)
- Mix C3 =Cement+F.N+(C.A+6%e-waste)
- Mix C4 =Cement+F.N+(C.A+8%e-waste)

2. CONSTITUENT MATERIALS

2.1 Fine aggregate:

Sand is a normally happening granular material made out of finely isolated rock and mineral particles. It is characterized by size, being better than rock and coarser than residue. Sand can likewise allude to a textural class of soil or soil sort; i.e. a dirt containing more than 85% sand-sized particles. Set up of sand we can likewise utilize base fiery remains which can be a of sand up to a level of 20% substitution of sand gives a decent compressive quality.

2.2 Coarse aggregate:

Coarse aggregates are particles greater than 4.75mm, but generally range between 9.5mm to 37.5mm in diameter. They can either be from Primary, Secondary or Recycled sources. Primary, or 'virgin', aggregates are either Land- or Marine-Won. Gravel is a coarse marine-won aggregate; land-won coarse aggregates include gravel and crushed rock. Gravels constitute the majority of coarse aggregate used in concrete with crushed stone making up most of the remainder. Additionally where the coarse total ought to adjust to IS-383-1970.

2.3 Water :-

Water plays a major role in mixing of concrete. The amount of water is required about 20 to 25% of weight of cement is used. To get a good and proper workability of concrete, more water is used. The amount of water in concrete can controls the fresh and hardened concrete. For these reasons, the amount of water in concrete is important for constructabiliiy and service life. The water used for mixing and curing should free from injurious amounts of oils, acids, salts that may be harmful to concrete. Ph value of water should be more than 6.

2.4 E. Waste plastic : -

Melt processing of blended plastic from waste electrical and electronic equipment is method to facilitate mechanical recycling, and this might improve the recycling conditions and increase yhe amount of plastic being recycled. Used electronics which are destined for reuse, resale, salvage, recycling, or disposal of e-waste in development

3.1 Tests on Aggregates:
Coarse aggregate of 20mm is obtained by passing through 25mm and retained on 20mm IS sieve was taken at 60% of total coarse aggregate and 10mm is obtained by passing through 12.5mm and retained on 10mm IS sieve was taken at 40% of total coarse aggregate.
Fine aggregate is passing through 4.75mm sieve is tested as per IS: 2386 part-3. The properties of aggregates are listed below

3.1: Properties of aggregates

Properties	Fine Aggregates	coarse Aggregates
Specific gravity	2.56	2.66

3.2 Tests on Cement:

The cement is tested as per IS:431 (part-4)-1988 and properties are listed below

Table-3.2: properties of cement

Properties	Value
Specific gravity	3.15

3.3 Design Mix:

As per Indian standard codes Mix design is to be prepared for M20 concrete grade to get a target mean strength of 26.6 N/mm^2. Mix proportion of this study is 1:1.74:2.95:0.5

4.TESTS ON HARDENED CONCRETE:

In order to determine the workability of Normal concrete and jute fibre concrete, Tests on Hardened concrete was carried out as per IS:1199-1959.

4.1 Materials Used:

- Cement - OPC53 grade

- Sand (F. A) - passing through 4.75mm
- Coarse Aggregate - 20min and 10mm Sieve
- Water-cement ratio - 0.5
- Mix proportions - 0.5:1:1.74:2.95
- E-waste plastic - 2%,4%,6%,8%

4.2 Curing of specimens:

Resultant specimens are to be casted and curing process is to be done at the age of 7 days and 28 days.

4.3 Test of specimens:

The test on hardened concrete to be conducted and it described below.

4.3.1 Cube Compression Test:

Resultant samples are to be casted in a cube set of specimen's size of 150mm*150mm*150mm are used. The test is to be conducted on cubes with different ages of curing and figure shows below.

Figure-4.3.1:Compression Strength Samples Figure-4.3.2: Flexural Strength Samples Figure-4.3.3: Split Tensile Strength Samples

4.3.2 Flexural Strength Test :-

Resultant samples are to be casted in a cylinder set of specimen's size of 100mm*100mm*500mm are used. The test is to be conducted on cylinders with different ages of curing and figure shows below.

Resultant samples are to be casted in a cylinder set of specimen's size of 150mm*300mm are used. The test is to be conducted on cylinders with different ages of curing and figure shows below.

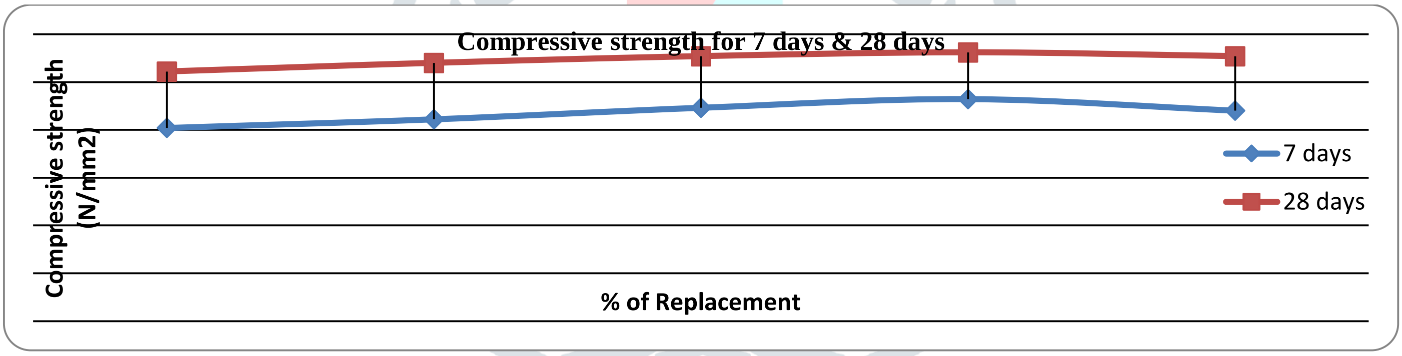
5.1. Concrete Cube Strength:

Specimens are to be tested at the age of 7 days, 28 days and their test results are to be tabulated in below table -1 and table -2 respectively.

Table -5.1: Compressive strength for 7 & 28 days

Mix	% of Replacement	Compressive strength (N/mm2)	
		7 days	28 days
C0	0	20.2	26.1
C1	2	21.1	27
C2	4	22.3	27.7
C3	6	23.2	28.1
C4	8	22	27.7

Graph-5.1: Compression Strength for 7 & 28days

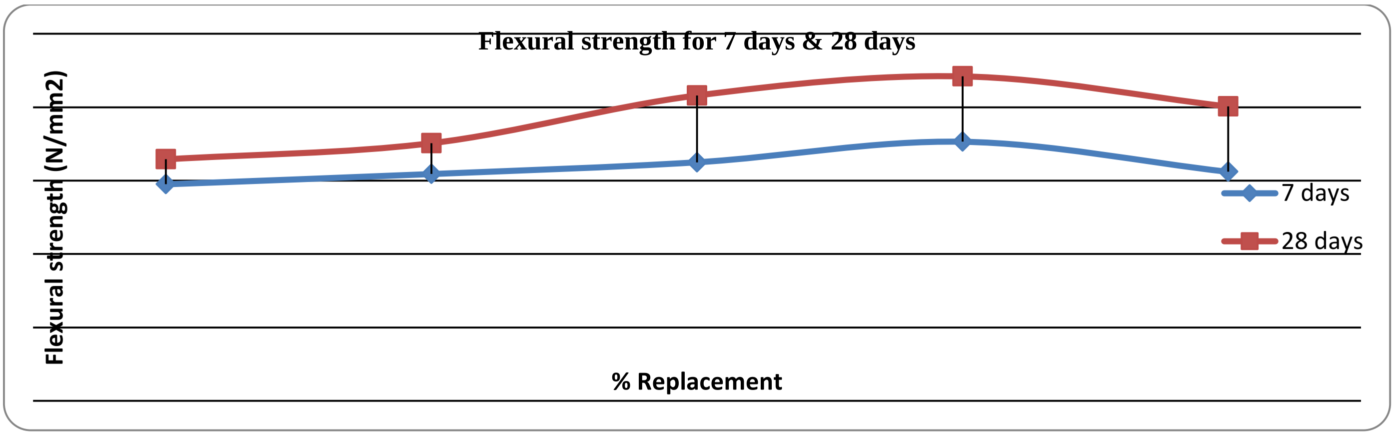


5.2 Flexural Strength:
Specimens are to be tested at the age of 7 days, 28 days and their test results are to be tabulated in below tabl-3 and table-4 respectively.

Table -5.2: Flexural Strength for 7& 28 days

Mix	% of Replacement	Flexural strength (N/mm2)	
		7 days	28 days
C0	0	2.95	3.29
C1	2	3.09	3.51
C2	4	3.25	4.16
C3	6	3.53	4.42
C4	8	3.12	4.01

Graph - 5.2: Flexural strength for 7 & 28days



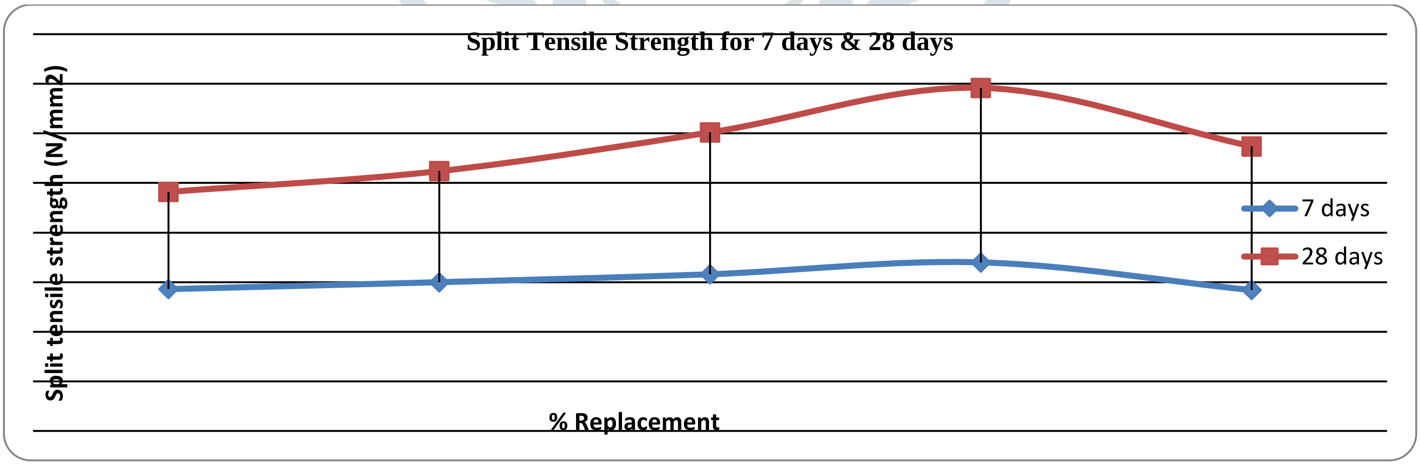
5.3: Split Tensile Strength

Specimens are to be tested at the age of 7 days, 28 days and their test results are to be tabulated in below table -1 and table -5 respectively.

Table 5.3:Split Tensile Strength Test For 7& 28 days:-

Mix	% of Replacement	Compressive strength (N/mm2)	
		7 days	28 days
C0	0	1.43	2.41
C1	2	1.51	2.62
C2	4	1.58	3.01
C3	6	1.7	3.46
C4	8	1.52	2.87

Graph - 5.3: Split tensile strength for 7 & 28 days



6. CONCLUSION

The following are the conclusions drawn from the study on e-waste shredded plastic coarse aggregate, the compressive strength of e-waste plastic concrete with 6% replacement is 28.1 N/mm2 on 28 days. In the flexural strength test and split tensile strength conducted on e-waste plastic concrete, it shows a increase in strength when compare to the strength of normal concrete. Now it is identified that the e-waste particles can be used as the construction materials.

7. REFERENCES

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