Effect on Compressive Strength of Concrete by Addition of Polypropylene Fiber in M20 Grade of Concrete

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Abstract- The paper deals with the effects of addition of various proportions of polypropylene fiber on the properties of high strength concrete m20 mixes.An experimental program was carried out to explore its effects on compressive strength under different curing condition. the main aim of the investigation program is to study the effect of polypropylene fiber mix by varying content such as 0%,0.5%,1%,1.5%,2% and find the optimum polypropylene fiber content.the concrete specimen were tested at different age level for mechanical properties of concrete name compressive strength of the concrete .a detailed study was carried out of curing conditions .the increase were compressive strength.

KEYWORDS-Ordinary portland cement,polypropylene fiber, different curing condition.

1.INTRODUCTION

The use of fiber in building material to improve their behavior is an old and intuitive concept.example include adding straw fiber to sun dried mud brick and asbestos fibers to pottery to a composite with a better performances.ppf are display large variations in fiber properties from plant to plant, such as strength,and fiber length and cross section area.the fiber are three types steel fiber,glass fiber polypropylene fiber.these fiber provide no post crack benefit and are used only for shrinkages cracking and not to provide improvement to other engineering properties.the amount of polypropylene fiber fiber recommended by most manufactures for use in paving mixtures and most other mix 0.1% by volume of concrete(0.889to0.950kg/cubic.meter) researchers have experiment with fiber volume up to 7%. greaterthan 2% normally involve the use of continuous fiber which are not usually considered for paving applications due to constructability problems fiber volume up to 0.5% can be use without major adjustment to the mixture proportions as volume level approach0.5% .air entraining and water reducing admixtures are required.

1.1 MATERIALS

Concrete is one of the most versatile building materials. It can be case to fit any structural shape it is readily available in urban areas at relatively low cost.concrete is strong under compression and weak under tension and a relatively brittle material of the reinforced is needed. The most common types of concrete reinforce is by steel bars .the advantage of using concrete include high compressive strength,good, fire resistance, high water resistance, low maintenance and long service life,it also has a few disadvantage like poor tensile strength and formwork requirement. PPF reinforced concrete is a mix that contains short discrete fiber and uniformly.

1.2 POLYPROPYLENE FIBER

The polypropylene filaments are ciose by a mono filamen form type and fit in thermoplastic polypropylene gathering. The polypropylene filaments are warmth soft, more be misshaped. Polypropylene strands are genuinely hydrophobic. polypropylene filament have been utilized at minimal inside to oversee plastic shrinkage splitting concrete the fiber are three types in steel fiber ,glass, fiber polypropylene fiber

2 CEMENT

The ordinary portland cement was used in this work

2.1 FINE AGGREGATE

The portion from 4.75mm to 150 microns are named as fine aggregate the water way sand is utilized in blend as fine aggregate adjusting to the prerequisites.the stream sand is washed to kill malicious materials and particle

2.2 COARSE AGGREGATE

The aggregate are obtained because of regular assignment of and rock and manually smashing of the stone.

Present experimental study was conducted to determine the optimum dosage of polypropylene fiber. The mechanical properties of fiber reinforced concrete were investigation by including polypropylene fiber .the standard cube test specimens, cylinder test

specimen and prism test specimen were casted ,cured and tested for 7 &28 days as per rules Indian standard guideline. In this experimental study it was found that the optimum dosage of polypropylene fiber was 0.05% by volume of concrete and exhibited convincing behavior speartly to hpc at the specifiedoptimum dosage.also the test results showed that use of polypropylene fiber reinforced concrete improve compressive strength and tensile strength compared to conventional concrete.

OZA.ET AL 2014 study the effect of fiber loading the different types of matrix on the hemp fiber reinforced composites . the composites were prepared using both recycled high density polethylene and virgin high density polyethylene .the mechanical and theme mechanical properties were also studied .the surface morphology and chemical composition of hemp fiber after treatment was analyzed by scanning electron microscope and transform infrareurier spectroscopy findings indicate that a 5wt%naoh treatment effectively improved the fiber matrix interface resulting in improved mechanical properties. with respect to both mechanical and merino mechanical properties

Salahaldein alsadey 1, muhsen salem2 et,al,2016 to study the effect of polypropylene fiber on compressive strength of concrete,the experimentation is conducted in the laboratory. based on the experimentation conducted , on the cube with different percent of polypropylene fiber the following some conclusions were drawn.1. the reduction of slump is noticed with increase in polypropylene fiber content ,especially beyond 2% dosage ,the mix become fiber which results in difficulty in handling 2. the compressive strength tests reveal that the strength were increase proportionately with the increase in volume ratios of polypropylene fiber with reference to the control mix with fiber . 3. the percentage increase of compressive strength of ppf concrete mixes compacted to the mix without is observed from 4to12% ,4. the sample with polypropylene fiber content of 2% showed optimum results in comparison with other sample in study.

- Fineness modulus =6.446
- Specific gravity =2.7
- Water absorption =1%
- Nominal maximum aggregate size =20mm

B. Fine aggregate

1 Fineness modulus = 2.70

2 Specific gravity =2.62

3 Water absorption =1.5%

4 Free surface moisture =2%

C. Cement

1 Initial setting time =29min

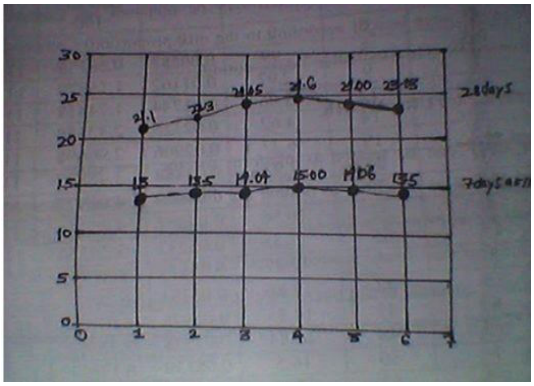
2 Fine setting time =596 3 Soundnes s = 7.62 mm

3 Fineness = 226.5m squire/ kg.

Compressive strength test result 7 and 28 days in M20

S.NO	M20+POLYPROPYLENEF(COMPRESSIVE STRENGTH)			
0	—	7 days	—	28day
1	0%	13	—	21.1
2	0.25%	13.5	—	22.03
3	O.5%	14.05	—	24.05
4	1%	15	—	24.6
5	1.5%	14.6	—	24.00
6	2%	13.5		—

Average of 3 specimen



Compressive Strength Graph Variation in M20 after 7 and 28 days

FUTURE SCOPE

1. The polymer matrix for example can use instead of polypropylene fiber

2.Experiment can be made by use some alternative chemical treatment which has produced good results according to literature.

3. The effect of various fiber can be explore for improvement in characteristics of the composite.

4 The present work can be extend by fiber other than hemp like grass coconut banana.

CONCLUSIONS

In the light of the preceding result and discussion,the following can be concluded:

1) The addition of polypropylene fiber increases the compressive strength by 6.0% with0.25% of fiber than starts decreasing with increase in fiber.
2) High quantities of fiber produce concrete with poor workability and segregation, higher entrapped air and lower unit weight.
3) A significant effect on the mode and mechanism of failure of concrete cylinders in acompression testing with fiber reinforced concrete.
4) The concrete with fiber in it fails in a more ductile mode.
5) It improves the tensile and cohesion of concrete.
6) The fiber concrete faile in more ductile mode a like the plain concrete that getsshattered into pieces.
7) The use of fiber reinforced concrete in columns as alternative solution to plain.
8) The usage of fiber reinforced concrete in foundation as alternative solution to plainconcrete reduces 17.5% of concrete quantity and reduces 8.5% of the concrete cost.

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