The Test of Different Types with Waste Material in Hybrid Concrete

Rahul verma[1], Sourabh Dashore[2]
[1]*Mtech scholar, Department of Civil Engineering, Sanghavi Institute of Management and Science, Indore*
[2]*Assistant professor, Department of Civil Engineering, Sanghavi Institute of Management and Science, Indore*

***Abstract*- The strength of concrete is determined by using Flexural test and strength test of M40 concrete. Compressive strength, Flexural strength, Split tensile strength and Alkalinity test of concrete mixes made with using different dust material , sand and 4.75mm down basalt have determined at 7 & 28 days. The compressive and flexural strength have determined of 15%, 20% and 50% in added M40 concrete. Results shows that the increase 15% and 25%compressive strength of the cement is high as compare to M40 cement concrete. The compressive &flexural strength also determine for M40 with mix sand basalt stone, 15%, 20%, 50% sand replacement**

The results clear indicate the compressive strength of the 28 days material is higher as compare to 7 days material. We can say that age of concert. Figure shows that the M40 with concrete with granite dust compressive strength for the 7 & 28 days. The results clear indicate the strength of the Sample-3, 25% is higher than the 15% and 50%. But as compare to beam not follow.

1. INTRODUCTION

The concrete is useful mixture of materials in the construction industry. It is not only used in building construction but also in other areas like roads, bridges, highways, dams and many others. It is a composite material which is made up of cement, sand, aggregate and water. The fresh concrete can be mould into any desire shape. The life of the concrete is very high so it can be used as versatile material. In the concrete the cement is used as the binder material which has the binding tendency. Due to increase in activities for different regions and utilities scaring of the naturally available resources is being forced.

The demand of natural sand is also very high in developing countries to satisfy the rapid infrastructure growth. The developing country like India faces scarcity of good quality natural sand. Rapid removal of sand from river bed causes so many problems. Recently natural sand is becoming a very costly material because of its demand in the construction industry.

1.1 Objective

The main objectives of this research are:

1. To make and optimal the mixture compositions of High grade of concrete M40 mix Concretes on the basis of their tensile and workability and also compressive test ;
2. To construct model the tensile actions of High grade of concrete with different combinations of waste material, on the basis of performed it's properties test.
3. To perform a study on its utilization in the engineering practice and to assess this utilization from engineering, technical and economical point of view.

1.2 Materials & Properties

Concrete and cement are not the same thing; cement is actually just a component of concrete. Concrete is made up of three basic components: water, aggregate (rock, sand, or gravel) and Portland cement.

According to theory of concrete the mixing of different ingredient as same function of cement , sand and aggregate with respected to marble , kota stone powder as well as granite dust and basalt stone whose replace with sand or cement .which provided to same strength .

1.2.1 Components of basic concrete mix

There are three basic ingredients in the concrete mix:

1. Portland Cement
2. Water
3. Aggregates (rock and sand)

1.3 Material

The materials used in this work are:-

1. Cement ppc (Portland plozzolana cement)
2. Sand natural Naramada sand
3. Natural aggregate
4. Marble kota stone dust
5. Conplast SP 430 G8 (admixture)
6. Basalt stone
7. Granite Dust Powder

2. COMPONENT OF MARBLE

Calcium carbonate appears in such natural materials as limestone, gypsum, chalk, and marble. The mineral content of marble results from the original makeup of its rock mass, which often includes manganese, magnesium, and iron.

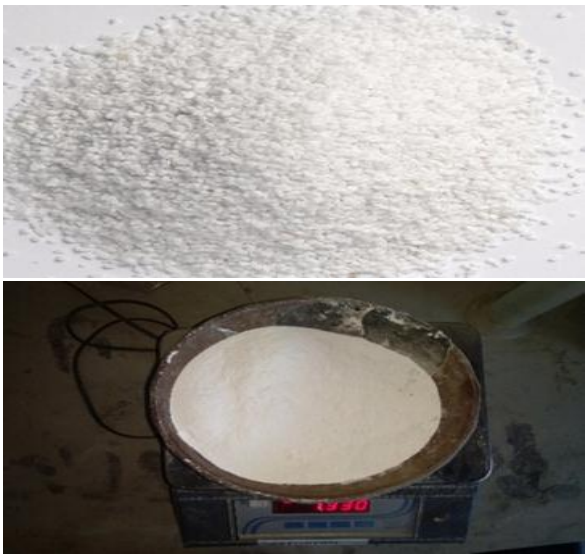


Fig.2.1 Marble Stone Powder

2.1 Methodology and Experiment

The numbers of methodology are available. In this work used the following stages:

i) Cement
a) Field testing
b) Laboratory testing
ii) Sand
a) Silt Content
b) Specific gravity of sand
c) Sieve analysis
IV)Aggregate
a) Sieve analysis
b) Flakiness test
c) Crushing Test
d) Elongation Test
v) Mix Design M-40 Grade

Figure 2.2 Cement Powder

2.2 Laboratory testing

In laboratory testing, included initial and final setting time, consistency test and fineness test of the cement.

A) Consistency test

Prepare a paste of weighted quantity of cement (350 gms) with a weighted quantity of water, start with 30% water of 350 gms of cement taking care that the time of gauging is not less than 3 minutes and not more than 5 minutes and the gauging shall be completed before any sign of setting occurs.

Place the test block with the mould, together with the non-porous resting plate, under the rod bearing the plunger (10mm dia) lower the plunger gently to touch the surface of the test block and quickly release, allowing it to penetrate into the paste. This operation shall be carried out immediately after filling the mould.

Prepare trial pastes with varying percentages of water and test as described above until the amount of water necessary for making the standard consistency as defined above is obtained. Express the amount of water as a percentage by weight of the dry cement.

Table-4.1:Consistency results of cement

Trail no	Wt. of cement gm	Water gm	Water % P	Needle penetration	Remark
1	300	75	25	39.5	Standard Consistency 28 degree Temperature
2	300	90	30	34.5	
3	300	96	32	29	
4	300	102	34	17	

5	300	105	35	16	0.85XP
6	300	108	36	6	0.85X36

Calculations:-

Standard consistency p%

$$= \frac{\text{weight of water added gm}}{\text{Weight of cement gm}} \times 100$$

3. RESULTS

Concrete is required to be tested in both fresh and hardened states. Fresh concrete is tested for workability to determine its capacity for satisfactory placing. The analysis of fresh concrete is required to judge the stability that is to identify segregation of the concrete mix, uniformity in mixing and to determine the proportions of the ingredients of concrete actually used.

3.1 Testing

The following topics are discussed.

1. Compressive Strength of concrete
2. Hardened of concrete
3. The ability to withstand wear of concrete
4. Elevate performance of concrete
5. Allowable tensile and compression stresses in concrete.

4. RESULTS DISCUSSION

As work is carried out in two stages, results of each stage are presented in graphical form. Tests are performed on cubes and beams and their 7 days and 28 days strengths have been determined. A comparison based on strength of different mix proportions is carried out. A comparison of strengths for 7 days and 28 days are also formulated.

4.1 Case-I: (standard concrete M40)

fig.no 4.1: According mix design to test on 7 days and 28 days

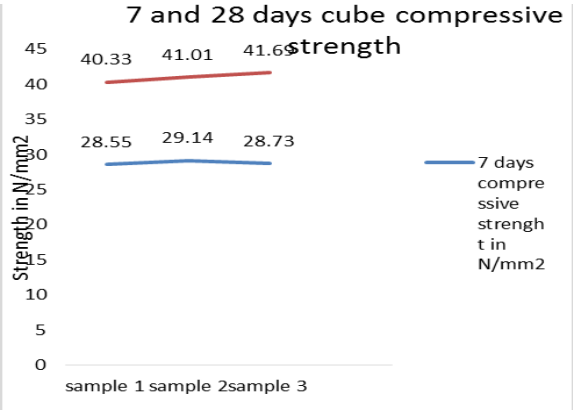
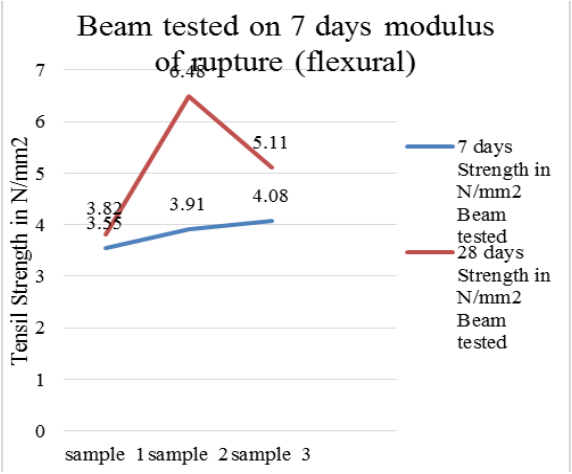
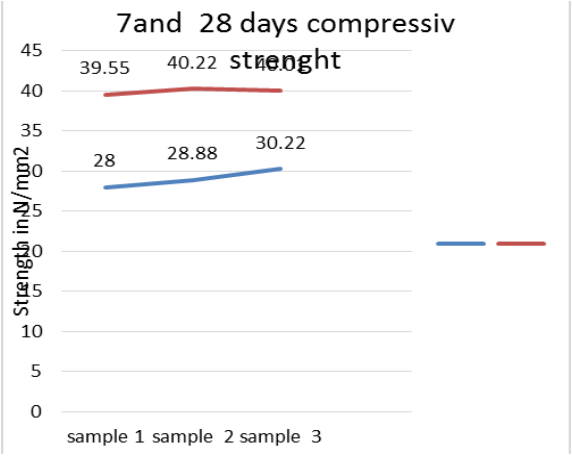


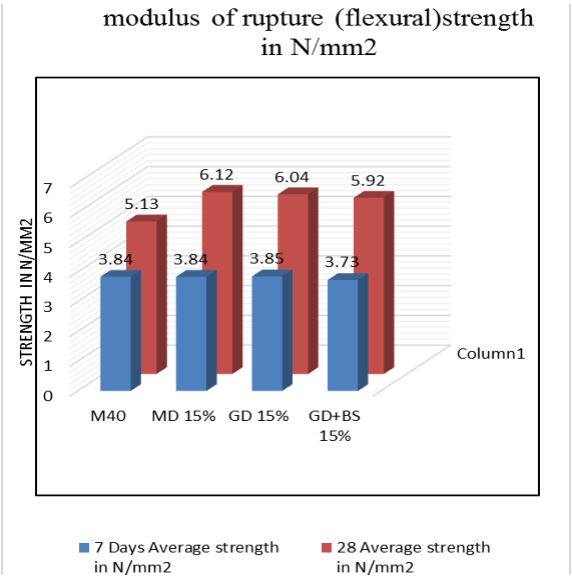
fig.no4. 2: Beam tested on 7 and 28 days modulus of rupture (flexural)



4.2 Case-2: (standard concrete with sand replacement 15%)

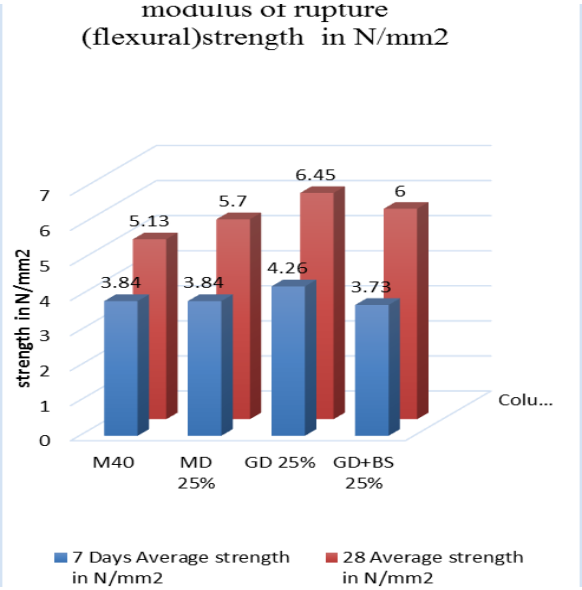
Figure no4.3: According mix design to test on 7 days and 28 days





4.3 Case 3 - We Compression between the 7 and 28 days modulus of rupture (flexural)25% Percentage Condition with Standard M40 Grad of Concrete AsShown In Figure

Figure 4 .4: Beam tested on 7 and 28 days modulus of rupture (flexural



5. CONCLUSION

The strength of concrete is determined by using Flexural test and strength test of M40 concrete. Compressive strength, The compressive and flexural strength have determined of 15%, 25% and 50% wastedust added M40 concrete. Results shows that theincrease compressive strength of the cement is high as compare to M40 cement concrete. The compressive &flexural strength also determine for M40 with mix sand mix basalt stone Equivalent downbasalt stone, using the marble dust, granite dust and basalt stone whose is toughest material of stone

The mixes of different percentage have increases with cement resulting in higher compressive strength in the concrete mix. And gives different result but in (when marble dust added 25%) gives good result.

The results clear indicate the compressive strength of the 28 days material is higher as compare to 7 days material. We can say that age of concert.

Figure shows that the M40 with concrete with granite dust compressive strength for the 7 & 28 days. The results clear indicate the strength of the Sample-3, 25% is higher than the 15% and 50%. But as compare to beam not follow.

Figure shows that the M40 with 4.75 mm down basalt stone concrete with 15%, 25%, 50% sand compressive strength for the 7 & 28 days. The results clear indicate the strength of the material is decrease with increase in sand percentage in concrete. 25 % give good result of concrete.

6. FUTURE SCOPE

From this research, there are few recommendations to improve, to extend and to explore the usage of 4.75mm down basalt, sand and sand replacement with different dust waste marble dust, granite dust, basalt stone dust or 4.75 down:

Determine the durability of concrete with using waste material. If Anywhere we can reduced the 4.75 mm down basalt stone as same size of sand so we get the good result.

Add chemical activator into waste glass powder concrete mix for determine the compatibility by observing the compressive strength of the concrete.

We can Using waste marble dust 25% with sand replacement gives good result

we Using granite marble dust 25% with sand replacement gives good result

We can Using waste granite dust with basalt stone 25% with sand replacement gives good result

Waste glass aggregate may be used with GLP.

Now the current research the ordinary Portland cement was used. Further its automatic properties can be compared by using different cement.

While soda lime glass presents a high alkali contented, utilize of ground waste glass as cement replacement in mortar, improved resistance to ASR.

Replacement of cement with waste glass powder in different water cement ratio.

Use of GSW as sand replacement and cement replacement need to be studied with different mix, different curing conditions. Also the other parameters like tensile strength, abrasion of the concrete needs to be evaluated.

Finally We can say that sand now current more valuable for construction as well as economy the price of 1 m3 sand is 2400rs/- as depend on session But basalt stone is available 1m3 1500-1700 per one cubic meter so clear here we get economy on site work .

White marble powder on India mart seal waste material on rate 1.35rs/ kilogram

REFERENCES

[1] baboo rai, khan naushad h, abhishek kr, tabin rushad s, and duggal s.K:- influence of marble powder/granules in concrete mix, international journal of civil and structural engineering, 2011, ISSN 0976 – 4399, volume.

[2] Shanmugapriya, R. N. Uma:-optimization of partial replacement of m-sand by natural sand in high performance concrete with silica fume, international journal of engineering sciences & emerging technologies, june 2012. ISSN: 2231 – 6604, volume 2, issue 2, and pp.: 73-80 ©ijeset .

[3] chandana sukesh, katakam bala krishna, P.Sri lakshmi sai teja, and S.Kanakambara rao: - partial replacement of sand with quarry dust in concrete, international journal of innovative technology and exploring engineering (IJITEE), may 2013, ISSN: 2278-3075, volume-2, issue-6.

[4] 4. priyanka A. Jadhav, dilip K. Kulkarni: - effect of replacement of natural sand by manufactured sand on the properties of cement mortar, international journal of civil and structural engineering, 2013, ISSN 0976 – 4399, volume 3

[5] Nimitha vijayaraghavan and A S waya:- effects of manufactured sand on compressive strength and workability of concrete, international journal of structure and civil engineering research,2013, ISSN 2319 – 6009, vol. 2 .

[6] g. Balamurugan, dr.P.Perumal:-behaviour of concrete on the use of quarry dust to replace sand – an experimental study,an international journal (ESTIJ), december 2013, ISSN: 2250-3498, vol. 3

[7] tasnia hoque, muhammad harunur rashid, md. rokon hasan, ebna forhad mondol: - influence of stone dust as partially replacing material of cement and sand on some mechanical properties of mortar, international journal of advanced structures and geotechnical engineering, april 2013, ISSN 2319-5347, and vol. 02.

[8] h. S. Suresh chandra, G. Sarangapani, and B. G. Naresh kumar:- experimental investigation on the effect of replacement of sand by quarry dust in hollow concrete block for different mix proportions,international journal of environmental science and development, february 2014, vol. 5.

[9] a jayaraman:- experimental study on partial replacement of natural sand with m- sand and cement with lime stone powder, international journal of chem tech research, april-june 2014, issn : 0974-4290, vol.6, pp. 948-954.

[10] n.Kiran kumar, dr.B.Damodhara reddy, and smt.S.Aruna jyothy:-an experimental investigation on strength of granite-fines concrete, international journal of science & technology, september 2014, ISSN (online): 2250-141X, vol. 4 issue 2.

[11] ij. Karthick, IIT.Rama, IIIN.Mani bharathi:-an experimental study on usage of quarry rock dust as partial replacement for sand in concrete, international journal of advanced research in education technology (IJARET), july - sept. 2014, ISSN: 2394-6814, vol. 1, issue 1.