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Traditional Properties Analysis in High Strength Cement Concrete with Intermediate Replacements of Brickbats Powder, Clay Mineral and Calcite in Concrete

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Abstract **- The processing of plain and reinforced cement concrete and utilizing it is sustainable concrete has become an important requirement in the construction industry. To improve environmental properties, several of supplementary cementing and pozzolonic materials are introduced and they are partial replacement of cement in the concrete. In this work we are using blending of three useful materials in this work namely brick bats grind powder, calcite is nothing but marble powder and important mineral of clay that is meta kaolin as partially replacing with cement. The adopted materials are very cheap in nature easily available in construction market using cementing materials are very prone to environment in these days. This dissertation reports the results of fresh and hardened properties of the concrete with partial replacement of these materials, at contrast percentages at different curing periods, various traditional methods and tests are conducted on concrete in fresh stage and hardened stage. Based on the previous citations we expected to get positive results from these partials replacements.**

Keywords **- Calcite ,Bb Powder, Clay Mineral**

I. INTRODUCTION

The processing of plain and reinforced cement concrete and utilizing it is sustainable concrete has become an important requirement in the construction industry. To improve environmental properties, several of supplementary cementing and pozzolonic materials are introduced and they are partial replacement of cement in the concrete. In this work we are using blending of three useful materials in this work namely brick bats grind powder, calcite is nothing but marble powder and important mineral of clay that is meta kaolin as partially replacing with cement. The adopted materials are very cheap in nature easily available in construction market using cementing materials are very prone to environment in these days. This dissertation reports the results of fresh and hardened properties of the concrete with partial replacement of these materials, at contrast percentages at different curing periods, various traditional methods and tests are conducted on concrete in fresh stage and hardened stage. Based on the previous citations we expected to get positive results from these partials replacements.

II. RESEARCH METHODOLOGY

- Formulation of Thesis Problem
- Formulation of Abstract & Objectives
- Introduction Of Materials
- Literature Review
- Tests on Materials
- Results
- Discussions

III. LITERATURE REVIEW

This chapter deals with the review of literature related to studies on Ternary Blended Concrete and Effects and performance of concrete with ternary blends. Till three-four years ago, hardly anybody in India was aware of the use of metakaolin in concrete. During these four years, the developments that have taken place include increased awareness of the huge potential of production of metakaolin in the country (with huge mineral resource, that is, kaolin availability across the country), start of indigenous commercial production and many investigations on the development of concrete mixes containing met kaolin.

ONG, CHEE HUAT (2006) the study focuses on the compressive strength performance of the blended concrete containing different percentage of metakaolin. The cement is replaced accordingly with the percentage of 5 %, 10%, 15%, 20%, and 30% by weight. Concrete cubes are tested at the age of 1, 3, 7, and 28 days. In addition, the effect of calcinations temperature to the strength performance is included in the study. Finally, the strength performance of metakaolin-concrete is compared with the performance of concrete blended with silica fume and

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slag. The results show that the strength development of concrete blended with metakaolin is enhanced. It was found that 10% replacement appears to be the optimum replacement where concrete exhibits enhanced compressive strength at all ages comparable to the performance of SF and GGBS.

General:

Stage I: Procurement of material and its testing
Stage II: Molding of specimens and curing
Stage III: Testing of specimens

Tests:

The tests that are conducted on hardened concrete are

1. Compressive strength.
2. Split tensile strength.
3. Upv test
4. Flexure test

Table 1 Compressive strength test results

% of BBP+CM+CALCITE			7DAYS
0 %	0 %	0 %	30.15
5%	5%	5%	31.80
10%	10%	10%	31.89
15%	15%	15%	31.91
20%	20%	20%	31.91

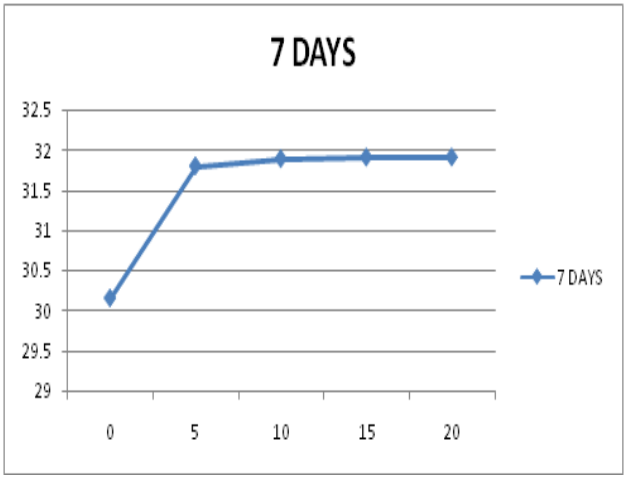

Fig.1 Seven day CS GRAPH.

Table 2 28 Days CS VALUE

% of BBP+CM+CALCITE			28 DAYS
0 %	0 %	0 %	48.00
5%	5%	5%	49.3
10%	10%	10%	49.32
15%	15%	15%	50.12
20%	20%	20%	50.4

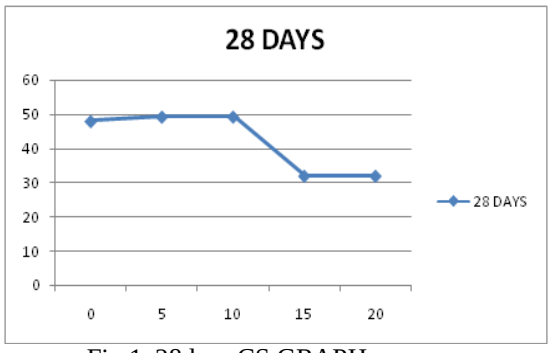

Fig.1 28days CS GRAPH .

Table 3 56 Days CS VALUE

% of BBP+CM+CALCITE			56 DAYS
0 %	0 %	0 %	51.8
5%	5%	5%	52.4
10%	10%	10%	53.7
15%	15%	15%	53.9
20%	20%	20%	58.7

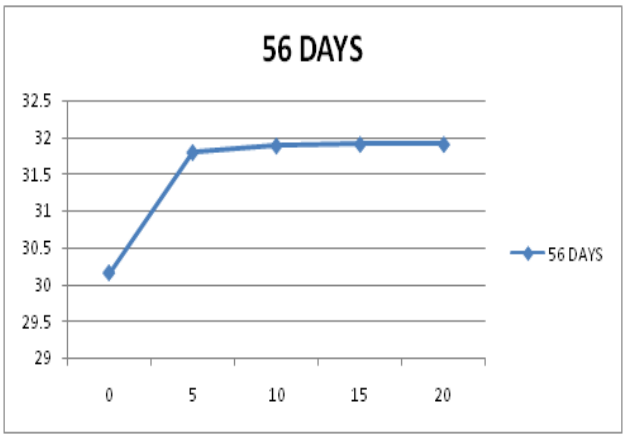

Fig.3 56 Days CS GRAPH

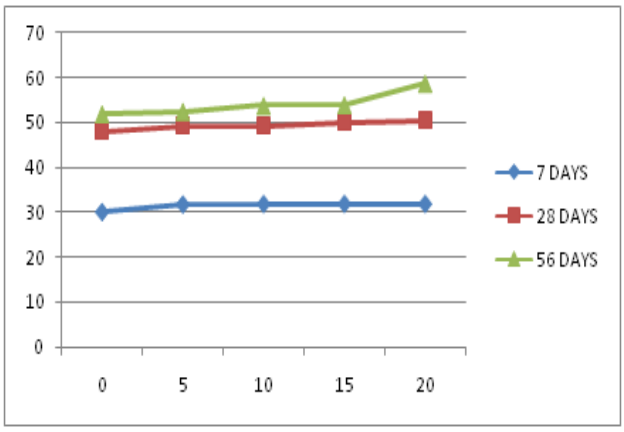

Fig. 2 Combined Graph (BB+CM+C)

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Table 4 Split Tensile Strength (BB+CM+C)

% of BBP+CM+CALCITE			7 DAYS
0 %	0 %	0 %	4.91
5%	5%	5%	5.46
10%	10%	10%	5.84
15%	15%	15%	5.98
20%	20%	20%	6.13

Table 4 Split Tensile Strength BBP+CM+CALCITE

% of BBP+CM+CALCITE			56 DAYS
0 %	0 %	0 %	8.41
5%	5%	5%	8.48
10%	10%	10%	8.79
15%	15%	15%	8.9
20%	20%	20%	9.4

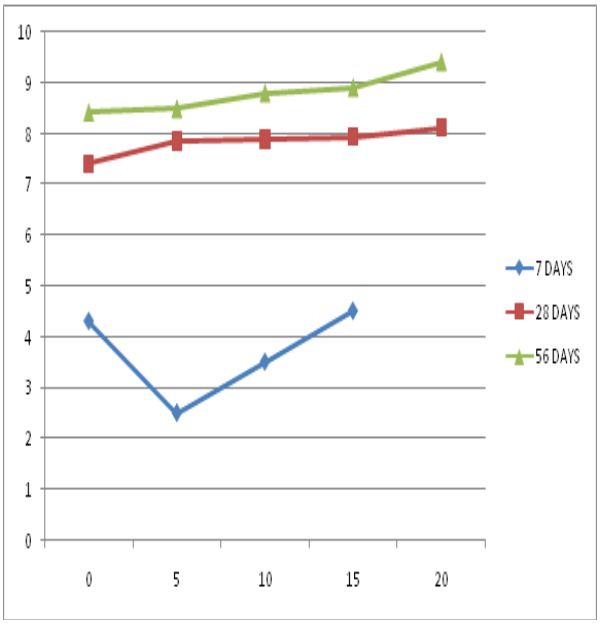

Fig.3 Combined Graph.

Table 5 Ultrasonic Pulse Velocity Test: M CUBE UPV VALUE

S. N.	% METAKAOLIN	Obtained average velocity(m/s)	Quality of Concrete
1	0	2890	POOR
2	5	2910	POOR
3	10	3100	MEDIUM
4	15	2989	POOR
5	20	2900	POOR

Table 6 BP CUBES UPV VALULES

S. N.	% OF BRICK POWDER	Obtained average velocity(m/s)	Quality of Concrete
1	0	2910	POOR
2	5	3100	MEDIUM
3	10	3125	MEDIUM
4	15	3200	MEDIUM
5	20	3254	MEDIUM

Table 7 Mp Cubes Upv Valules

% of BBP+CM+CALCITE			28 DAYS
0 %	0 %	0 %	7.41
5%	5%	5%	7.86
10%	10%	10%	7.89
15%	15%	15%	7.94
20%	20%	20%	8.12

Table 8 Combined materials Cubes Upv Valules

S. N.	% Of Marble Powder	Obtained average velocity(m/s)	Quality of Concrete
1	0	3923	Good
2	5	4156	Good
3	10	4298	Good
4	15	4574	Excellent
5	20	4134	Good

Table 9 Combined Material Upv Values

S N	% OF METAKAOLIN+BRICK POWDER+ MARBLE POWDER	Obtained average velocity(m/s)	Quality of Concrete
1	0	4570	Excellent
2	5	4579	Excellent
3	10	4794	Excellent
4	15	4798	Excellent
5	20	4800	Excellent

Flexure Test: Obtained Satisfactory Resulsts With Combined Replacement Of The Materials.

Discussions:
The following conclusions have been arrived from the study:

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1. Clay mineral is an effective and results in enhanced the strength properties of concrete and ultimate strength of concrete.
2. The strength of concrete, for earlier as reported to i.e., 7 days is improved by blending the OPC with 10%, 15 % ,20 % of clay mineral by weight.
3. The 10% replacement with clay mineral is the most optimum replacement, enhancing the concrete's compressive strength at curing periods.
4. The 28-days compressive strength of concrete was improved by partial replacements of OPC by C.M in the range up to 10% by weight, and was at the 20% level still maintained. The highest 28-days strength improvement of concrete can be expected at partial replacements in the 10-15% range.
5. The combined use of CM and a super plasticizer allowed increasing the aforementioned partial replacement levels, i.e. to 20% in the case of maintaining strength.
6. Ternary blending by Metakaolin in combination with brick bats powder ,& marble powder was found leading to further technical improvements to concrete strength.
7. Brick powder is low cost material which is useful to cast concrete slabs and further when combined with the ternary blends.
8. Conducting the ultrasonic pulse velocity test it gave a satisfactory results.

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