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Utilization of Coconut Fiber and Marble Slurry in Concrete

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***Abstract*- Concrete is a composite material made out of fine and coarse total reinforced along with liquid concrete that solidifies over the long run. Concrete is most ordinarily utilized man made material on the planet. It is form capable, versatile, moderately fireproof, for the most part accessible, and reasonable. Unfortunately, the production of Portland cement releases large amounts of carbon dioxide, into the atmosphere, which causes enormous impact on the environment. Worldwide, the cement industry alone is estimated to be responsible for about 7% of all CO2 generated. 1.25 tones of co2 is emitted for production of 1 tone cement. Simultaneously enormous measure of characteristic assets are needed to deliver huge loads of cement each year which causes over misuse of normal assets. Consequently, the development business is constrained to search for other financial and supportable substitutes.**

***Keywords*- Effective Microorganisms for Concrete (EMC); Effective Microorganisms (EM); Admixture; Concrete Technology.**

I. INTRODUCTION

Rajasthan is delivering over 80% of marble created in India. Marble industry assumes significant job in the economy of state yet the waste delivered from this industry is coming to fruition of significant danger to the climate. These squanders can be isolated in to two significant classifications for example quarrying waste and preparing waste. Around 45% marble is lost as corn meal, fines and slurry to get the completed item. Enormous region of land is needed to arrange these squanders. The marble slurry contain marble fine powder (approx. 30%) and water (approx. 70%). Marble slurry is fine in nature. Its molecule size changes from 300 micron to under 75 micron. Its particular gravity is minimal higher than the common sand. So it tends to be utilized as incomplete substitution of regular sand.

Since concrete is frail in flexure and pressure, most regularly it is strengthened utilizing steel bars, which is pricey. Numerous endeavors have been made to add various kinds of strands to make it tough, affordable and solid. Common fiber, for example, coconut fiber has certain mechanical and actual attributes that can be used successfully in the improvement of fortified solid material. Much of the time, these coconut strands are unloaded as agrarian waste, so can be effectively accessible in enormous amount henceforth making them cheap. By thinking about the properties of coconut fiber and marble slurry, these materials can be utilized in arrangement of cement.

Ongoing investigates have demonstrated that coconut fiber might be utilized in the creation of fortified cement. Likewise, marble slurry might be utilized as incomplete or full substitution of regular sand or around 10 to 15% substitution of concrete.

II. LITERATURE REVIEW

Coconut fiber and marble slurry have ecological contamination, impacts the environment and perilous to the living creatures whenever unloaded in open land. Subsequently shifts specialists attempted to use it in different application with the goal that this waste can go it to esteem added item. A concise audit of the work done by different specialists related with Coconut fiber and marble slurry is introduced here.

Kshitija Nadgouda learned about the coconut fiber fortified cement. In this investigation coconut fiber going from 3% to 7% by weight of concrete was included M20 concrete. Split tractable, flexural and compressive strength test was directed. The outcomes show that flexural strength increments when utilizing 3% coconut fiber however there is slight decrease in compressive strength with the expansion in coconut fiber. Creator further recommends utilizing admixtures.

V, sai et al contemplated strengthened cement with coconut strands. In this examination coconut fiber was added from 1% to 5% with a time period. Results shows that both compressive and elasticity increments at 1% coconut fiber.

III. RESEARCH OBJECTIVE

The objectives of my research are listed below:

- To study the physical, chemical, thermal, and micro structural properties of coconut fiber and marble powder to determine the compatibility.
- To analyze the fresh, mechanical and durability properties of concrete mixes designed with different mix proportions of constituent materials considered as conventional concrete, coconut fiber and marble slurry.

IV. RESEARCH METHODOLOGY

Methodology discussed here is the approach used to fulfill the objectives of the research mentioned earlier. To observe the behaviour of coconut fiber and marble slurry in concrete, following mixes are planned.

- CTRL
- CTRL with 0.5% Coconut fibre
- CTRL with 1.0% Coconut fibre
- CTRL with 1.50% Coconut fibre
- CTRL With 2.0% Coconut fibre
- Marble slurry 20.0 % + with no coconut fibre
- Marble slurry 20.0 % + with 0.5% coconut fibre
- Marble slurry 20.0 % + with 1.0% coconut fibre
- Marble slurry 20.0 % + with 1.5% coconut fibre

The proportion of constituent materials are decided by mix design of concrete for M30 grade concrete without any replacements. The following tests and experiments will be performed to obtain the results and assess the properties of concrete.

Table 1. Test for fresh concrete.

Test	Code
Workability	IS 1199
Fresh Density	IS 1199
Air content	IS 1199
Bleeding	ASTM C232

V. SIEVE ANALYSIS OF AGGREGATE

Aggregates were well graded and had been acquired from local sources. Proportioning was done carefully as in DoE method of mix design of concrete as it has a very crucial role in achieving desired slump as well as mechanical strength of the concrete mix. The table below shows test results of sieve analysis for fine aggregate (sand), 10mm and 20 mm coarse aggregate.

1. Fine Aggregate Grading:

Table 2. Sieve Analysis of Fine Aggregate (IS 383/2386).

Sieve size	Retained (gm.)			% Retained weight	Cumulative % Retained	Cumulative % Passing	Limit as per IS 383
	Sample 1	Sample 2	Average				
10 mm	0	0	0	0	0	100	100
4.75 mm	11	9	10	2	2	98	90-100
2.36 mm	26	24	25	5	7	93	75-100
1.18 mm	42	38	40	8	15	85	55-90
600 micron	151	159	155	31	46	54	35-59
300 micron	133	147	140	28	74	26	8-30
150 micron	103	97	100	20	94	6	0-10
PAN	32	28	30				

2. Compressive Strength after 7days:

The compressive strength test of concrete was determined after 7 days of casting on both grades of concrete of M30. The test results of the above test is shown in the table 4.13. Graphical representation of the same is represented.

Table 3. Days Compressive Strength for M-30.

S. No	Sample	Compressive Strength at 7 days (N/mm^2)	Avg. Compressive Strength (N/mm^2)	% Increase/ Decrease
1	M 30 (Control Mix)	19.64 19.56 19.67	19.62	0
2	MS	21.44 21.35 21.44	21.41	9

3	MS+CF.5	21.66 21.66 21.55	21.62	10

3. Compressive Strength after 14 days.

The compressive strength of concrete was carried out after 14 days of casting on both grades of concrete M30. The test result of the above test is shown in the table. Graphical representation of the same is represented in 4.3 and 4.4.

Table 4. 14 Days Compressive Strength for M-30.

S. No	Sample	Compressive Strength at 14 days (N/mm^2)	Avg. Compressive Strength (N/mm^2)	% Increase/ Decrease
1	M 30 (Control Mix)	20.44 24.52 24.44	23.13	0
2	MS	20 42.66 33.33	31.99	38
3	CF 0.5	33.33 32.88 32.88	33.03	43

4. Compressive Strength after 28 days:

The compressive strength of concrete was carried out after 14 days of casting on both grades of concrete M30. The test result of the above test is shown in the table and 4.18. Graphical representation of the same is represented in figure.

Table 5. 28 Days Compressive Strength for M-30.

S. No	Sample	Compressive Strength at 28 days (N/mm^2)	Avg. Compressive Strength (N/mm^2)	% Increase/Decrease
1	M 30	30.66 27.32 32.88	30.28	0
2	Marble slurry	35.55 37.33 36.44	36.44	21
3	MS + CF	38.22 37.77 38.00	37.99	26

Table 6. (Clause 4.3) Table 4 of IS: 383-1970.

(Clause 4.3)				
IS sieve	Percentage Passing For			
	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4.75 mm	90-100	90-100	90-100	95-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30-70	55-90	75-100	90-100
600 micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

5. Coarse Aggregate Grading(10mm):

Table 7. Sieve Analysis of 10 mm Aggregate.
(IS 383/2386)

Total weight/ Sample = 10000 gms						
Sieve size	Retained (gm.)			%Retained weight	Cumulative % Retained	Cumulative % Passing
	Sample 1	Sample 2	Average			
12.5 mm	0	0	0	0	0	100
10 mm	587	553	570	5.7	5.7	94.3

4.75 mm	8055	7586	7820	78.2	83.9	16.1
2.36 mm	1380	1300	1340	13.4	97.3	2.7
PAN	278	262	270	2.7	100	

6. Coarse Aggregate Grading(20mm):

Table 8. Sieve Analysis of 20 mm Aggregate. (IS 383/2386)

Total weight/ Sample = 25500 gms							
Sieve size	Weight Retained (gm)			%weight Retained	Cumulative % Retained	Cumulative % Passing	Limit as per IS 383
	Sample 1	Sample 2	Average				
40 mm	0	0	0	0	0	100	100
20 mm	766	714	740	2.9	2.9	97.1	85-100
10 mm	21564	20106	20835	81.7	84.6	15.4	0-20
4.75 mm	3484	3248	3366	13.2	97.8	2.2	0-5
PAN	581	541	561	2.2	100		

Table 9. Density of Concrete forM-30.

S. No	Sample	Dry density (kg/m^3)
1	M20(Cntorl Mix)	2366.0
2	CF .5%	2426.0
3	CF .10	2378.0
4	CF .15%	2399.5
5	CF .20%	2489.0

VI. CONCLUSIONS

On the basis of experimental study which has been carried out and presented in this paper, the conclusions are as follows: on the basis of result and comparison between different percentages of coconut and fiber 0.5% and 30.0% marble powder but better results are coming on 14 days at marble slurry and coconut fiber.

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