



An Experimental Review on Partial Replacement of Coconut Shell with Coarse aggregate and Coir fiber with Cement

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ABSTRACT:

concrete has been continuously used for infrastructural development due to which its demand as a construction material has increased. The depletion of the natural sand has been the major concern in the construction industry, and this makes the need of finding other alternative approaches for this problem. Considering that natural sand has to be saved for the future for sustainable development, there is a need of replacing this sand partially or fully with other suitable materials. Waste materials are also on an increase creating environmental problems, hence if they are incorporated into the concrete construction industry, it will reduce the environmental problems, thus helping in saving natural sand extraction. This paper focuses on using waste material with varying percentages of coconut shell as coarse aggregate. and then comparing the 3rd, 7th and 28th days compressive strength, respectively. The compressive strength of concrete replaced with 5 and 10% of crushed coconut shell as coarse aggregate and we also replace partial part of cement with coir fiber as 1% and 2% percentages and then comparing the 3rd, 7th and 28th day compressive strength, respectively.

Keywords: Solid Waste material, environmental problems ,coconut shell ,coir fiber , compressive strength .

Introduction:

The project work under Solid waste management. This project deals With management of a domestic waste as construction material. The waste Is used in manufacturing of cube as construction material, the project aims To experimental review on partial replacement of coconut shell as coarse Aggregate and coir fiber as cement.

There were many experimental works has been done to improve the Concrete's properties by using new material in a concrete mix, The Additional material can be replacing the aggregate or cement there are a Large amount of domestic waste was disposed in the world.

The coconut shell is inherently hard and does not easily deteriorate Once it is incorporated into concrete, so it does not contaminate or leach out Produce toxic substance. As the construction industry is rapidly growth in The world today the use of concrete increase because the concrete is the Widely used is structure material.

A higher demand involves the higher need for coarse aggregate. The Development of construction industry also would be considered as the Factors that cause the increase of waste production, hence some alternative Must be establish because of economic environmental and technological Benefit.

Methodology:

1. Proportions used:

Coconut shell and coir fiber collection:

- Collect the coconut shell and coir fiber from Shops and Minder.
- We are collected the coconut shell 10 kg and coir fiber 15 bags
- And crushed this coconut shells manually using rammer and burned The coir fiber.

2. Crushing of Coconut Shell

We crushed 10 kgs of coconut shell of size more than 4.75 mm that is coarse aggregate in our institute using rammer.

3. Burning of coir Fiber

We burn 15 bags of coir fiber until the coir fiber became the powder. In Our institute.

4. Working method of concrete block

- Proportion of materials
- Batching of materials
- Mixing of materials
- Casting
- Vibrating
- Finishing
- Demoulding
- Curing

Proportion of materials

We are making M25 grade of concrete for that we have used 1:1:2. Proportion. That is 1 part of cement 1 part of sand and 2 part of Aggregates. While replacing 5% ,10 % of coconut shell as aggregate and 1%, 2% of coir fiber as cement, that is for 1 cube the proportion of Material is as follows:

- Cement = 1730gm
- Sand or fine aggregate =1920 gm
- Coarse aggregate = 3460gm
- Water = 883 ml (w/c ratio =0.46)
- Coconut shell = 384 gm
- Coir fiber = 192gm

Mixing of materials

We have mixed these materials by hand mixing. First mixed dry without Adding water for getting homogeneous mixture of concrete, and then Adding three times of water the whole concrete is mixed thoroughly. Then the mixture is ready for filling in the mould.

.Casting

The moulds are first applied with oil on all inner sides of it using brush For getting smooth texture of concrete block after demoulding. Then the Mould is filled with concrete mixture in three layers with tamping each Layer at least 25 times to avoid voids. Thus, compacting is done in this Process.

Vibrating

The concrete filled mould then vibrated using table vibrated to remove Lumps and voids present in the concrete. Care should be taken that over-Vibration should not be allowed thus it results into honeycombing. During vibrating if the concrete gets required to fill the mould, then it Should be filled with same grade of concrete to completely filling of Mould.

Finishing

After vibration the mould should be finished by using trowel to get Smooth and uniform surface of concrete block after demoulding.

Demoulding.

The concrete block is demoulded after 24 hours after casting and then it Should be placed for curing.

Curing

The curing should be done for 3,14 and 28 days for getting accurate Results.

Compressive Strength

The compressive strength of the concrete cube test provides an idea about all the Characteristics of concrete. By this single test one judge that whether Concreting Has been done properly or not. Compressive strength of concrete depends on Many factors such as water-cement ratio, cement strength, quality of concrete Material, quality control during the production of concrete, etc. Compressive strength formula for any material is the load applied at the point of Failure to the cross-section area of the face on which load was applied. We have Taken compressive strength of cubes at the interval of 3,7 and 28 days.

Objective

- To determine the strength of while adding coir fiber and coconut shell.
- To determine the effect of coconut shell and coir fiber in concrete cube.
- To compare the result of normal and additional concrete.

Results

Compressive Strength

The compressive strength of the concrete cube test provides an idea about all the characteristics of concrete. By this single test one judge that whether Concreting has been done properly or not. Compressive strength of concrete depends on many factors such as water-cement ratio, cement strength, quality of concrete material, quality control during the production of concrete, etc. Compressive strength formula for any material is the load applied at the point of failure to the cross-section area of the face on which load was applied. We have taken compressive strength of cubes at the interval of 3,7 and 28 days.

Results of 28 days:

Proportion	Sample No	Size (mm ³)	Load (KN)	Compressive Strength (N/mm ²)	Average Compressive Strength (N/mm ²)
	1	150×150×150	630	28	
Normal concert	2	150×150×150	620	27.55	28.14
	3	150×150×150	650	28.88	
	1	150×150×150	600	26.66	
Case 1:Coconut Cube(C.S:5%,C.F:1%)	2	150×150×150	610	27.11	27.25
	3	150×150×150	630	28	
	1	150×150×150	610	27.11	
Case 2:Coconut Cube(C.S:10%,C.F:2%)	2	150×150×150	600	26.66	26.81
	3	150×150×150	600	26.66	

Conclusion

- The coconut shell is inherently hard and does not easily deteriorate, once it is incorporated in concrete, so it does not contaminate or leach out product Toxic substance.
- The experimental test result indicated that concrete with coconut shell and Coir fiber has improved toughness and flexural strength.
- The compressive strength of normal concrete after 28 days is 95% and the Compressive strength with coconut shell and coir fiber of case – 1 after 28 Days is 90% and for case – 2 is 85% .
- The compressive strength of normal concrete is 5 to 10 % greater than Concrete with coconut shell and coir fibre.
- But the coconut shell and coir fiber concrete have density less than 2000Kg/m³ so they have high weight. It can be reduced the material cost in Construction because at the low cost and it's availability is abundance.
- They exhibit more resistance against the crushing, impact and abrasion Compare to crushed granite aggregate.

□ We conclude that the slump and density of concrete with coconut shell and Coir fibre will reduced compared to the normal concrete.

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List all the material used from various sources for making this project proposal

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