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## **An Experimental Analysis on the Strength by Using Marble Dust and Rural Waste Fibers**

**Rinky Ojha<sup>1\*</sup>, Rajeev Arya<sup>2</sup>**

<sup>1</sup>Research Scholar, <sup>2</sup>Director, Truba Institute of Engineering & Information Technology,  
Bhopal (M.P.) India

**Corresponding Author\***

**Email Id: [sweetrinkyojha91@gmail.com](mailto:sweetrinkyojha91@gmail.com)**

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### **ABSTRACT**

*Experiments were conducted on concrete cubes with various percentages of marble dust and fibers as Cement. When the cement is replaced with 8% marble powder gives the optimum compressive strength. The steel fiber reinforced concrete gives 21.22% compressive strength increase with addition of 1% steel fiber with 8% of marble powder volume of concrete with compared with normal mix. The nylon fiber reinforced concrete gives 11.79% compressive strength increase with addition of 0.75% nylon fiber with 8% of marble powder volume of concrete with compared with normal mix. The jute fiber reinforced concrete gives 8.59% compressive strength increase with addition of 0.75% jute fiber with 8% of marble powder volume of concrete with compared with normal mix. So by the above observation a saving 5.69% in the cost of cement can be achieved by using steel fiber, 6.6% using nylon and 9.02% total cost saving in the concrete. The percentage of increase compared with control concrete for M20 respectively.*

*Keywords: Marble Dust, Rural Waste Fibres, Cement Concrete.*

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### **INTRODUCTION**

The cementations materials other than Ordinary Portland cement, mainly consist of silica fume or fly ash, which has been considered in the production of High Strength concrete (HSC) because as per requirement high cementations materials content and low W/(C+P) ratio (W = water content, C = cement content, P = pozzolans cement) [1-3]. These materials can help control the temperature rise in concrete at early ages and can reduce the water demand for given workability. On the other hand the early strength gain of concrete may decrease [4-6].

The marble cutting plants area unit emitting the powder in any close pit or vacant areas, close to their unit though notified spaces are marked for disposing

resulting in serious environmental and dirt pollution and covering Broad area of land, particularly once desiccation of powder, therefore it's necessary to treat the marble waste quickly and use it within the industry.

In India, the marble and granite stone process is one in all the foremost thriving trade the results if variable marble mud contents on the physical and mechanical properties of contemporary and hardened concrete are investigated [7-9].

### **RESULTS**

On the basis of the above results of the study of replacement of cement by waste marble dust in 0%, 2%, 4%, 6%, 8%, 10%, & 12% by weight of cement, following conclusions were drawn [10-12].

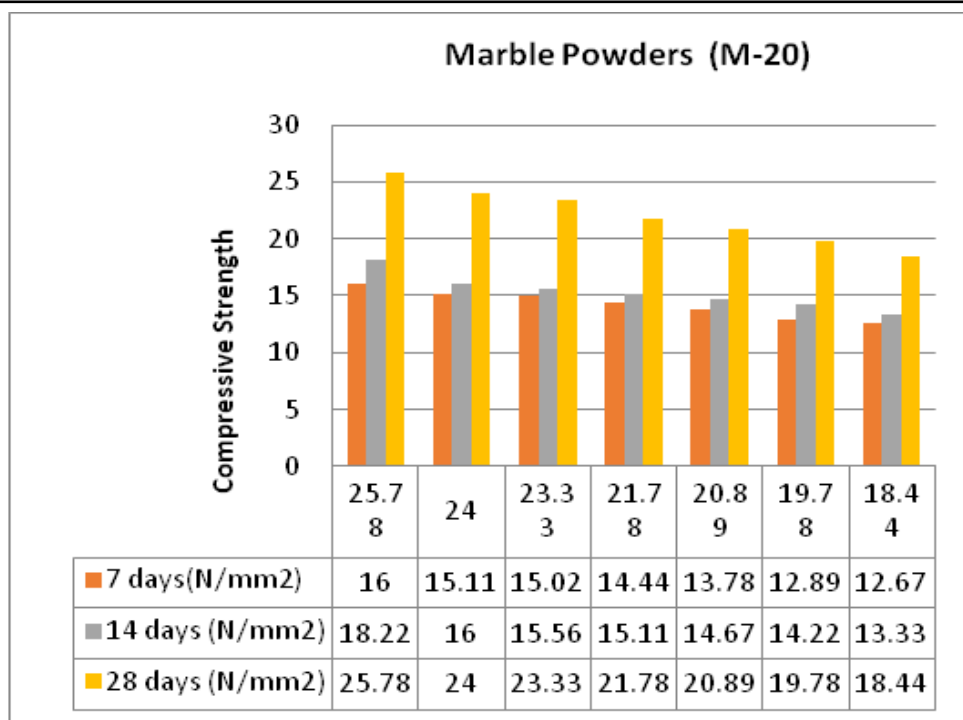


Fig. 1. Marble Powders (0-12 %) Compressive Strength of M-20

**Compressive Strength using Fibers**

Compressive strength test is carried out on specimen cubes of concrete blended with various percent replacements to cement by

steel fiber (varying percentages) with 8% marble dust and conventional concrete at 7, 14 and 28 days of curing with compression testing machine [13-15].

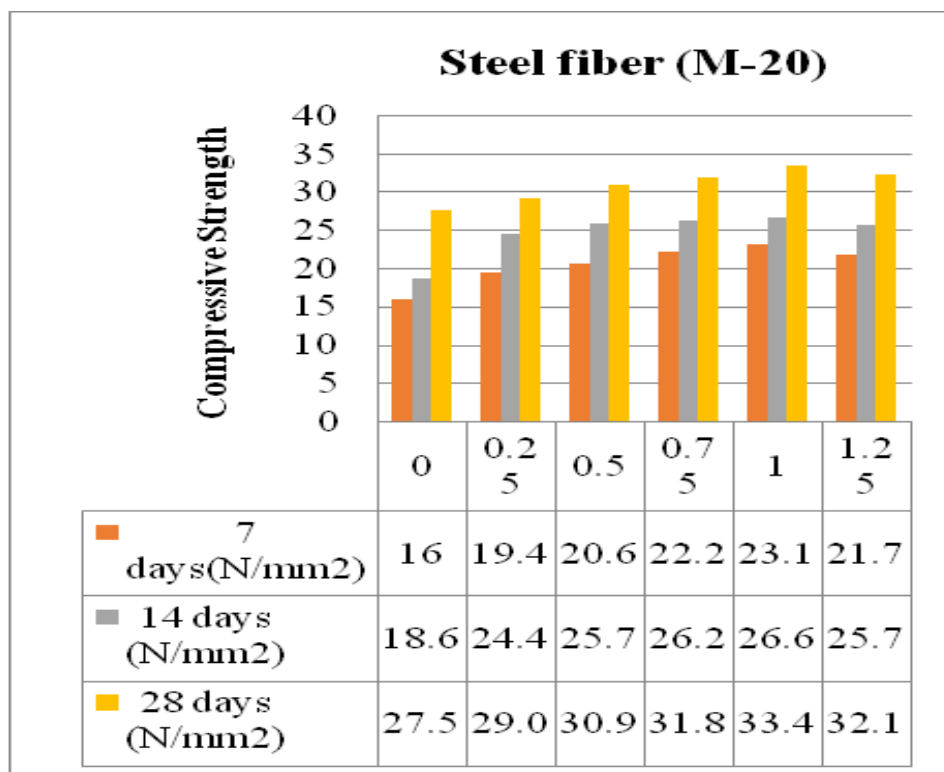


Fig. 2. Results at 8% marble dust of compressive strength test on M20

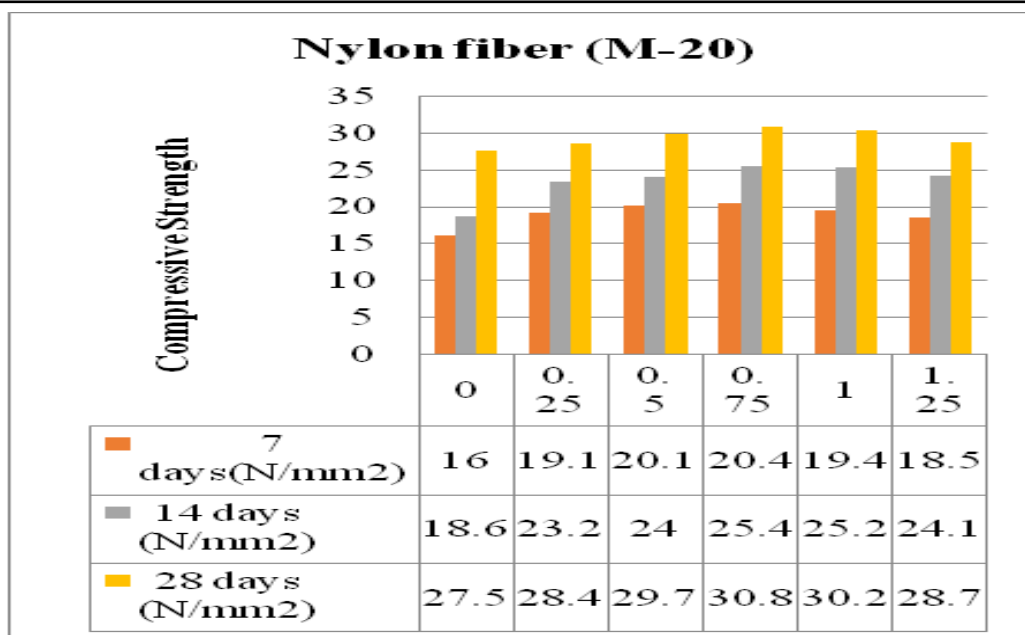


Fig. 3. Results at 8% marble dust of compressive strength test on M20

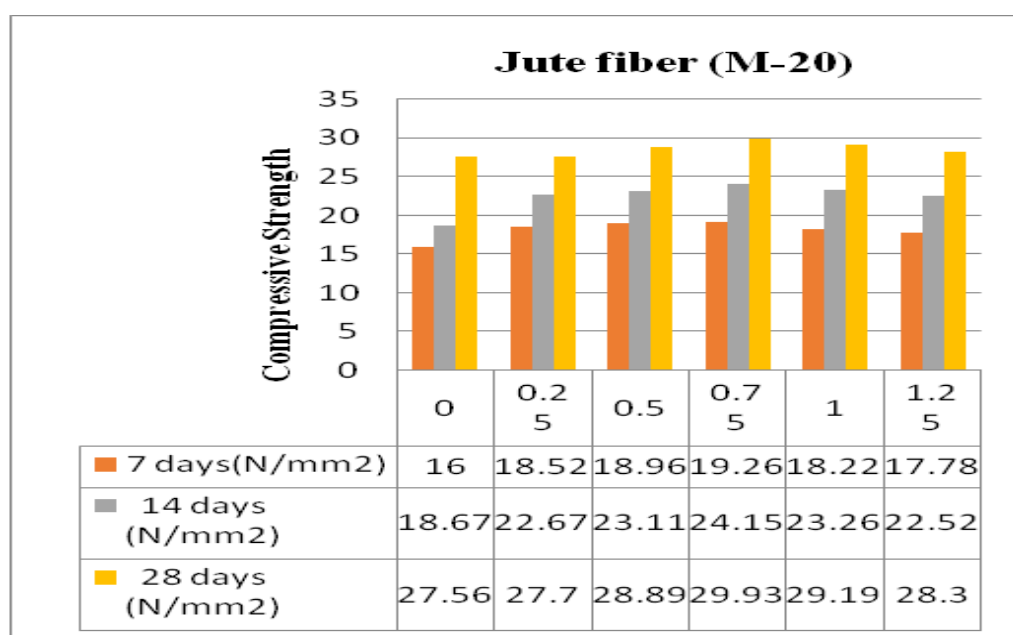


Fig. 4. Results at 8% marble dust of compressive strength test on M20

## CONCLUSIONS

- 1) Slump value increased with increase marble powder.
- 2) Slump value decreased with increase of percentages of fiber added in the concrete.
- 3) The compressive strength decrease with the increase in marble powder compared with normal concrete. The values that are obtained decreased at 7 days, 14days and 28 days of curing for 8% replacement of cement by marble dust can be satisfactorily done as the compressive strength.
- 4) When the cement is replaced with 8% marble powder gives the optimum compressive strength.
- 5) The steel fiber reinforced concrete gives 21.22% compressive strength increase with addition of 1% steel fiber with 8% of marble powder volume of

concrete with compared with normal mix.

- 6) The nylon fiber reinforced concrete gives 11.79% compressive strength increase with addition of 0.75% nylon fiber with 8% of marble powder volume of concrete with compared with normal mix.
- 7) The jute fiber reinforced concrete gives 8.59% compressive strength increase with addition of 0.75% jute fiber with 8% of marble powder volume of concrete with compared with normal mix.
- 8) So by the above observation a saving 5.69% in the cost of cement can be achieved by using steel fiber, 6.6% using nylon and 9.02% total cost saving in the concrete.

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