

Experimental Investigation on Properties of Concrete using Marble Dust Powder & Sugarcane Bagasse Ash (SCBA) as Partial Replacement of Fine Aggregate and Cement

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ABSTRACT

Marble dust is described by its fine surface, like that of crushed limestone. Since marble is a harder, crystallized rock, the residue isn't included delicate particles. The residue likewise has a slight shimmer to it because of the crystallized particles, and it can also be discolored with brown, dark, yellow, pink or even greenish particles because of pollutions in the original marble. Hence, as a solution to the above mentioned issue, it can be used as an aggregate in concrete depending on its property. Utilization of agricultural waste and industrial products for construction has been heart of exploration for economical and environmental reasons. Experimental investigations were performed to study the strength properties of M-25 grade of concrete mix, with partially replaced sand with Marble dust (MD) with 10% SCBA with cement. The use of Marble Dust as a substitute for fine aggregates in concrete mix is one option that can Marble Dust disposal problem.

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INTRODUCTION

Concrete is a complex material which is composed primarily of cement, fine aggregates and coarse aggregates blended in portable water that hardens with time. The aggregates are generally crushed rocks or coarse rock like lime stones, along with fine aggregates i.e., sand. Portland cement is usually used for production of concrete and other materials which have cementitious properties such as fly ash cement all are function as a binder for the aggregates.

Objectives

- To study the concrete properties by using partially replaced Marble dust as natural sand with 10% SCBA.

Workability Test

In this work the workability is tested by slump test. When the concrete is freshly mix then it is tested by filling the fresh concrete in the slump cone. The workability is measured by removing the slump cone and measured the subsidence of the concrete this value is called the slump value of the concrete.

Table no.1 Slump Value of the Different mix M-25 Concrete (with 10% SCBA)

| Ingredients | | | | | Slump Value in (mm) |
|--------------------|------------------|------|----------|--------|---------------------|
| Coarse Aggregate % | Fine Aggregate % | MD % | Cement % | SCBA % | |
| 100 | 95 | 5 | 90 | 10 | 78 |
| 100 | 90 | 10 | 90 | 10 | 72 |
| 100 | 85 | 15 | 90 | 10 | 69 |

| | | | | | |
|-----|----|----|----|----|----|
| 100 | 80 | 20 | 90 | 10 | 67 |
| 100 | 75 | 25 | 90 | 10 | 63 |
| 100 | 70 | 30 | 90 | 10 | 59 |

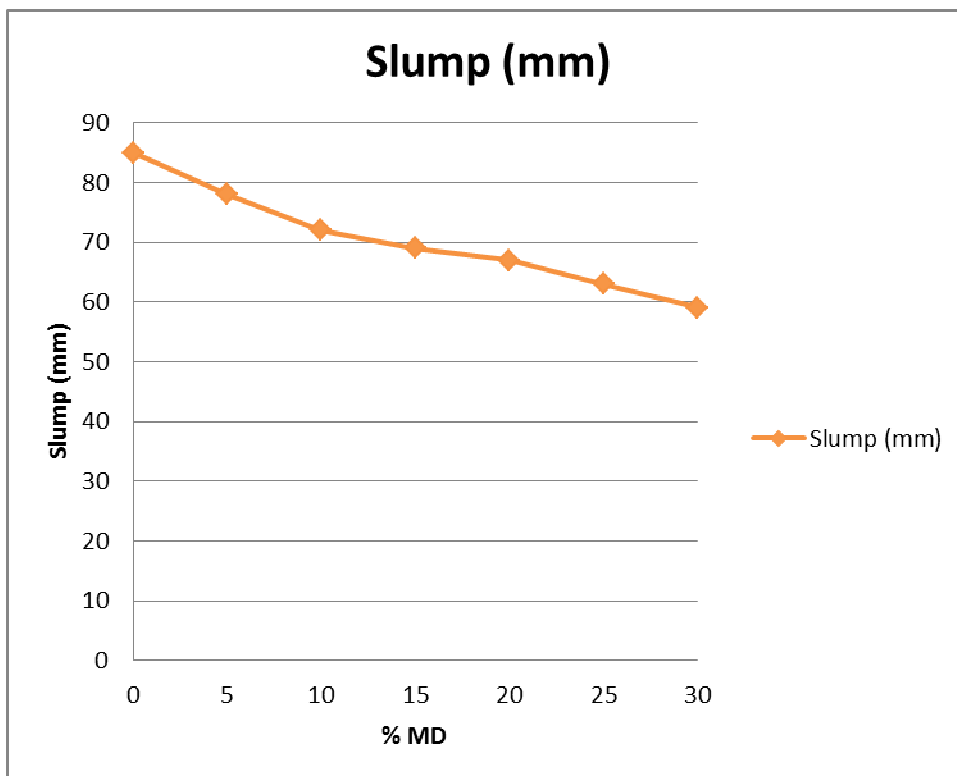


Fig. 1 shows Slump value in mm with 10% SCBA

Compressive Strength Test (M-25)

Compressive Strength test is carried out on specimen cubes of Concrete blended with various percent replacements to fine aggregate by Marble Dust (varying percentages) with 10% SCBA and conventional Concrete at 7, 14 and 28 days.

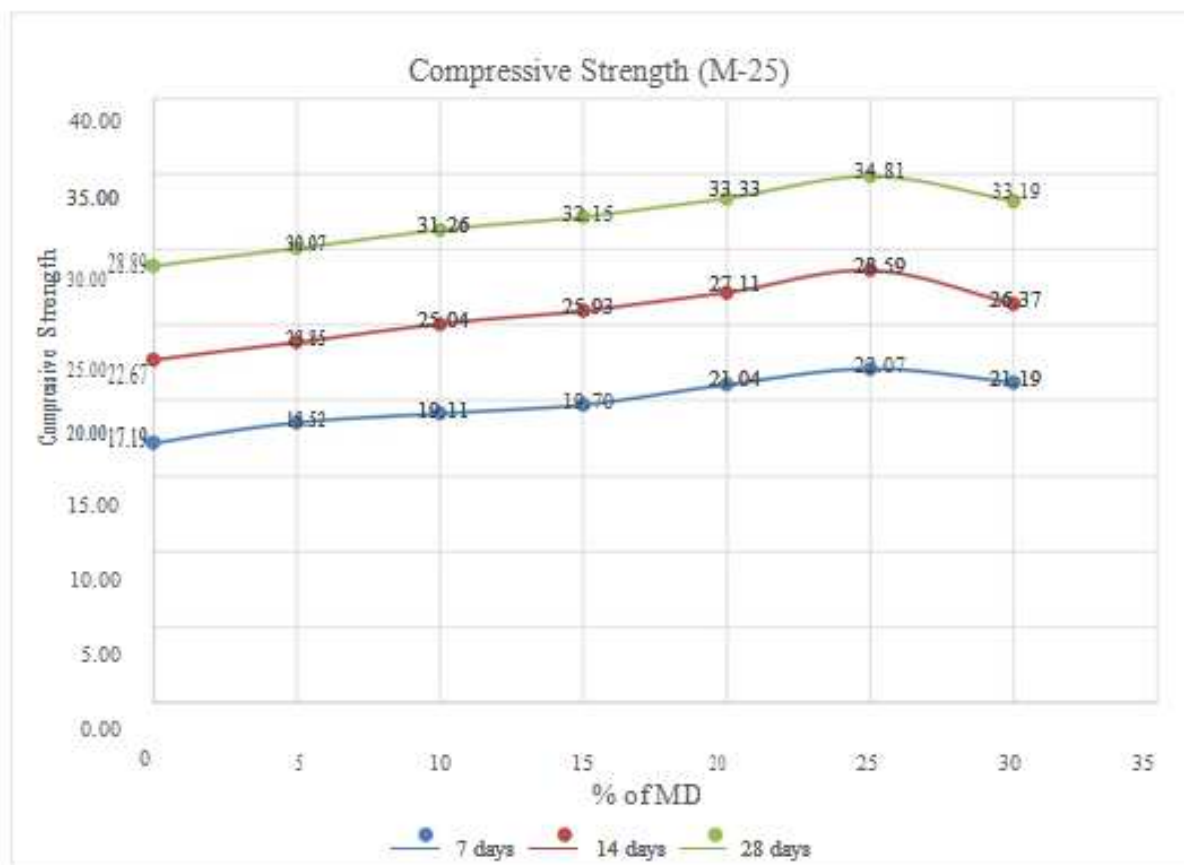
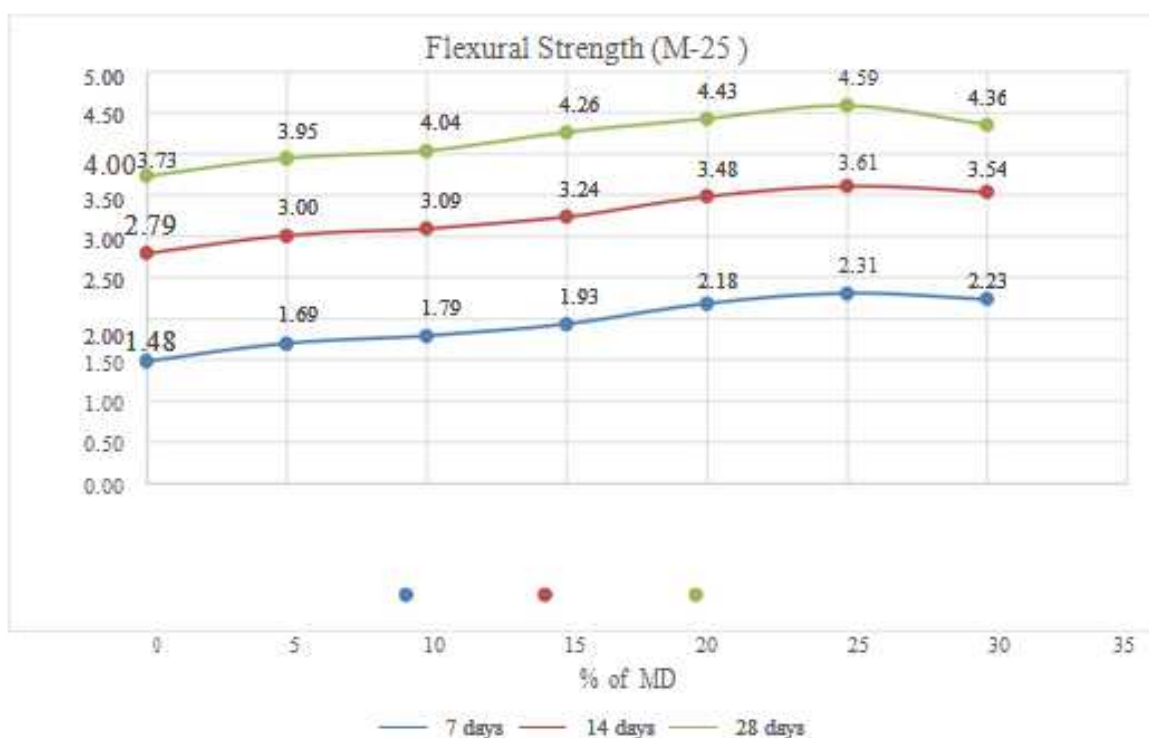


Fig. 2: Compressive Strength of cubes for 7, 14 and 28 days (M-25)

Flexural Strength Test (M-25)**Fig. 3: Flexural Strength of Beams for 7, 14 and 28 days (M-25)****Conclusion-**

- Test results showed that there is increase in compressive strength and Flexural strengths for M-25 grade of concrete mixes with inclusion of Marble Dust (MD) up to 30% replacement. Results showed that there were optimum strength properties at 25% MD replacement of fine aggregate with 10% SCBA for M-25 grade of concrete.
- At 25% Marble Dust with 10% SCBA replacement to fine aggregate and cement increases strength than conventional. Thus, the construction by Marble Dust with SCBA mix concrete can be more Economical.

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