



Investigation of Compressive Strength of Concrete Made With Bhagodi Black Sand

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ABSTRACT

Since the Urbanization and consequently the utilization of river bedded sand is increasing the value of river bedded sand touching the sky and simultaneously it is causing huge effect on the environment. This burning factor has motivated the authors to do this project research under consideration. This paper presents the effect of the use of Bhagodi black sand as fine aggregate in concrete as substitutes to natural sand. Bhagodi black sand is chiefly available black coloured river sand of Gulbarga area where authors belongs. From the concrete Grade of M20 concrete cubes were cast of size 15x15x15 cms size, and they are cured for 3,7,14, and 28 days in the concrete technological laboratory tank of KCT Engineering College Gulbarga.

KEYWORDS : bhagodi black sand, compressive strength, flexural strength, split tensile strength.

Introduction

Bhagodi black sand is Chiefly available sand in Gulbarga area. On account of the huge prices and legal hurdles of obtaining the river bedded good quality sand Engineers and various agencies are using this chiefly available sand by replacing the good quality river bedded sand of Shahpur area. Currently India has taken a major initiative on developing the infrastructures such as express highways, power projects and industrial structures etc. to meet the requirements of globalization, in the construction of buildings and other structures concrete plays the rightful role and a large quantum of concrete is being utilized. River sand, which is one of the constituents used in the production of conventional concrete, has become highly expensive and also scarce. In the backdrop of such a bleak atmosphere, there is large demand for alternative materials. Since on account of various constraints construction activities in this area of authors is carried out with the cheaply available mud mixed black colored sand which is known as bhagodi sand commonly over in this area. Due to digging of the sand from river bed reduces the water head, so less percolation of rain water in ground, which result in lower ground water level. There is erosion of nearby land due to excess sand lifting as well as it destroys the flora & fauna in surrounding areas. Utilization of river bedded good quality sand and its excavation generates the turbulence created by dredging sand near the estuaries could damage the fragile ecosystem along the coast.

II OBJECTIVES

The objective of this study is to investigate compressive strength of the concrete made with Black bhagodi sand of Gulbarga.

- To study the compressive strength development of concrete made with the utilization of black bhagodi sand and to study the properties of black bhagodi sand.
- To study the development of compressive strength in the normal concrete prepared by using good quality river bedded sand.
- To compare the compressive strength development of concrete prepared by using black bhagodi sand available in Gulbarga and good quality river bedded sand available in Gulbarga.

III. Materials and methodology

CEMENT

The common OPC 53 grade cement is used. The physical properties of the cement tested according to standard procedure conform to the requirement of IS 12269:1989

Table 1 Physical properties of Cement.

S.No	Characteristics	Value obtained experimentally
1	Standard Consistency	33%
2	Fineness (90 micron sieve)	3%
3	Initial setting time	30 minutes
4	Specific gravity	3.0

FINE AGGREGATES

Locally available good quality river sand passing through 4.75mm sieve conforming to the recommendation of IS383-1970 was used.

Table 2 Physical properties of Fine Aggregate River bedded sand

S. No	characteristics	Value obtained experimentally
1.	Fineness modulus	2.95
2.	Specific gravity	2.613

FINE AGGREGATES

Locally available river sand passing through 4.75mm sieve conforming to the recommendation of IS383-1970 was used.

Table 2 Physical properties of Fine Aggregate Bhagodi black sand

S. No	characteristics	Value obtained experimentally
1.	Fineness modulus	3.2
2.	Specific gravity	2.90

COARSE AGGREGATE (Basalt): Locally available coarse aggregate retaining on 4.75mm sieve of basalt stone is used.

Table 3 Physical properties of Coarse Aggregate (Basalt stone)

S.NO	characteristics	Value obtained experimentally
1.	Fineness modulus	7.73
2.	Specific gravity	2.59

Water

Potable water suitable for drinking purpose available in the campus of KCT Engineering college is utilised in the preparation of concrete.

Methodology

The basic tests required on the ingredients of concrete were carried out. Thereafter the mix design of the concrete is done. Then in the material testing laboratory and concrete technology laboratory of KCT Engineering college Gulbarga the mixing of the concrete is done. Concrete cubes of 15cmx15cmx15cm sizes were prepared and cured for 3,7,21, and 28 days of curing is carried out. Then these blocks are removed from the curing tank and tested for compressive strength in Compression testing machine of building material testing laboratory of KCT Engineering college Kalburgi. The results of compressive strength are tabulated in proper tabular columns.

Concrete is prepared is of two types.

1. By using sand of good quality in concrete in place of fine aggregates in concrete, which is termed by the authors over here as the Normal concrete.
2. The concrete prepared by using the black bhagodi sand of gulbarga in place of fine aggregates in concrete, Bhagodi sand concrete.

IV. RESULT AND DISSCUSION

Table 5 Compression strength of Concrete cubes in N/mm²

% of different sands in concrete	3 days	7days	21 days	28days
Good quality sand	10.54	17.78	24.02	26.34

Table 5 Compression strength of Normal Concrete cubes in N/mm²

From the above tabular Colum we can notice that the strength development of normal concrete that is concrete made with the utilization of good quality sand which is available in Gulgarga area are 10.54 N/mm², 17.78 N/mm², 24.02 N/mm² and 26.34 N/mm² at 3,7,21,28 days of curing respectively.

Table 5 Compression strength of Bhagodi sand Concrete cubes in N/mm²

% of different sands in concrete	3 days	7 days	21 days	28days
Good quality sand	9.98	16.88	23.06	25.44

From the above tabular Colum we can notice that the strength development of bhagodi sand concrete that is concrete made with the utilization of bhagodi sand which is available in Gulbarga area are 9.98 N/mm², 16.88 N/mm², 23.06 N/mm², 25.44 N/mm² at 3,7,21,28 days of curing respectively.

The black Bhagodi sand which is far cheaper than the good quality sand (Shahpur sand) is also good for the manufacturing of concrete because the strengths variations in between two types of concretes

prepared with the above sands are not much. Beside this the compressive strength development in the bhagodi sand concrete which is cast for M20 grade of concrete are quite a good.

V. CONCLUSIONS

From the above tabular column values the following conclusions are drawn

In the concrete made with bhagodi black sand which is black in colour the following results of compressive strengths are obtained. 9.98 N/mm², 16.88 N/mm², 23.06 N/mm², 25.44 N/mm² at 3,7,21,28 days of curing respectively.

In the concrete made with the utilization of good quality sand that is shahpur sand which is costly available in the Gulbarga are 10.54 N/mm², 17.78 N/mm², 24.02 N/mm² and 26.34 N/mm² at 3,7,21,28 days of curing respectively.

The black Bhagodi sand which is far cheaper than the good quality sand (Shahpur sand) is also good for the manufacturing of concrete because the strengths variations in between two types of concretes prepared with the above sands are not much. Beside this the compressive strength development in the bhagodi sand concrete which is cast for M20 grade of concrete are quite a good, sufficient enough to be utilised in the construction of structures.

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