

WASTE MATERIALS USED IN CONCRETE TECHNOLOGY

GIRISH MAKHIJA¹, Ms. MAUNI MODI²

¹PG Student, M.E. (Civil) infrastructure engineering, L.D.R.P Institute of Technology & Research

²Asst. Professor, Dept. of civil engineering, L.D.R.P institute of technology & Research

Abstract - Infrastructure Development across the world has created the demand for construction materials. Concrete is the premier in civil engineering construction material. Concrete manufacturing includes the consumption of ingredients Such as cement, Sand, aggregates, water and admixtures. Among all these ingredients aggregates form the major part. In the other hand, we use alternative waste materials in place of natural aggregates in concrete production which can make concrete as environment friendly material. Examples of such materials are Coconut shells, Scrap tires, plastic waste, Recycled aggregates etc. If these materials are used in construction industry, the pollution and disposal problems may be partly reduced.

1. INTRODUCTION

Concrete is basically made of aggregates, cementitious materials paste, which includes cementitious materials and water. Major problems to the local authority to identify the potential and recycling of waste products like Waste rubber tires which are expensive and decreases the number of landfills. The disposals of waste tires to landfill are legally banned in all the countries. The main purpose of study on waste rubber tyre in concrete for eco-friendly environment. Decomposition of waste rubber tire which contains composed materials and it causes serious contamination for environment condition. Another process of decomposing is burning that can cause pollution in environment and the gases exhausted are harmful.

2. Methodology

In this method, our present study aims the use of waste rubber tire as a partial replacement of coarse aggregate to produce concrete in M20 grade of mix. Different partial replacement of rubber chips (0, 10, 20, & 30%) by the volume of coarse aggregate casted and tested for compressive strength in water on 14 and 28 days.

Materials and Methods

Materials

Cement

Portland cement with OPC grade 53 cement is used.

Aggregate

The fine aggregate which is round in shape is used in the experiment with siliceous sand.

Rubber tyre chips

A rubber tyre chips of size 20mm are used with specific gravity of 1.16

Water

A portable water of Ph 7 to 8 is used

Experimental Setup

In this experiment consist of 4 types of mix proportions replaced by coarse aggregate in 0, 10, 20, 30% of waste rubber tyre in M20 grade of concrete.

Total number of 48 cubes (150×150×150mm) were casted for durability test and compressive strength. Compressive test was performed at the age of 14 and 28 days and the durability test at the age of 28 days of curing.

Compressive strength of concrete is calculated using compressive strength machine



Figure 1: compressive strength machine used in experiment

I. RESULTS AND DISCUSSION

Workability Of Concrete

TABLE 1 Workability of Concrete

% Replacement of waste rubber tyre	Slump value (mm)
Conventional concrete	81
10%	74
20%	67
30%	44

TABLE 2 Compressive strength of concrete

% Replacement of waste rubber tyre	Average compressive strength (N/mm ²)	
	14 days	28 days
Conventional concrete	17.58	20.41
10%	20.20	23.11
20%	18.15	20.85
30%	9.53	13.28

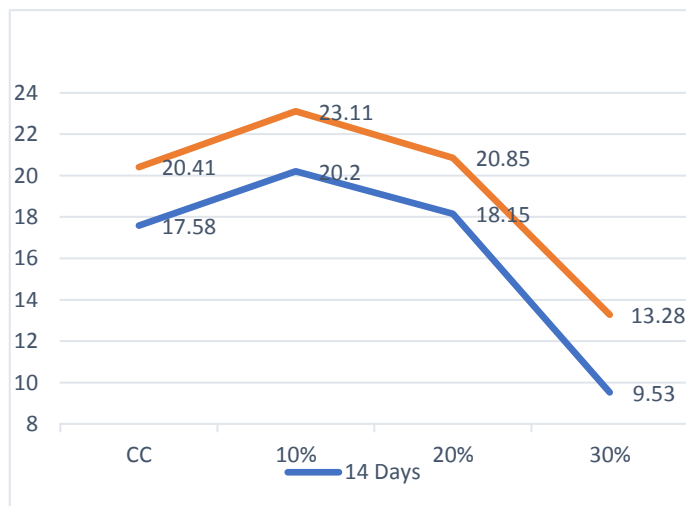


Fig 1. Graph Of results

3. CONCLUSIONS

The various strength tests were conducted for the concrete mix which contains different replacement proportions for waste rubber tyre. Adding the waste rubber tyre into the normal concrete mix leads to decrease in workability for the various mix samples.

All the main points of the research work are written in this section. Ensure that abstract and conclusion should not same. Graph and tables should not use in conclusion.

1. When 10% coarse aggregate was replaced by the waste rubber tyre the compressive strength of the concrete increases nearly about 14%
2. Density of the concrete decreases nearly about 11%
3. Strength decrease with increasing the waste tyre due to the poor bonding strength between cement and waste tyre chips at 14- and 28-days strength

REFERENCES

- [1] Mohammad Reza Shorbi and Mohammad karbalaie, "An Experimental Study on Compressive Strength of Concrete Containing Crumb Rubber". International Journal of Civil and Environmental (IJCEE) Vol.11, NO.3, pp 24-28, 2011.
- [2] Sara S Gobba, Giuseppe Carlo Marano, Massimo Borsa and Marcello Molfetta, " Use of Rubber Particles from Recycled Tires as a Concrete Aggregate for Engineering Applications", Second international Conference on Sustainable construction materials and Technologies, The University of Wisconsin Milwaukee Centre of By-products Utilization June 2010.
- [3] Pacheco Torgal. F, Shasavandi. A and Jalali. S, "Tyre Rubber Wastes Based Concrete: A Review". WASTES: Solutions, Treatments and Opportunities, First International Conference, September 2011.
- [4] Neela Deshpande. S, Kulkarni. S, Tejaswinee Pawar and Vijay Gunde, "Experimental investigation on Strength characteristics of concrete using tyre rubber as aggregates in concrete". International Journal of Applied Engineering Research and Development, Vol. 4, Issue 2, pp 97-108, April 2014.

BIOGRAPHY



Makhija Girish Prakash Kumar
PG student, (M.E Civil)
infrastructure engineering