ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Replacement of Cement and Fine Aggregatein Concrete by Using Domestic Waste Plastic Fibers

Salim Abbas Shafe
Master of Engineering,
Dept of Civil Engineering, University College of Engineering,
Osmania University, Hyderabad, India.

ABSTRACT:

As the world populace develops. On these lines deal with the same and the sorts of squanders being created numerous squanders deliveries today will stay in the environment for hundreds and maybe a huge turn of years.The creation of non-rotting waste materials, fused with a developing shopper populace, has a resultedinwaste transfer emergency, One answer for this emergency lies in reusing squanders into helpful items.Because of fast industrialization and urbanization in the nation a ton of advancements are bringing place.This system thus, drove inquiries of human race to assume charge of the issue created by this improvement.The issues characterized are intense lack of constructional material, expanded profitability of squanders and other livestock. For custom development work M20 grade cement is used, consequently in this undertaking M20 evaluation of cement with an alternate water bond proportion has been chosen.

Plastic fiber strengthened cement is a composite fabric comprising of concrete based lattice with a requested or arbitrary dispersion of character which can be contamination etc..The compositions of 90 numbers, chamber 20 and shaft 20nombers were thrown to test for compressive quality, split elasticity and flexural quality.In the present examinations to inspect the impact on mechanical properties of the expansion of polyethylene strands (household waste plastics) at a measurement of 0.0%, 0.2%, 0.4%, 0.5% and 0.6% by weight of attachment and fine total of M20 evaluation of cement. The ideal waste plastic fiber was observed to be 0.5% at 0.45 water concrete proportions. The solid works utilizing modifier can be applied for the articulation of unbending asphalts which prompts the decrease in the general greatness of the glade.

Keyword:

Domestic plastic fiber, Compressive strength, Split tensile strength, Flexural strength of concrete.

INTRODUCTION:

Cement is by a wide margin the most broadly utilized building material today. The Versatility and mold capacity of this cloth, its high compressive quality has offered to a great extent to its extensive role. It can legitimately be expressed, this is the time of cement. Solid, where a bond is connected as tying material is called concrete cement. The bond cement is one of the clearly straightforward, all things considered complex materials. Inside and out, however the fast advances have been achieved amid the last couple of decades in the path and learning about solid, a significant number of its complexities are so far to be distinguished to use this material beneficially and financially. At that place are apparently numerous components during the time spent solid making, apparently tend to yield a result of fairly uncertain properties.In this arrangement of assault, it is tough to take up other material of a building which is only as flexible as concrete. The characteristics of cement, basically rely on upon the fixings utilized as a portion of solid making.The principle essential materials used as a part of making cement will be concrete, sand, pulverized stone and water.

Despite the fact that the manufacturer guarantees the nature of bond, it is difficult to find an issue evidence concrete.It is a consequence of the way that the development material is concrete and not just bond. The properties of sand, squashed stone and water, if not utilized as indicated, reason significant inconvenience in cement. In furtherance to this workmanship, tone control and routines for context is likewise assumed the main character on the traits of concrete. Many researchers everywhere throughout the globe have endeavored to alter the characteristics of traditional concretetosuit the individual needs. The changes were for the most part acknowledged in the nature of the solid making, textiles. To commence with, numerous added substances were attempted as opposed to fluctuating the materials employed.Added substances, by and large respond with bond to change the solid properties, were fabricated.

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

A couple of endeavors were put together to create the lightweight cement by utilizing air performers, going over procedures and making empty blocks.

They offered the reason some assistance with up to some degree. Today, like never before some time lately, the structural specialist is called for that commit thought and time to the issues of solid setting and exercise.

The results achieved in the arena by the development engineer and the solid monitor rely on their insight into cement and of the material from which it is made.

RESULTS:

The results obtained from test examination to examine the mechanical traits of utilization, waste plastic fiber in cement M20 grade with various water bond ratio. The study was directed to retrieve out the impact of waste plastic fiber on cement mechanical properties.Solid 3D square example size 150 X 150 X 150 mm were thrown utilizing plastic substance of 0.0%, 0.2%, 0.4%, 0.5% and 0.6% (by weight of the cement+ weight of fine aggregate).Similarlyblocksof plain bond cement was likewise shed. At that point examples were subjected to rehashed stacking tests at the pace of 60 rounds/minute. The compressive test did in 7 , 14 and 28 days.Comparison of the compressive strength of different w/c and different FRP % in 28 days.

%FRP	Compressive Strength 28 day w/c 0.45	Compressive Strength 28 day w/c 0.5	Compressive Strength 28 day w/c 0.5
0%	34.44	34	33.78
0.20%	33.78	33.33	33.56
0.40%	35.11	34.67	34.44
0.50%	36.67	35.78	34.89
0.60%	36	35.6	34.49

Table1: Relation between FRP percentage with w/c percentage in 28 days

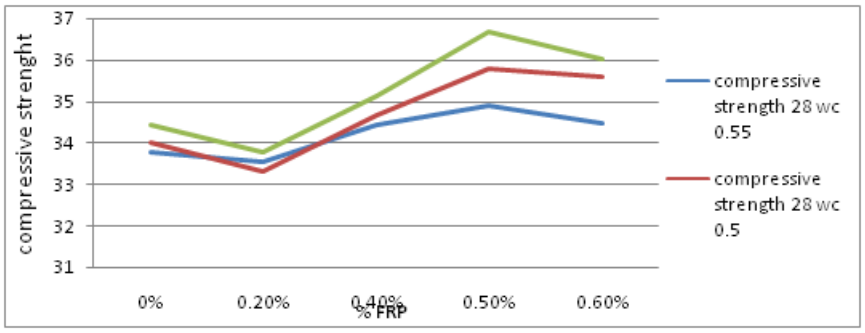

Figure 1: Relation between FRP percentage with w/c percentage in 28 days

The above structure the estimations of compressive quality of solid shapes at 28 days for the typical cement without fiber and with diverse rates of FRP, it is portraying an expansion of compressive quality at 0.5% FRP at 0.45 water concrete proportions.Equation of the compressive quality of various w/c and diverse FRP % in 14 days.

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

%FRP	Compressive Strength 14 day wc 0.45	Compressive Strength 14 day wc 0.5	Compressive Strength 14 day wc 0.5
0%	30	30.22	30.22
0.20%	29.33	29.78	30.44
0.40%	30.89	30.22	30.67
0.50%	31.78	32	31.56
0.60%	31.11	30.67	31.11

Table 2: Relation between FRP percentage with w/c percentage in 14 days

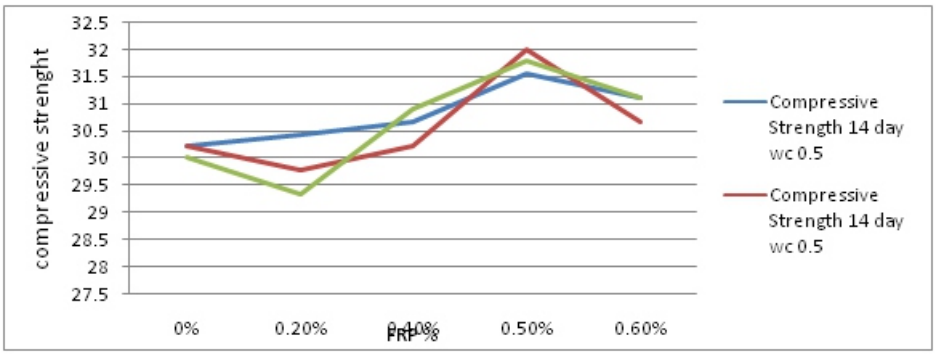

Figure 2: Relation between FRP percentage with w/c percentage in 14 days

The above structure the estimations of compressive quality of 3D squares at 14 days for ordinary cement without fiber and with diverse rates of FRP, it is delineating an expansion of compressive quality at 0.5% FRP at 0.5 water concrete proportion. Similarity of the compressive quality of various w/c and distinctive FRP % in 7 days.

%FRP	Compressive Strength 28 day w/c 0.45	Compressive Strength 28 day w/c 0.5	Compressive Strength 28 day w/c 0.5
0%	21.33	23.11	22.44
0.20%	22.66	22.89	22.22
0.40%	22.44	22.66	22
0.50%	23.55	23.33	22.66
0.60%	22.89	22.44	21.78

Table 3: Relation between FRP percentage with w/c percentage in 7 days

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

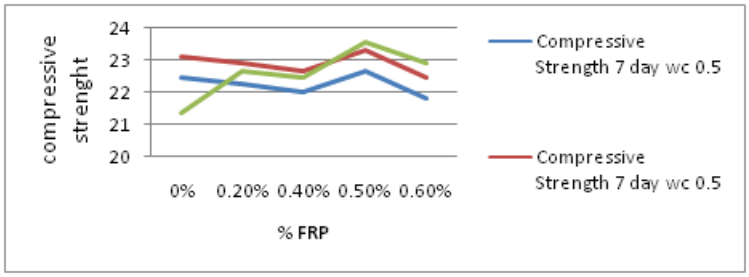

Figure 3: Relation between FRP percentage with w/c percentage in 7 days

The above structure the estimations of compressive quality of solid shapes at 7 days for ordinary cement without fiber and with diverse rates of FRP, it is portraying an expansion of compressive quality at 0.5% FRP at 0.45 water bond proportion.Testing of most extreme compressive quality with FRP and without FRP in w/c 0.45.

%FRP	Compressive strength age for 7days	Compressive strength age for 14days	Compressive strength age for 28days
0.5%	23.55	31.78	36.67
0.0%	21.33	30	34.44

Table 4: Maximum compressive strength with FRP and without FRP in w/c 0.45

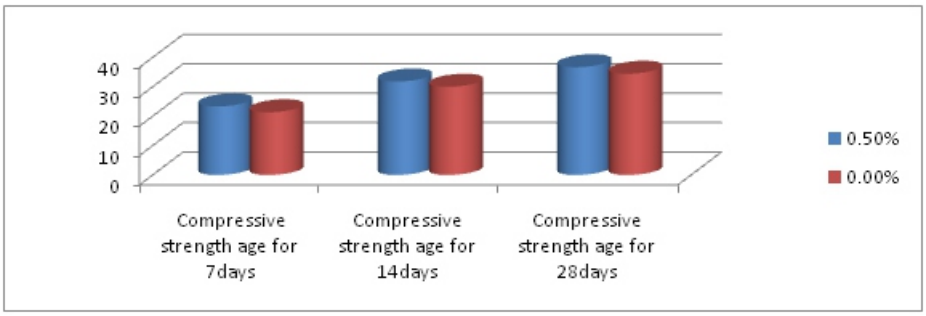

Figure 4: Maximum compressive strength with FRP and without FRP in w/c 0.45

The above structure the most extreme estimations of compressive quality of 3D shapes at 7, 14 and 28 days for ordinary cement without fiber and with FRP, it is delineating an expansion of compressive quality at 0.5% FRP at 0.45 water concrete proportions. Correlation of blend compressive quality with FRP and without FRP in w/c 0.5

%FRP	Compressive strength age for 7days	Compressive strength age for 14days	Compressive strength age for 28days
0.5%	23.33	32	35.78
0.0%	21.33	30	34.44

Table 5: maximum compressive strength with FRP and without FRP in w/c 0.5

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

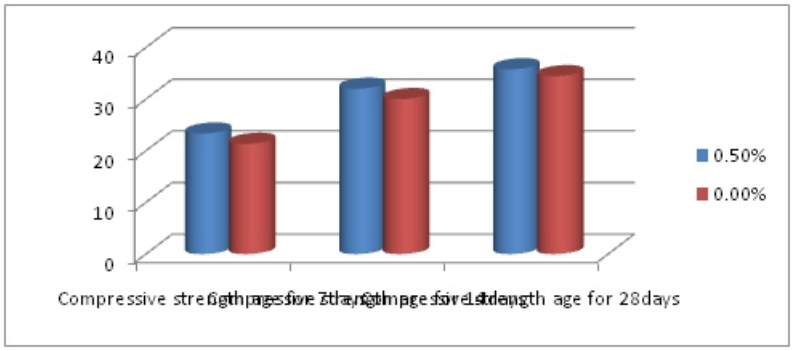

Figure 5: maximum compressive strength with FRP and without FRP in w/c 0.5

The above structure the most extreme estimations of compressive quality of 3D shapes at 7, 14 and 28 days for the typical cement without fiber and with FRP, it is delineating an expansion of compressive quality at 0.5% FRP at 0.5 water concrete proportion. Normal Comparison of most extreme compressive quality with FRP and without FRP in w/c 0.55

%FRP	Compressive strength age for 7days	Compressive strength age for 14days	Compressive strength age for 28days
0.5%	22.66	31.56	34.89
0.0%	22.44	30.22	33.78

Table 6: maximum compressive strength with FRP and without FRP in w/c 0.55

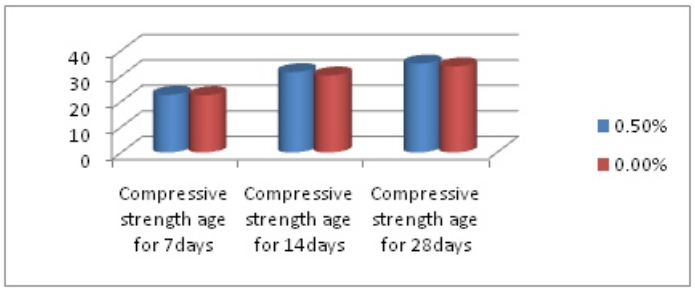

Figure 6: maximum compressive strength with FRP and without FRP in w/c 0.55

The above structure the most extreme estimations of compressive quality of 3D squares at 7, 14 and 28 days for the typical cement without fiber and with FRP, it is portraying an expansion of compressive quality at 0.5% FRP at 0.55 water concrete proportions. Correlation of greatest compressive quality in ages of 7 days and 14 days:

Water/cement ratio	14days strength/ 7 days strength	14days strength/ 7 days strength *100
0.45	1.349	134.9
0.5	1.371	137.1
0.55	1.392	139.2

Table 7: Comparison of compressive strength in ages of 7 days and 14 days

* Comparison of maximum compressive strength in ages of 7 days and 28 days

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Water/cement ratio	28days strength/ 7 days strength	28days strength/ 7 days strength *100
0.45	1.390	139.0
0.5	2.133	213.36
0.55	1.4727	147.273

Table 8: Comparison of compressive strength in ages of 7 days and 28 days

Test Result Splitting Tensile Strength Of Concrete:

The splitting tensile quality test result for all example in 28 days the outcome with filaments and without strands show in various water concrete proportions. The part elasticity test results for all examples at 28 in 0.45 water cement.

no	% waste plastic fiber	Splitting tensile strength
1	0.0	2.39
2	0.2	2.33
3	0.4	2.4
4	0.5	2.45
5	0.6	2.43

Table 9: Splitting tensile strength test at 28 days in 0.45 w/c

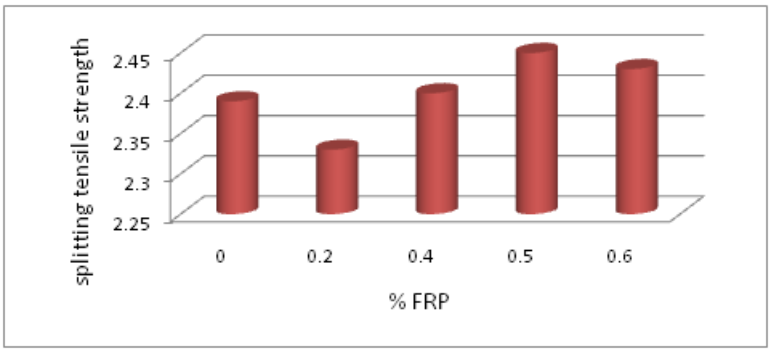

Figure7:Splitting tensile strength test at 28 days in 0.45 w/c

No	% fiber plastic	splitting tensile strength
1	0.0	2.36
2	0.2	2.31
3	0.4	2.37
4	0.5	2.42
5	0.6	2.41

Table 10: Splitting tensile strength test at 28 days in 0.50 w/c

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

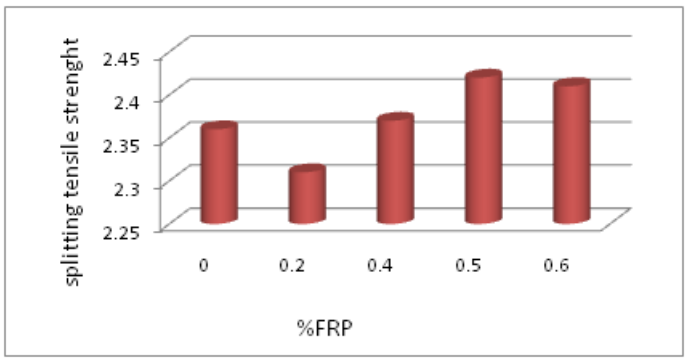

Figure 8: Splitting tensile strength test at 28 days in 0.50 w/c

No	% fiber plastic	splitting tensile strength
1	0.0	2.35
2	0.2	2.31
3	0.4	2.34
4	0.5	2.39
5	0.6	2.32

Table 11: Splitting tensile strength test at 28 days in 0.55 w/c

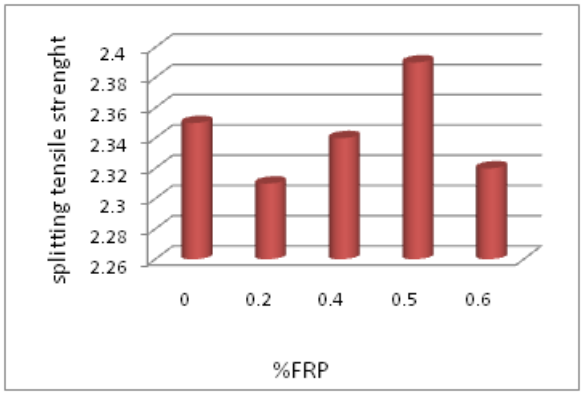

Figure 9: Splitting tensile strength at 28 days in 0.55 w/c

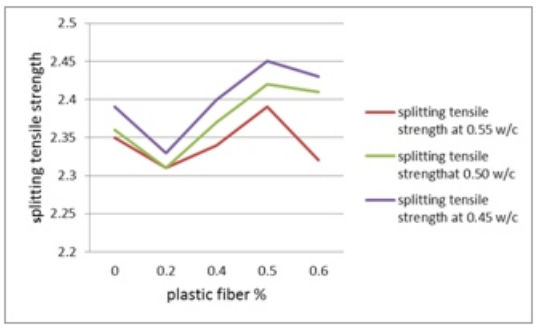

Figure 10: Splitting tensile strength at 28 days vs % plastic fibers at different w/c

4.4 Result Flexural Strength of Concrete:

The flexural quality of solid test result for all examples at 28 days the outcome with strands and without filaments in various water bond proportion. The extent of the example 150mm distance across and 300mm high. The flexural quality of solid test result for all examples at 28 in 0.55 water bond proportion table (25).

No	% fiber plastic	flexural strength
1	0.0	3.48
2	0.2	3.44
3	0.4	3.51
4	0.5	3.6
5	0.6	3.57

Table 12: Flexural strength at 28 days in 0.55 w/c

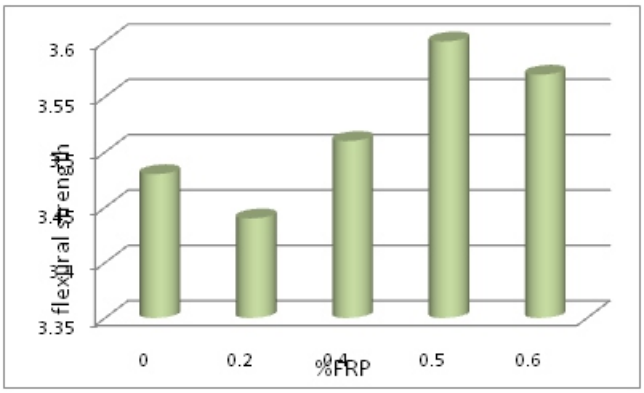

Figure 11: Flexural strength at 28 days in 0.55 w/c

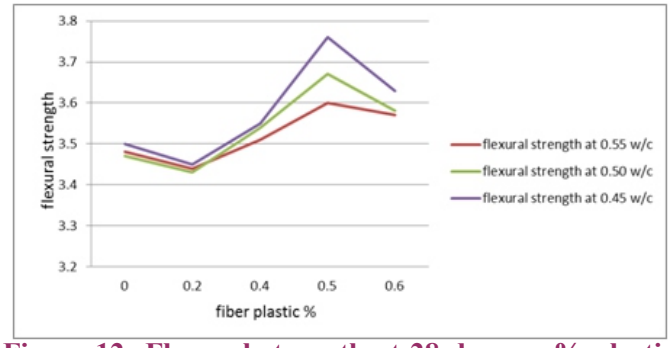

Figure 12: Flexural strength at 28 days vs % plastic fibers at different w/c

DISCUSSION:

The compressive quality of M20 evaluation of the cements expanding as the segment of the waste plastic fiber increase. Compared to the compressive quality of ordinary Concrete 0% waste plastic fiber with cement utilized

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

(0.2%, 0.4%, 0.5%, 0.6%) at 0,45 water bond proportion this expansion was found out to be 2% less for 0.2% fiber, 1.9% More for 0.4%, 6.4% more for 0.5% fiber and 4.5% more for 0.6% fiber.The greatest increase in compressive quality is 6.4% for 0.5% waste plastic fiber.Contrasted with the compressive quality of traditional Concrete with cement utilized (0.2%, 0.4%, 0.5%, 0.6%) at 0.5 water bond proportion this expansion was found out to be 2% less for 0.2% fiber, 1.9% More to 0.4%, 5.2% more for 0.5% fiber and 4.7 more for 0.6% fiber.The most extreme increase in compressive quality is 5.2% for 0.5% waste plastic fiber contrasted with the compressive quality of typical Concrete with cement utilized (0.2%, 0.4%, 0.5%, 0.6%) at 0,55 water bond proportion this expansion was found out to be 0.7% less for 0.2% fiber, 1.9% More to 0.4%, 3.2% more for 0.5% fiber and 2.1% more for 0.6% fiber.

The most extreme increase in compressive quality is 3.2% for 0.5% waste plastic fiber, the greatest increase in compressive quality is 6.4% for 0.5% waste plastic fiber at 0.45 water bond proportion.Alluding to Table (9,10,11,15,16,17) and the Fig (4,5,6) compressive quality change of waste Plastics cements can be distinguished. Case in point for the situation M20 concrete with 0.5% waste plastic substitution the 7 days quality of 23.55 N/mm2 is expanded to 36.67 N/mm2 at 28 years old days. And then on that point will be definitely a further evolution in the compressive quality at the age over 28 days.In similar manner, there are significant expansions acquired in quality with the time of different rates of waste plastics as well.

The examination aftereffect of partial elasticity for M20 evaluation of cement with various rates of fiber 0.2%, 0.4%, 0.5% and 0.6% saw to be more than that of routine cement 0.0%fiber at 0.45 water concrete proportions. It is noted that the pliable part quality expanded up to 0.4% to 0.4 %, 2.5% to 0.5 % and 1.6% to 0.6 %, and diminish 2.6% to 0.2 %. The most extreme of the split elasticity 2.5% at 0.5 %. So also for 0.5 water bond proportion, it is noted that the malleable part quality expanded up to 0.4% to 0.4 %, 2.5% to 0.5 % and 2.1% to 0.6 %, and diminish 2.2% to 0.2 %. The most extreme of the split elasticity 2.5% at 0.5 %. Correspondingly for 0.55 water bond proportion, it is noted that the pliable part quality expanded up to 1.7% from 0.5 %, and diminishing to 1.8% for0. 2 %, 0.5%for 0.4% and 1.3% to 0.6%. The greatest of the split elasticity 1.7% at 0.5 %.

The most extreme increment in split rigidity is 2.5% for 0.5% waste plastic fiber at 0.45 water bond proportion. The flexural quality for M20 evaluation of cement with various substitutions (0.2%, 0.4%, 0.5%, 0.6%) fiber at 0.45 water bond proportion saw to be more than that of customary cement 0.0% fiber is 1.5%less for 0.2%, 1.4% more for 0.4%, 7.4%more for 0.5% and 3.7% more for 0.6%. . The most extreme flexural quality of cement is 7.4% at 0.5% fiber. It has been demonstrated in the table (23) and in the figure (15,18). The flexural quality for M20 evaluation of cement with various substitutions (0.2%, 0.4%, 0.5%, 0.6%) fiber at 0.45 water bond proportion saw to be more than that of traditional cement 0.0% fiber is1. 2 % less for 0.2%, 2% more for 0.4%, 5.7% more for 0.5% and 3.1% more for 0.6%. The most extreme flexural quality of cement is 5.7% at 0.5% fiber. The flexural quality for M20 evaluation of cement with various substitution (0.2%, 0.4%, 0.5%, 0.6%) fiber at 0.45 water bond proportion saw to be more than that of customary cement 0.0% fiber is1. 2 % less for 0.2 , 0.8% more for 0.4%, 3.4% more for 0.5% and 2.5% more for 0.6%. The greatest flexural quality of cement is 3.4 at 0.5% fiber. The most extreme increase in flexural quality is 7.4% for 0.5% waste plastic fiber at 0.45 water bond proportion.

Conclusion:

For the situation M20 concrete with 0.5%wasteplastics substitution the 7days quality of 23.55 N/mm2 is expanded to 36.67 N/mm2 at 28 years old days. At the stage when the power is looked at of changed ages 7 and 28 days the quality expanded to 55 % and henceforth we can explain the life time expanded half time when we utilize this household waste plastics as strands in cement.Henceforth the plastic is a non-degradable material it doesn't debase in the ground gives better outcomes when added to concrete and builds the life of cement.As plastic is less in weight it likewise cuts the thickness of cement with more character.For 28 days results we got the most idealistic world, even at the same time it might increment with period of cement. Future examinations should be possible on expansion of notable periods. The waste plastic fiber shows increment in the compressive quality, split elasticity and flexural quality of cement. At 0.2% waste plastic fiber seen the compressive force, split rigidity and flexural quality of cement because of the absence of relationship between's solid components. The ideal rate of the waste plastic fiber it 0.5% at 0.45 water bond proportion.

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

The survey can be extended out to higher stages of cement to examine the compressive, flexural and qualities of cement.Look into the performance of cement underneath the impact of high temperature and saturation on the compressive, flexural and qualities of cement, for the same symmetries.The probe of the quality of solid utilizing the same properties snapped a long haul test 90 days, 180 days and 360 days.Further testing can be stretched out to focus on the flexural and bendable conduct of cement for same extents.

REFERENCE:

1.Amit Gawandea, (2012),"An overview of waste plastic utilization in asphalting of roads" Journal of engineering research and surveys, Vol.3,No.2, pp 01-05.

2.Bhogayata1, (2012) "Performance of concrete by using Non-recyclable plastic wastes as concrete constituent"International Journal of Engineering Research & Technology (IJERT), Vol.1, No. 4, PP 1-3.

3.P. Muthupriya, k. Subramanian and B. G. Vishuram, (2011)"experimental investigation on high performance reinforcement concrete column with silica fume and fly ash as admixtures" journal of structural engineering, Vol. 38, No. 1, pp. 46-59.

4.Naik, T.R, S.Ssingh, C.O.Huber and B.S. Brodersen ,(1996). use of post-consumer waste plastics in cement based composites .cement and concrete research, Vol. 26, No. 10, PP 1489-1492.

5.kandasamy and r.murugesan,(2012),"fiberreinforeced self-compacting concrete using domestic waste plastics as fibres " journal of engineering and applied sciences, Vol. 7, No. 6, PP 405-4010.

6.Faisal Fouad Wafa(1990),"Properties and Applications of Fiber Reinforced Concrete" King Abdulaziz University JKAU engineer and sciences, Vol. 2, PP 49-63.

7.Ravikumar G and Manjunath M (2015), "Investigation on Waste Plastic Fibre Reinforced Concrete Using Manufactured Sand as Fine Aggregate"International Research Journal of Engineering and Technology (IRJET), Vol. 2, No. 4, PP 183-186.

8.J. SimsonJose and Mr. M. Balasubramanian (2014)," Experimental Investigation of Characteristics of Polythene Waste Incorporated Concrete" International Journal of Engineering Trends and Technology (IJETT), Vol.10, No.7, PP.346-351.

9.Nibudey. R.N, Nagarnaik. P. B, Parbat. D.K and, Pande. (2013),"Cube and cylinder compressive strengths of waste plastic fiber reinforced concrete"international journal of civil and structural engineering, Vol.4, No.2, PP.174-181.

10.Amit Rai and Dr. Y.P Joshi (2014) "Applications and Properties of Fibre Reinforced Concrete"Amit Rai et al Int. Journal of Engineering Research and Applications, Vol. 4, No. 5, PP.123-131.

11.D.B. Pansuriya and A. C. Bhogayata(2015)"Development of Stress-Strain Curves for the Conventional Cement Concrete Containing Aluminum Metalized Post Consumer Plastic Waste".IJSRD - International Journal for Scientific Research & Development, Vol. 3, No.2,PP 2459-2460.