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USE OF COCONUT FIBER CONCRETE

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Abstract *Rising rate of steel day by day is the main problem in construction of new building. As an alternate solution of this problem, I use coconut fiber in place of steel which is quite economical, easy available and have desirable strength. In this test we made a concrete block of 200x100x80mm in which coconut fiber is use. Coconut fiber were added in proportion of 0.1% , 0.2%, 0.3%, 0.4% and 0.5% in volume of concrete. The comperssive strength flexural strength and water absorption were determined at and of 7 and 28 days. The paper also shows the cost comparison per each block.*

Keywords- *Cocunut Fiber, Compressive Strength, Cost, Flexural Strength, Paver Block, Water Absorption.*

Introduction

As all we know that today price of steel is rising day by day because of which making a structure or we should say making even a small load bearing structure is quite difficult for a common man of our country.
For solution of this problem I try to use coconut fiber in place of steel to reduce cost of building.
Now I would like to spot some light on property of concrete, actually concrete is only able to absorb comperessive forces, it fail in tension forces. To make concrete able to absorb tension force be use reinforced concrete. I used coconut fiber as a alternate solution of steel. These type of block can be used in construction of street road, small & medium market road. Concrete block pavement will absorb stress such as small earthquakes, freezes and thaws, and slight ground erosion by flexing.

Literature Review

Coconut fibers were extracted from coconut seeds and chopped into 40 mm in length compressive strength a modulus of rupture of CFRC specimens were determined following standard procedures at curing ages of 7,21,28and 56 days. Also crack pattern was monitored
In the present investigation coconut fibers were added in the mis different proportions varying from 0.1% to 0.5% in the volume of concrete. The infulence of addition of these fibers in the top 20mm thickness was studied. By taking 0.3% as optimum dosage the influence of top layer thickness is also studied.

Material Specification

Oridinary portland cement (OPC) of grade 53 conforming to IS: 10262, fine aggregate with a maximum size of aggregate of 20mm was used. Semi grit is less than 9.5mm were used. Dolomite powder is one mineral with specific gravity of 2.84 to 2.86 were used. Coconut fiber of 10mm length and diameter of 0.01mm which produce from lofgren are used in the present study.

PHYSICAL TESTS ON MATERIALS:

Tests on cement:
Fineness of the cement = 92%
Specific gravity of cement sample = 3.05
Standard consistency of cement = 27%
Initial setting time of the cement sample = 45 min
Final setting time of the cement sample = 4 hrs 42 min

TEST ON AGGREGATES
Specific gravity of aggregate = 2.59
Water absorption of aggregate = 0.097%
Average crushing value of aggregate sample = 23.78%
Fineness Modulus = 293/100 = 2.93

TEST ON SEMI GRIT
Fineness Modulus = 314.8/100 = 3.148
Test on quarry dust: Fineness Modulus = 426.6/100 = 4.266

Mix proportion:
All the mixes prepared are corresponds to M-20 grade. For the design of mix IS: 10262-2009 & IS: 15658:2006 recommendations are adopted.

Mix Design Proportion for Top Layer

Sample	Cement	Pigment	Semi Grit
Top Layer	50Kg	4Kg	100 Kg
Ratio	1	0.08	2

Mix Design Proportion for Bottom Layer

Sample	Cement	Fine agg.	Quarry	Dolomite powder
Bottom Layer	50 Kg	50 Kg	175 Kg	150 Kg
Ratio	1	1	3.5	3

Experimental Methodology

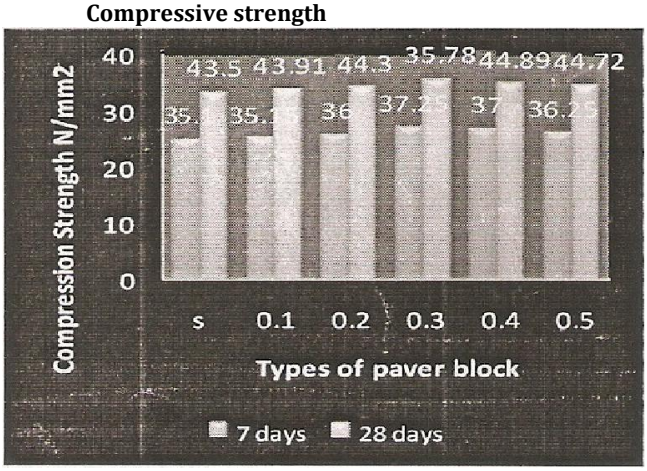
Paver block is made of cement, semi-grit, dolomite powder & pigment in the upper layer while bottom layer are made up of cement, fine agg. & quarry at the bottom layer.

Now in top layer 30mm coconut fiber is to be added to the concrete in proportions of 0.1%, 0.2%, 0.3%, 0.5% by weight of the concrete. At the time of casting water added only for the wet purpose of the mix.

After one day the specimen were placed at safe place and water curing till continued 28 days

EXPERIMENTAL RESULT

Compressive strength



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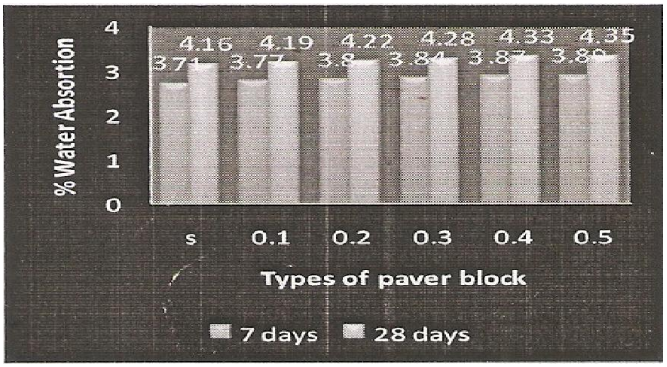
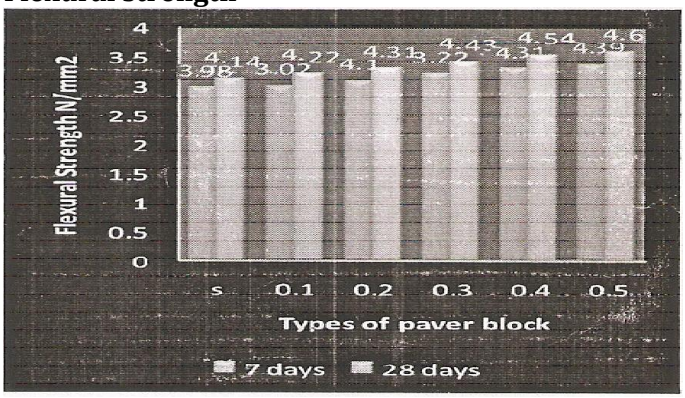
Water absorption



Flexural strength



COST COMPRASION ECONOMIC FEASIBILITY

1	Cement	5.80
2.	Semi Grit	0.60
3.	Dolomite Powder	1.40
4.	Fine Aggregate	0.80
5.	Quarry Dust	0.40
6.	Coconut Fiber	30

Cost of Each Paver Block with and without Fiber

Types of paver block	paver block	Cost of Each
1	S	7.77
2	CF (0.1 %)	7.82
3	CF (0.2 %)	7.88
4	CF (0.3 %)	7.93
5	CF (0.4 %)	7.99
6	CF (0.5 %)	8.04

	Types of Paver block	Cost of Each block (Rs)
1	CF (10mm)	7.95
2	CF (20mm)	7.93
3	CF (30mm)	7.91
4	CF (40mm)	7.89

CONCLUSION

From this study the following conclusion can be drawn:

1. Compressive Strength enhancement ranges from 1.30% to 7.0% when % of fiber increases from 0.1% to 0.3% when compared to the concrete paver block at 28 days.
2. By changing the top layer thickness from 10mm to 40mm the compressive strength increases gradually from 4.00% to 11.00% when compared to the concrete paver block at 28 days.
3. Flexural strength is significantly improving from 5.00% to 22.00% when compared to the concrete paver block at 28 days, as the top layer thickness is varied from 10mm to 40mm.
4. By changing the top layer thickness and using coconut fibres the properties of the paver block are improving significantly and also it is found to be economical

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