

An Experimental Study on Property of Concrete Using Vedic Cement as Partially Replacement of Cement

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Abstract : At the moment, mixed concrete technology is developing rapidly, with many other added material application technologies to produce concrete with the desired properties. One way to improve the quality use of the Concrete Mix the addition of the material, or a chemical like forming admixture, reducing synthetic or organic form of water. Apply Vedic cement to four concrete mixture that will be compared to regular concrete to know the optimal amount of Vedic cement in concrete to improve the concrete strength. Concrete mix M30 will be prepared with vedic cement 10 percent, 20 percent, 30 percent and 40 percent and compression test will be performed. Analysis will be carried out by comparison of the test results.

Index Terms - Concrete, Vedic Cement, Strength, Workability and Eco-friendly.

I. INTRODUCTION

Maintaining a balance between efficiency and expense in the construction industry while continuously meeting an environmental regulations has become a challenge for building material suppliers, design engineers and contractors. The challenge has contributed to the discovery and use of modern construction materials and techniques. Mixed concrete is now also evolving rapidly, many other added material application methods are useful for the fulfillment of desired characteristics. Another way to obtain desired characteristics of the Concrete Mix is to be use the added material, either a chemical such as admixture, water reduction in the form of synthetic or organic. Concrete quality also enhances the use of green technology with Vedic cement, which is not yet covered by concrete chemical admixtures. The quality of the Concrete Mix is good for enhancing concrete mix strength.

Vedic cement (also referred to as Waste material of Industry) Vedic cement consists mainly of cow dung, natural gypsum, clay, etc., which can be obtained abundantly from nature and is in budget as well. Cow dung is essentially the rejection of herbivorous matter which symbiotically acts upon. Gypsum is natural waste which has evolved from industry and leads to pollution of the environment. As Gypsum has proven to be a pozzolonic material, it is used to replace cement in the concrete mix. Such a product leads to an environmentally friendly technique of disposing of enormous quantities of material that pollute the environment.

II. OBJECTIVES

- ✚ To prepare Concrete using Vedic Cement economically.
- ✚ To study different properties of concrete using Vedic cement (fresh and hard).
- ✚ To find out Optimum Percentage of Vedic Cement in Concrete.
- ✚ To analyze the costs of Vedic cement concrete.
- ✚ To wake ecofriendly environment by using Vedic cement in concrete.

III. LITERATURE REVIEW

¹Anisha G Krishnan, ²Sruthi G Raj, ³Gibi Miriyam Mathew, ⁴Sruthy B investigated that Maximum strength is attained at 8% CDA and 0.5% of glass fiber.

¹Neha P Asrani, ²R. Gayathri, ³J Arthika investigated that Recommended mix is 5% CDA, 7.5% Granite powder and 15% Marble stone.

¹Jitender Kumar, ²Surendra Roy investigated that material can be replaced by cement. 10% fly ash, 10% cow dung ash are higher than rock aggregate at the curing period of 7, 14 & 21 days.

¹Arun Reddy Thumma - Department of Civil Engineering, ²S Warangal Institute of Technology and Sciences investigated that increase in strength from 5% to 10% is more. But increase in strength 7 days to 14 days curing is more than (14 – 21) days curing.

IV. MATERIAL AND METHODOLOGY

Fine Aggregate: The river sand which is naturally available use as a fine aggregate. The sand properties were determined by testing according to IS 2386 (Part- I).

Table 1 Physical Property of Fine Aggregate

Properties	Sand
Sieve analysis	Zone II
Fineness modulus	2.871
Specific Gravity	2.64
Water Absorption	1.77

Bulk Density	1.62 (Loose)
	1.76 (Compacted)

Coarse aggregate: Crushed Coarse aggregate conforming to IS 383-1987 was used. Coarse aggregate of size 20mm and 10 mm were used.

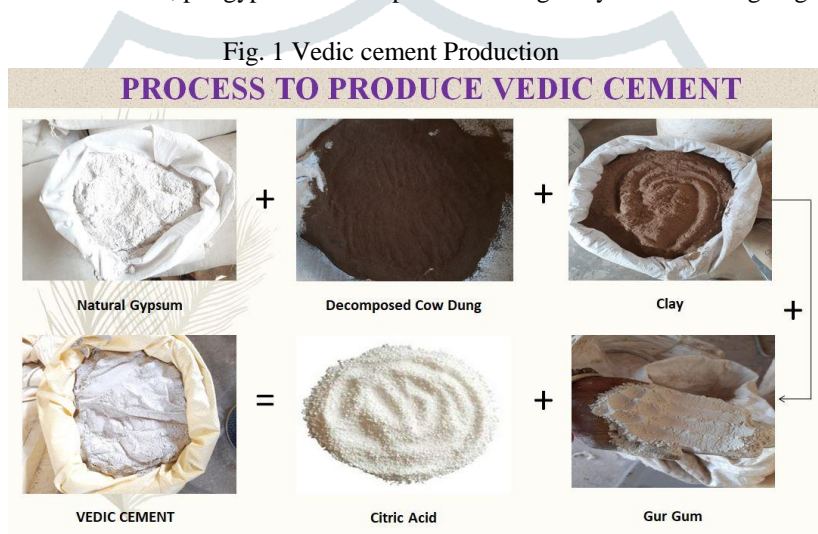
Table 2 Physical Property of Coarse Aggregate

Properties	20mm	10mm
Specific Gravity	2.88	2.99
Water Absorption	1.46%	0.29%
Aggregate Impact Value	9.21%	9.33%
Aggregate Crushing Value	11.75%	9.98%
Flakiness Index	10.89%	25.26%
Elongation Index	6.84%	7.66%
Bulk Density	1.657 (Loose)	1.53 (Loose)
	1.75 (Compacted)	1.68 (Compacted)

Vedic cement: Method for preparation of Vedic cement

Method:

- Put the material in the bore mill, put gypsum+decompose cow dung+clay+cetric acid+guargum.



Procedure:

- Sieve the decompose cow dung in sieve machine, collect the fine decompose.
- Then put the gypsum of 70% in the bore mill.
- Then put the composed cow dung of 10%.
- Then put the clay of pond which is very fine 9.16%.
- Then put the citric acid which is in the powder form.
- Then put the guar gum in the boremill.
- Rotate the bore mill for 1 hour and the cement is ready to pack.
- The amount of citric acid is about 100kg cement only 60 gm. is required.
- The amount of gurgum is about 100kg cement only 100 gm. is required.

Table 3 Physical Properties of Vedic cement

Properties	Value
Fineness	4.4
Specific Gravity	2.73 (g/cm3)
Consistency	41.5%
Strength	35.5
Initial setting time	25 min
Final setting time	35 min
Color	Off white

Table 4 Mix Proportion for grade M30 For (0% Vedic cement)

Aggregate. Proportions as per table 2 of IS 383			0.60	0.40
Water	Cement	Sand	(20mm)	(10mm)
168	370	509	676.2	450.8
0.45	1	1.37	1.82	1.21

Table 5 Mix Proportion for grade M30 For (10% Vedic cement)

Aggregate. Proportions as per table 2 of IS 383			0.60	0.40
Water	Cement	Sand	(20mm)	(10mm)
171	383	634	783	552.4
0.446	1	1.65	2.04	1.36

Table 6 Mix Proportion for grade M30 For (20% Vedic cement)

Aggregate. Proportions as per table 2 of IS 383			0.60	0.40
Water	Cement	Sand	(20mm)	(10mm)
173	386	587	693.6	462.4
0.448	1	1.52	1.79	1.19

Table 7 Mix Proportion for grade M30 For (30% Vedic cement)

Aggregate. Proportions as per table 2 of IS 383			0.60	0.40
Water	Cement	Sand	(20mm)	(10mm)
173	389	670	749.4	579.6
0.310	1	1.72	1.92	1.48

Table 8 Mix Proportion for grade M30 For (40% Vedic cement)

Aggregate. Proportions as per table 2 of IS 383			0.60	0.40
Water	Cement	Sand	(20mm)	(10mm)
181	410	705	854.4	583.84
0.44	1	1.71	2.08	1.42

V. RESULTS

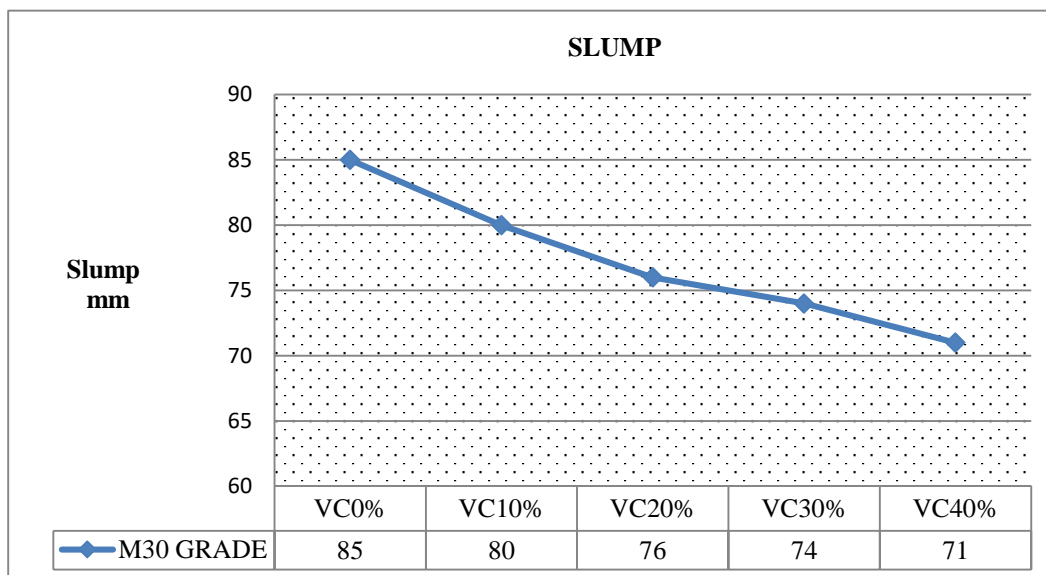
Workability:

- ✚ The concrete slump test measures before it sets the workability of fresh concrete.
- ✚ It tests the Workability of fresh produced concrete, and thus the ease with which in concrete flows.
- ✚ It can also be used as an indication for a poorly mixed batch.
- ✚ The slump test is used for the measurement of a property of fresh concrete as per IS: 1199 – 1959.

Table 9 Slump Test Results

Slump Value in (mm)	
Variations	M30 GRADE
VC 0%	85
VC 10%	80
VC20%	76
VC30%	74
VC40%	71

Fig. 2 Slump Values Comparison



Compressive Strength Test:

- ✚ Determination of compressive strength using by cube where size of cube specimen is 150×150×150 mm and this test was performed on a 2000 KN capacity compression testing machine.
- ✚ The Bureau of Indian Standards suggests that Concrete's compressive strength should be the basis for the determination of all properties and the study of concrete response. As such more emphasis was given on this test. Concrete's compressive strength was assessed at 7 days, 14 days, and 28 days in age.
- ✚ The Compressive strength of cube specimen is calculated using the following formula:

$$\sigma = P/A$$

Where, P = failure load
A = cross sectional area of cube in mm

Table 10 Compressive Strength Test Result

Cement	7 Days M30	28Days M30
VC0%	22.73 N/mm ²	36.97 N/mm ²
VC10%	24.08 N/mm ²	39.43 N/mm ²
VC20%	23.97 N/mm ²	38.52 N/mm ²
VC30%	22.93 N/mm ²	37.00 N/mm ²
VC40%	22.31 N/mm ²	36.42 N/mm ²

Fig. 3 Compressive Strength Values Comparison 7-Days

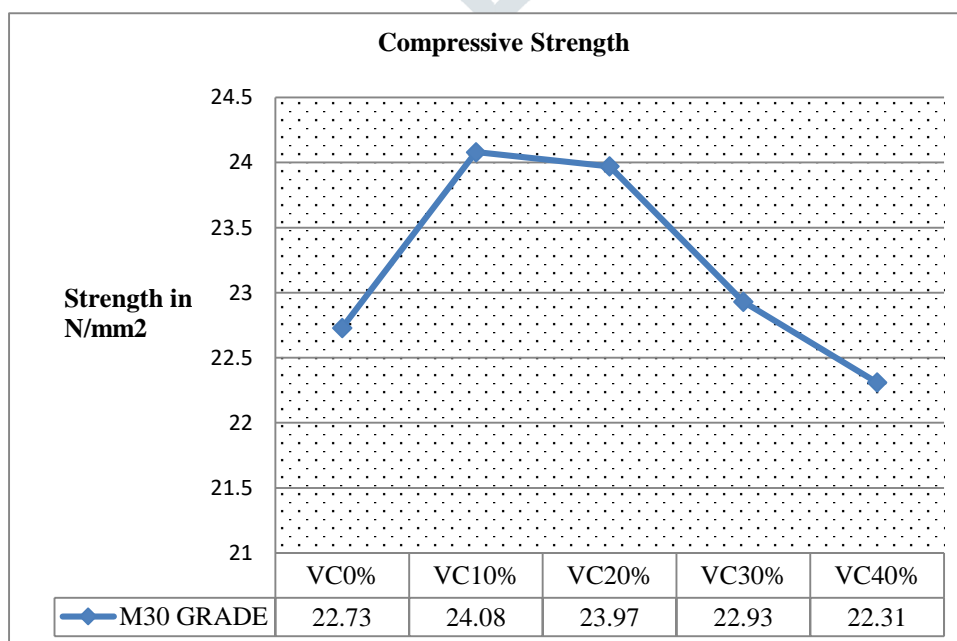
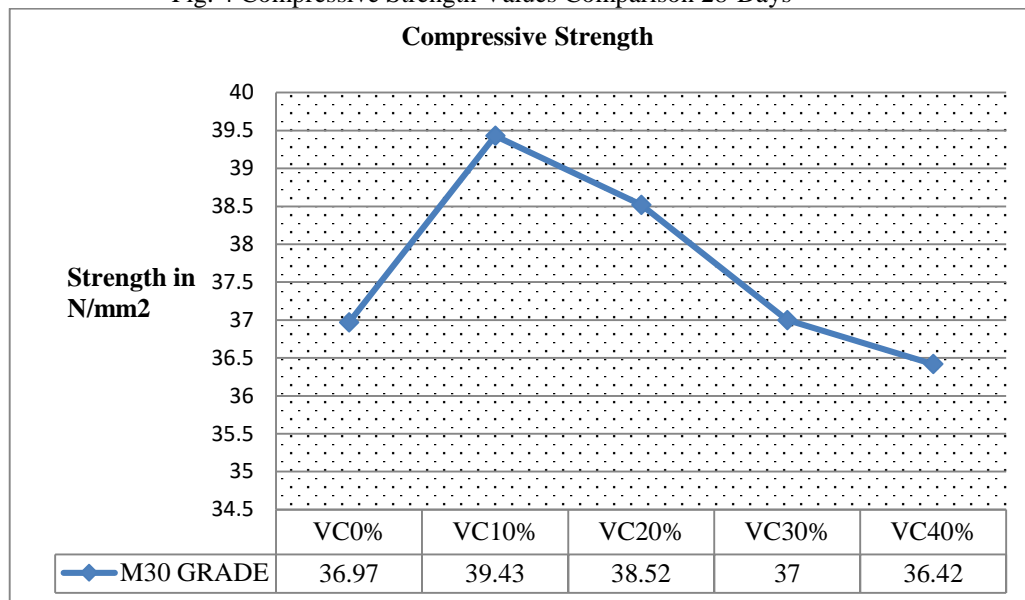


Fig. 4 Compressive Strength Values Comparison 28-Days



VI. CONCLUSION

- ✚ It is observed that there is no change in workability (Slump test) for the M30 grade of Concrete treated with 10% of Vedic cement when compared to untreated concrete.
- ✚ It is observed that there is 2.99% increase in strength for the M30 grade of Concrete treated with 10% of Vedic cement when compared to untreated concrete.
- ✚ It is observed that there is increase in strength rapidly at early stage treated with Vedic cement.
- ✚ Optimum value of Vedic cement is 10%.

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