MAPLE TREE PUBLISHING HOUSE

INTERNATIONAL RESEARCH JOURNAL OF MULTIDISCIPLINARY TECHNOVATION (IRJMT)

http://www.mapletreejournals.com/index.php/IRJMT
Received 21 August 2019 ISSN 2582-1040
Accepted 16 September 2019 2019; 1(6); 235-239
Published online 02 November 2019

Comparative Study on Mechanical Strength Properties of Concrete by Using Demolished Concrete Waste

K.Sabarinathan[1*], R.Ashwathi[2]

[1] *Assistant Professor, Department of Civil Engineering, Excel Engineering College, Komarapalayam.Tamil Nadu, India.*

[2] *Assistant Professor, Department of Civil Engineering, BIT, Sathyamangalam, Tamil Nadu, India.*

**Corresponding author E-Mail ID: civilsaba@gmail.com,*

Doi: https://doi.org/10.34256/irjmtcon30

ABSTRACT

The growing environmental awareness and Construction waste, is increasing day by day which in turn makes the world in seeking for examining the characteristics of Construction waste and obtaining a solution by using its reliable segments such that it can be used as a raw material and Conservation the natural recourses like Coarse aggregate

***Keywords: Construction waste, natural recourses*.**

1. INTRODUCTION

Construction is a major part of the development for all the developing countries including India. Concrete is mostly used in construction material in the world.

Construction and demolition waste is generated whenever any construction or demolition activities such as building roads, bridges, flyover, subway, remodeling etc., takes place. It consists essentially of inert and non-biodegradable materials such as concrete, plaster, metal, wood, plastic etc. Recovery of aggregate from construction and demolition waste by the recycling may reduce the demand.

Concrete is very strong in compression but weak in tension. Concrete is a relatively brittle material when subjected to normal stresses and impact loads. So we can use the Concrete waste as fine as well as coarse aggregate and able to give the good compressive strength comparatively conventional concrete

OBJECTIVE

- To find the optimum percentage of replacement in the mix.
- To increase the strength of concrete and reduce the micro internal cracks in concrete.
- To find out the percentage of increase in strength property.

MATERIALS

CEMENT

Cement is a binding material concrete which binds the other materials to form a compact mass. Generally, OPC is used for all engineering construction works, OPC cement of 53 grade

used for investigation. When cement is mixed with water, chemical reaction takes place as a result of which the cement paste sets and hardens into a solid mass.

Table 1. Properties of cement

S.No.	Properties	Value
1	Consistency	30%
2	Initial setting time	35 minutes
3	Final setting time	10 hours
4	Fineness Modulus	3.5 %
5	Specific gravity	3.15

FINE AGGREGATE

A concrete with better quality can be made with sand consisting of rounded grains rather than angular grains. In this research, demolished waste concrete has been used as fine aggregate. The specific gravity of sand is determined using pycnometer test. Locally available clean and sun-dried sand passing through 4.75mm IS sieve and retained on 150 micron IS sieve is used for the experiments.

Table 2. Properties of fine aggregate

S.No.	Properties	Value
1	Consistency	30%
2	Initial setting time	35 minutes
3	Final setting time	10 hours

COARSE AGGREGATES

Aggregates must be clean and free impurities. The coarse aggregate obtained from locally available sales quarries used for this project study. The sieve analysis result shows that the coarse aggregate confirms to single nominal size of 20mm.

Table 3: Properties of coarse aggregate

S.No.	Properties	Value
1	Specific gravity	2.60
2	Fineness modulus	3.77
3	Grading	Zone –II

WATER

Clean potable freshwater, which is free from concentration of acid and organic substances, has for been used for mixing the concrete.

The major factor controlling strength, everything being equal, is the amount of water used per quantity of cement. Maximum strength is obtained by proper water-cement ratio.

Table4: Properties of water

S.No.	Properties	Value
1	Appearance	Clear liquid
2	Specific gravity	1.1
3	pH	7

RESULTS AND DISCUSSION

Table5. Compressive Strength

S.No.	% Concrete Waste	Compressive strength in MPa		
		7 days	14 days	28 days
1	0	15.61	20.73	25.6
2	10	14.30	18.70	22.01
3	20	14.7	21.11	26.73
4	30	14.61	17.99	24.32
5	40	11.33	13.73	18.56

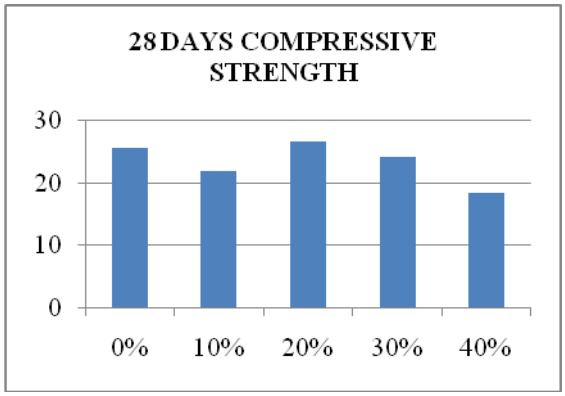


Table 6: Split Tensile Strength

S.No.	% Concrete Waste	Split tensile strength in MPa		
		7 days	14 days	28 days
1	0	1.52	1.98	2.45
2	10	1.57	1.75	2.22
3	20	1.39	2.08	2.59
4	30	1.47	1.81	2.39
5	40	1.12	1.35	1.83

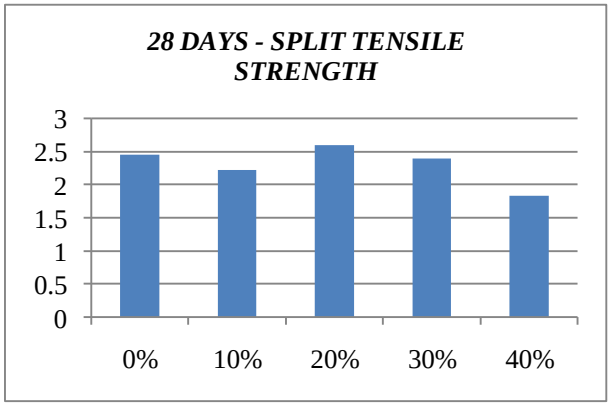
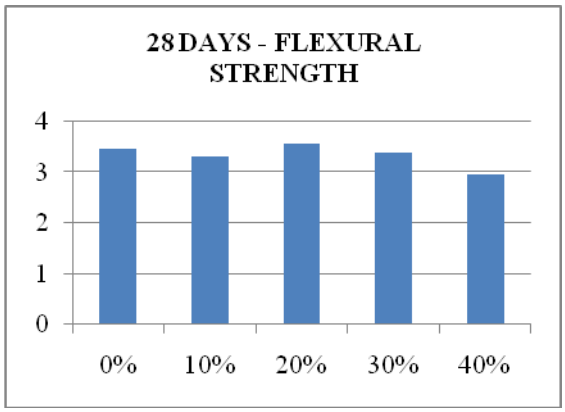
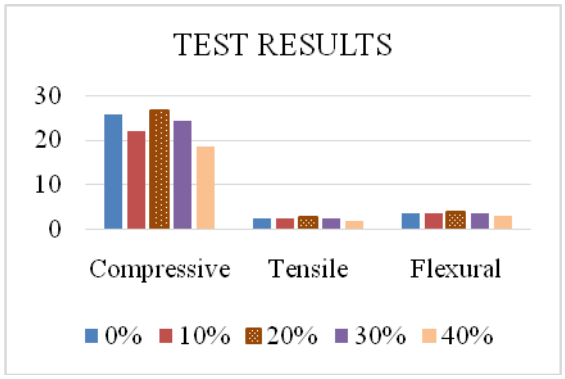


Table7. Flexural strength test

S.No.	% Concrete Waste	Flexural strength in MPa		
		7 days	14 days	28 days
1	0	2.75	3.25	3.47
2	10	2.62	3.09	3.32
3	20	2.58	3.15	3.58
4	30	2.76	2.87	3.39
5	40	2.41	2.61	2.95



CONCLUSION



Based on experimental observations, following conclusions can be established:

1. Demolished waste concrete increases its compressive strength, flexural and tensile strength as compared with the conventional concrete.
2. As the percentage replacement in concrete increases, workability of concrete also increases, thereby decreasing the strength.
3. From strength point of view, 20% replacement shows better results than conventional concrete.
4. 4. The paper is finally assured that the Concrete waste can be used and replaced in fresh concrete within the optimum level. Which results the natural resources can protect and helps to sustainable development for the future generation.

REFERENCES

1. B.M. Vinay Kumar a,*, H. Ananthan a, K.V.A. Balaji b"Experimental studies on utilization of recycled coarse and fine aggregates in high performance concrete mixes" Alexandria Engineering Journal (2018) 57, 1749–1759

2. Pavan P S1 , Babitha Rani H1 ,Deepika Girish1 , Raghavendra K M2 , Vinod P N1 ,Dushyanth.V.Babu.R1 ,Shaik Numan1 "A Study On Recycled Concrete Aggregates" International Journal of Pure and Applied Mathematics Volume 118 No. 18 2018, 3239-3263
3. Jitender Sharma1 , Sandeep Singla2 "Study of Recycled Concrete Aggregates" International Journal of Engineering Trends and Technology (IJETT) – Volume 13 Number 3 – Jul 2014
4. Mr. Tushar R Sonawane1 ,Prof. Dr. Sunil S. Pimplikar2 "Use of Recycled Aggregate Concrete" IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) ISSN: 2278-1684, PP: 52-59
5. Hardik Gandhi# , Dr.Dharshana Bhatt*, Chetnaben Vyas2 "Study on Use of Recycled Coarse Aggregate In Concrete" National Conference on Recent Trends in Engineering & Technology
6. 1Aasif Baig, 2Rakhi M. Shelke, 3Veena Ganvir "Engineering Performance of Recycled Aggregate Concrete Made From Crushed Concrete" ISSN (Online): 2347 - 2812, Volume-5, Issue -7-8, 2017
7. Mr. Aditya G. Kutwad1, Mr. Manoj B. Nikam2, Mr. Madhav T. Wagare3, Mr. Vinay B. Birajdar4, Mr. Gaurav C. Vispute5 "A Study and Use of Recycled Aggregate with Fly Ash in Concrete"International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 04 Issue: 04 | Apr -2017

Conflict of Interest

None of the authors have any conflicts of interest to declare.