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Effect of Waste Marble Powder on Compressive Strength of Concrete

Yogesh U. Bhapkar, Shivaratna V. Nagawade, Shubham S. Nagawade, Bhushan B. Pachpute, Abhishek B. Pachpute

HSBPVT's College of Engineering Kashti, Savitribai Phule, Pune University, Maharashtra, India

ABSTRACT

This Paper Aims to Study Experimentally, the Effect of Partial Replacement of Cement by Marble Powder and Check the Compressive Strength of Concrete of Concrete by Using M25 Grade of Concrete. Replacing Marble Powder by Varying Percentage (i.e 5%, 10%, 15%, 20%) to the Cement and Checking the Compressive Strength after 14 days and 28 days of Curing. and Optimum Percentage of Replacement of Cement is Found Out.

Keywords : Marble Powder, Compressive Strength.

I. INTRODUCTION

The Construction Industry is One Which Grow very Fastly and Rapidly. And this Growth have Some Bad Impact on Environment and Human health. That's why we required an eco friendly and Economical material. Marble Powder are non Degradable waste material and by using this into concrete the cement cost is Reduces. Strength increases and their will be effective utilization of waste material. Cement is very costlier material in concrete and by Replacing the cement with the Marble Powder. The cost of producing the concrete will be minimized. In this Experiment, we have tested sum of 30 cubes for 14 days and 28 days of curing with the varying percentage of marble Powder and Compare the Result with Conventional Concrete.

II. MARBLE POWDER

India producing large amount of marble in this production process Such as Cutting, Shaping, polishing & edginga large amount of marble is turn into marble powder. This marble powder is non-degradable & having some bad impact on plant & human health. Hence, utilization of such waste is necessary Marble powder have some similar chemical properties like Cement. Marble powders have whitish in colour.[6]

III. OBJECTIVES

1) To study the effect on Compressive strength by replacing cement with marble powder.
2) To compare result of normal concrete with marble dust powder concrete.
3) For effective utilization of waste marble powder.
4) To reduce the cost of cement.
5) To reduce cost of concrete by reducing cement content.

6) To increase strength of concrete by reducing cost of concrete.
7) It is used for PCC work.

IV. SCOPE OF PROJECT WORK

1) For low cost construction work.
2) For increasing strength by reducing cement content.
3) To reduce environmental impact due to marble powder.
4) Using locally available materials.
5) Effective utilization of waste material.
6) It is used for compound wall.
7) To reduce the cost of construction.

V. METHODOLOGY

Prepare mix design of m25 grade concrete by using is method

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Normal concrete

Marble Powderwaste concrete

Using Marble Powder (5% replacement to Cement)
Using Marble Powder (10% replacement to Cement)
Using Marble Powder (15% replacement to Cement)
Using Marble Powder (25% replacement to Cement)

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Casting of cubes (with varying of % of Marble Powder)

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Curing of these cubes for 7 & 28 days

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Testing of these cubes

↓

Comparing normal and Marble Powder waste concrete result

VI.RESULT

Following are the result of compressive test carried on % of varying of Marble Powder

1) Normal concrete (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength(N/mm²)	Avg. Comp.strength(N/mm²)
1	7	22500	400	17.77	
2	7	22500	375	16.66	16.88
3	7	22500	365	16.22	

2) 5% replacement to Cement(N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength(N/mm²)	Avg. Comp.strength (N/mm²)
1	7	22500	370	16.44	
2	7	22500	410	18.22	17.33
3	7	22500	390	17.33	

3) 10% replacement to Cement (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength(N/mm²)	Avg. Comp.strength (N/mm²)
1	7	22500	350	15.55	
2	7	22500	400	17.77	16.88
3	7	22500	390	17.33	

4) 15% replacement to Cement (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength(N/mm²)	Avg. Comp.strength(N/mm²)
1	7	22500	300	13.33	
2	7	22500	350	15.55	14.21
3	7	22500	310	13.77	

5)20% replacement to Cement (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength (N/mm²)	Avg. Comp.strength (N/mm²)
1	7	22500	260	11.55	
2	7	22500	280	12.44	12.29
3	7	22500	290	12.88	

1) Normal concrete (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength (N/mm²)	Avg. Comp.strength (N/mm²)
1	28	22500	590	26.22	
2	28	22500	560	24.88	25.55
3	28	22500	575	25.55	

2) 5% replacement to Cement (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength (N/mm²)	Avg. Comp.strength (N/mm²)
1	28	22500	590	26.22	
2	28	22500	610	27.11	27.25
3	28	22500	640	28.44	

3) 10% replacement to Cement (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength(N/mm²)	Avg. Comp.strength (N/mm²)
1	28	22500	690	30.66	
2	28	22500	630	28.00	29.62
3	28	22500	680	30.22	

4) 15% replacement to Cement (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength(N/mm²)	Avg. Comp.strength(N/mm²)
1	28	22500	485	21.55	
2	28	22500	440	19.55	20.07
3	28	22500	430	19.11	

5) 20% replacement to Cement (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength(N/mm²)	Avg. Comp.strength(N/mm²)
1	28	22500	410	18.22	
2	28	22500	460	20.44	19.40
3	28	22500	440	19.55	

VII. C0NCLUSION

1) It has been observed that after replacing 10% of marble powder the compressive strength after 28 days is increase by 4 N/mm².
2) By using 5% of marble powder the strength increase by 2 N/mm².
3) By using 15% of marble powder the marble powder the strength decrease by 5 N/mm².
4) By using 20% of marble powder strength decrease by 6N/mm².
5) It has been seen that 10% replacement is effective for conventional concrete.
6) By replacing marble powder to the cement the cost of concrete is reduce.
7) By using waste marble powder the waste material is effectively utilized.
8) By using marble powder In the concrete the disposal cost of marble powder is avoided.
9) This is an effective method of increasing strength by reducing cost.

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