

EXPERIMENTAL TEST ON STRENGTH OF CONCRETE BY USING M-SAND AND SUPERPLASTICIZER MASTERRHEOBUILD 918

K.R.DIVYA BHARATHI¹,S.KANCHANA²,S.VEERAMANI³,K.DINESH⁴ S.MATHAN KUMAR⁵
UG Students Civil Engineering¹²³⁴, Assistant professor⁵ Civil Engineering
SreeSakthi Engineering College, Karamadai,Coimbatore,Tamilnadu,India

ABSTRACT; In recent days the demand for river sand is increasing due to growth of construction field. Hence the practice of replacing river sand with M-sand is taking a tremendous growth it is also inferred from the literature that replacement of M-sand produces no appreciable increase in compressive strength. This paper presents the fully replacement of river sand by M-sand with superplasticizer Master Rheobuild 918. This superplasticizer is helps to increase the strength of the concrete with less curing days. The studies reveal that the increasing in percentage of superplasticizer increased in the compressive strength, tensile strength, flexural strength of M₂₅ grade of concrete in less days.

Keywords; Compressive strength, Tensile strength, Flexural strength, M-sand, Superplasticizer, Master Rheobuild 918.

INTRODUCTION;

Concrete is commonly used structural material for all types of construction concrete is the basic need whose ingredients are cement, fine aggregate, coarse aggregate and water. It is used in all types of construction from domestic work of multi-storey, office blocks and shopping complexes. In the recent times its use in construction has been increased considerably thus the cities and towns are virtually becoming concrete jungles. So the cost of construction has been increasing up to 15% every year. The natural sand is very demand in nowadays, In past decade the use of natural sand as fine aggregate are increases the cost of construction so in present investigation the river sand is replaced by the natural sand completely. As the manufactured sand is producing modern techniques it will be completely free from impurities therefore manufactured sand is one of the economical replacement of

river sand. The M-sand used concrete does not achieve strength as natural sand so we are adding superplasticizer Master Rheobuild 918 in the concrete to achieve high strength in less days, this is used to increase the workability of concrete and also attain strength in less days.

EXPERIMENTAL INVESTIGATION;

1.Materials

I.Cement

The cement used is Maha OPC 53 grade cement, the ordinary Portland cement of 53 grade conforming to IS:12269 was used tests were conducted on cement like Setting time, Specific gravity, Fineness modulus the properties of cement are given in Tab.1

SL.NO	PROPERTIES	RESULT
1	Specific Gravity	3
2	Initial Setting Time	30min
3	Final Setting Time	10hrs
4	Fineness Modulus	3%

II.Manufactured sand

The M-sand is crushed aggregates produced from hard rocks from quarry which is cubically shaped with grounded edges, washed and graded with consistency to be used as a fine aggregate in concrete. The sieve analysis was carried out as per IS 383-2016 and confirming to zone II the properties of fine aggregate are given below in Tab 2

SL.NO	PROPERTIES	RESULT
1	Specific Gravity	2.5-2.9
2	Grading Zone	Zone II
3	Water Absorption	0.9
4	Fineness Modulus	2.3

III.Coarse aggregate

The coarse aggregate were crushed angular aggregates of maximum nominal size of 20mm, The aggregate size were tested as per IS-2386 part I. The specific gravity, Water absorption were tested as per IS-2386 part IV, The properties of coarse aggregate are given below in Tab 3

SL.NO	PROPERTIES	RESULT
1	Specific Gravity	2.8
2	Water Absorption	0.8
3	Impact Factor	7.4
4	Abrasion Factor	17.12

IV.Superplasticizer

Master Rheobuild 918 of BASF company has been used as superplasticizer. It will not promote corrosion of reinforcing steel in concrete it ensures that rheoplastic concrete remain workable in excess of 2 hours this product shall comply with IS-9103 and type G and a dosage range of 15ml to 1kg of cement. The product has been mainly used in achieving workability, High performance, High durability characteristic.

Aspect	Dark Brown Free Flowing Liquid
Relative Density	1.18±0.02 at 25 °c
PH	≥6
Chloride ion content	<0.2%

V.Water

In this investigation the preparation of specimens and curing of specimens are done with drinking water.

VI.Mix design

The mix design in this investigation was designed as per the guide lines specified in IS-10262 for M₂₅ grade concrete with 0.45 water cement ratio.

2.EXPERIMENTAL PROCEDURE;

With the mix proportion of 1;1.74;2.84 with corresponds to M₂₅ grade concrete with water cement ratio 0.45. The test specimens are prepared.

I.Compressive strength

In order to find compressive strength cubical shaped specimens of dimensions [150 x 150 x 150 mm] were prepared these specimens are tested in CTM machine having capacity of 2000 KN.

II. Tensile strength

In order to find tensile strength cylindrical shaped specimens of dimensions 150mm diameter and 300mm length were prepared these specimens are tested in CTM machine having capacity of 2000 KN.

III. Flexural strength

In order to find flexural strength beam shaped specimens of dimensions [100 x 100 x 500mm] were prepared these specimens are tested in flexural testing machine and test is carried out by two point loading in 100mm effective span.

3. RESULT AND DISCUSSION

I. Compressive strength of concrete.

The test is carried out confirming to IS 516-1959 to obtain compressive strength of concrete at the 7 days, 14 days, 28 days, the cubes are tested using 2000 KN capacity compressive testing machine the result are presented in Tab 5

Sl.no	Days	M-Sand Without Superplasticizer	M-Sand with Superplasticizer
1	7days	23.5	28.3
2	14days	28	32.4
3	28days	32.7	38

Tensile strength of concrete.

The test is carried out for cylinder specimen to obtain tensile strength of concrete at the 7 days, 14 days, 28 days, the cylinder are tested using 2000 KN capacity compressive testing machine the result are presented in Tab 6

Sl.no	Days	M-Sand Without Superplasticizer N/mm ²	M-Sand With Superplasticizer N/mm ²
1	7 days	6.41	8.33
2	14 days	8.16	10.91
3	28 days	10.25	12.58

Flexural strength of concrete.

The test is carried out for prism specimen to obtain tensile strength of concrete at the 7 days, 14 days, 28 days, the cylinder are tested using flexural testing machine the result are presented in Tab 7

Sl.no	Days	M-Sand Without Superplasticizer N/mm ²	M-Sand With Superplasticizer N/mm ²
1	7 days	2.83	3.96
2	14 days	4	5.3
3	28 days	5.41	6.8

CONCLUSION;

The fully replacement of natural sand by M-sand will result in the strength of the concrete, the concrete without superplasticizer achieves the Compressive strength, Flexural strength, Tensile strength at the 28th day test is not appreciable so we use the superplasticizer Master Rheobuild 918 to increase the strength [compressuasive, Tensile, Flexural] of the concrete in less curing days and it also improves the workability of the concrete. So it is useful for the future generation to achieve the high performance and high durable buildings by saving natural resources. This type of concrete is helps to utilize the most precious water and time

REFERENCE

I.B.K.Tuljaramsa and V.D.Gundakalle [2015]

The replacement of Msand for natural sand were satisfactory and it increased the compressive strength and the bond strength. But the % of Msand is up to 30%, the flowing capacity decreased continuously.

II.R.Lakshmi Priyanka B.Ravi Kiran [2017]

The compressive strength of the concrete cube has maintained up to 40 % when fine aggregate replaced by Msand. Compare to the compressive strength of 10%,20%,of addition of Msand, the compressive strength 30%,40%,50%,60%, fly ash concrete has been decreased.

III. Dr.M.Shahul Hameed [2016]

The fully substitute of river sand by Msand, which have achieved an equal compressive strength of natural sand at the 7 days and 28 days. Due to the filler effect of GGBS is increased the compressive and split tensile strength of Msand concrete.

IV. Mr.Manu Vijay , Mr.Srivathsa [2017]

The compressive strength of the concrete by using Msand is marginally higher 6%-9% when compared to the concrete using Msand. They use metakaoline to increase the workability of fresh concrete.

