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COMPARATIVE ANALYSIS OF QUALITY OF DIFFERENT SAND SAMPLES FOR COMPRESSIVE STRENGTH -A CASE STUDY GADHINGLAJ (INDIA)

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ABSTRACT

As per Civil Engineering is concern, one must know the importance of good construction material. For concreting purpose, cement, sand, aggregate and water is used. Considering present scenario of material, it looks bit difficult to identify the sand for construction as the river sand is banned due to environmental impact.

This project is a study of all the sand samples available at Gadhinglaj Tahsil. The available sand samples are tested for its quality and its response is assessed when added in concrete. The production cost per meter cube is calculated to decide its economy. At the same time, misunderstanding about available sand samples for its response under loading conditions is been kept in mind while going through this research work.

KEYWORDS: Compressive Strength, M-sand.

1. INTRODUCTION

Cement, sand and aggregates are essential needs for any construction industry. Sand is major material used for preparation of mortar and concrete and plays a most important role in mix design.

Now a days, demanding of river sand in construction industry is very high, in most of the construction river sand is used as the fine aggregate as the demand increases scarcity of sand also increases this leads to illegal snatching of sand from the river bed it is difficult to find out alternate material to replace sand which having same advantages such as easily availability, eco-friendly, cheap, etc. so there is need to find out other sand having same strength.

Therefore in this experimental study we are going to discuss on the comparative study of compressive strength of concrete by using various sa

Objectives

1) To test different properties of sand samples.
2) To determine the compressive strength of concrete by using various sands samples.
3) To compare compressive strength of concrete block prepared by using various sands samples.
4) To suggest better sand sample depending upon maximum Compressive Strength, Economy and Availability.
5) To compare the available sand samples based on production cost.

2. LITERATURE REVIEW

a. AMZ Zimar, GKPN Samarawickrama, WSD Karunarathna, S Jayakody "EFFECTS OF MANUFACTURED SAND AS A REPLACEMENT OF FINE AGGREGATES IN CONCRETE"

This paper states that, the Bulk density, Specific gravity and water absorption are higher for MS than river sand. MS shows higher fineness modulus compare to river sand because of higher clay and silt content. The

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workability of concrete gradually decreases with the addition of M-Sand. However, the required workability can be achieved by using water reducing admixture. Therefore, river sand can be fully replaced with manufactured sand.

b. Ganesh V. Tapkire, Vikram J. Patel, Hemaraj R. kumavat, Rajendra R. Patil, "COMPARATIVE ANALYSIS OF RIVER AND CRUSHED SAND IN CONCRETE"

This paper states that, the physical properties of crushed sand satisfies the IS requirement, But in workability test it is less workable as compare to river sand concrete. Similarly he compare the compressive strength result of concrete it is found that gives the result is 8% less than the river sand concrete. From all observations, he suggested that at the time of concreting crushed sand should be used with admixture for better workability and strength improvement of concrete.

c. Nimitha Vijayaraghavan, A. S. wayal, "EFFECTS OF MANUFACTURED SAND ON COMPRESSIVE STRENGTGH AND WORKABILITY OF CONCRETE"

This paper states that, the 100% replacement of natural sand by crushed sand, the compressive strength increases by 7.03% and the river sand can be fully replaced by artificial sand. Concrete mix becomes harsh with increase in proportion of manufactured sand.

3. METHODOLOGY

The process of performing a particular work in proper manner i.e. step by step procedure of work. The procedure of work is as follows:

1. Collection of materials from different places
2. Material Testing
3. Mix proportion
4. Cube casting
5. Curing of cubes
6. Check Compressive strength on 7 and 28 days

4. EXPERIMENTAL WORK

In this research work to determine the compressive strength of sand samples collected from Gadhinglaj tahsil, IS specified moulds of size 150mmX150mmX150mm were used. As per mix proportion of M20 (1:1.5:3) the materials were calculated. The constituents (cement, sand, aggregate, water) were weighed and the materials were mixed properly by hand mixing method. The mixes were compacted with tamping rod and vibrated on machine vibrator. These specimen were kept for 24 hours and then demolded, cured for 7and 28 days and tested as per IS standards.

5. RESULTS

a. On the basis of experimental study results obtained are as follows:

1. Compressive strength of River sand

Sr.No.	Age of cube	Weight of cube (Kg)	C/S area of cube (mm^2)	Load (KN)	Compressive strength (N/mm^2)	Avg. Comp. strength (N/mm^2)
1.	7 Days	8.550	22500	435	19.33	18.05
2.		8.540	22500	436	19.37	
3.		8.470	22500	348	15.46	
4.	28 Days	8.240	22500	583	25.91	23.76
5.		8.400	22500	570	25.33	
6.		8.380	22500	451	20.04	

ISSN: 2277-9655
Impact Factor: 5.164
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2. Compressive strength of Hiranyakeshi river sand

Sr.No.	Age of cube	Weight of cube (Kg)	C/S area of cube (mm^2)	Load (KN)	Compressive strength (N/mm^2)	Avg. Comp. strength (N/mm^2)
1.	7 Days	8.390	22500	231	10.26	11.28
2.		8.460	22500	313	13.86	
3.		8.650	22500	219	9.73	
4.	28 Days	8.170	22500	377	16.75	18.97
5.		8.180	22500	382	16.97	
6.		8.540	22500	522	23.200	

3. Compressive strength of Begampuri sand

Sr.No.	Age of cube	Weight of cube (Kg)	C/S area of cube (mm^2)	Load (KN)	Compressive strength (N/mm^2)	Avg. Comp. strength (N/mm^2)
1.	7 Days	7.740	22500	413	18.355	16.940
2.		8.020	22500	411	18.266	
3.		7.790	22500	320	14.220	
4.	28 Days	8.350	22500	474	21.060	21.590
5.		8.420	22500	517	22.970	
6.		8.320	22500	467	20.750	

4. Compressive strength of Rajgoli sand

Sr.No.	Age of cube	Weight of cube (Kg)	C/S area of cube (mm^2)	Load (KN)	Compressive strength (N/mm^2)	Avg. Comp. strength (N/mm^2)
1.	7 Days	7.700	22500	363	16.133	16.118
2.		7.680	22500	412	18.311	
3.		7.560	22500	313	13.911	
4.	28 Days	8.100	22500	623	27.680	26.960
5.		8.180	22500	621	27.600	
6.		8.180	22500	576	25.600	

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Impact Factor: 5.164
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5. Compressive strength of Fonda sand

Sr.No.	Age of cube	Weight of cube (Kg)	C/S area of cube (mm^2)	Load (KN)	Compressive strength (N/mm^2)	Avg. Comp. strength (N/mm^2)
1.	7 Days	7.780	22500	445	19.77	18.34
2.		7.640	22500	355	15.77	
3.		7.520	22500	438	19.48	
4.	28 Days	7.980	22500	566	25.155	25.685
5.		8.170	22500	615	27.330	
6.		8.030	22500	553	24.570	

6. Compressive strength of Crushed sand

Sr. No.	Age of cube	Weight of cube (Kg)	C/S area of cube (mm^2)	Load (KN)	Compressive strength (N/mm^2)	Avg. Comp. strength (N/mm^2)
1.	7 Days	8.800	22500	270	12.00	13.76
2.		8.830	22500	326	14.48	
3.		8.740	22500	333	14.80	
4.	28 Days	8.360	22500	368	16.35	19.64
5.		8.150	22500	426	18.93	
6.		8.640	22500	532	23.64	

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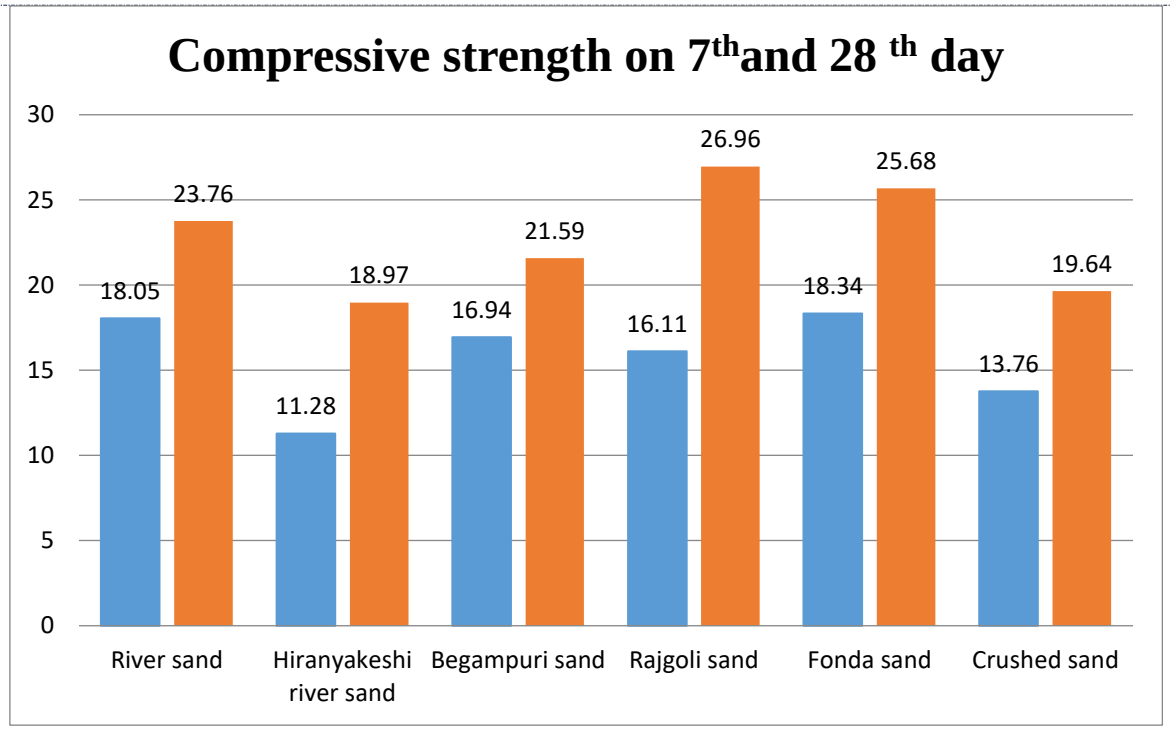

b. Comparison based on cost and compressive strength:

Sr.No.	Name of sand sample	Compressive strength On 28(N/mm^2)	Cost for 1 cu.m concrete preparation (Rupees)
1.	River Sand	23.76	4100
2.	Hiranyakeshi River Sand	18.97	3446
3.	Begampuri Sand	21.59	3921
4.	Rajgoli Sand	26.96	3508
5.	Fonda Sand	25.68	3745
6.	Crushed sand	19.64	3710

6. CONCLUSION

On the basis of results obtained from the research work following conclusions are made,

1) As compared to River sand M-sands are easily available and economical.
2) Cubes manufactured from M-sands satisfy the criteria of design strength.
3) The compressive strength of M-sands can be improved by using admixture.
4) The M-sands are economical as well as good in compressive strength.

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