Effect of Ash Rubber on Some Properties of Concrete

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Abstract *— The main aim of this research is to study the effect of adding % by weight of ash rubber tire (2.5 , 4 , 5 , 10 , 15)% as a replacement materials from the weight of cement to concrete .*
The tests which were used in this study were :

1. *Slump test .*
2. *Compressive strength .*
3. *Density .*

It was found that in cooperating of ash rubber tire in concrete affected on compressive strength relative to reference mix at 28 day were (75% , 1.02 , 1.38)for concrete with (2.5 , 4 , 5) % from ash rubber tire by weight of cement respectively.
Also, there is decrease in dry density relative to reference mix at 28 day were (0.96 , 0.95)for concrete with (4, 5)% from ash rubber tire by weight of cement respectively.
So increscent in slump test with the increscent of add mixture about (10.15) %from the reference value which is considered as a failure mix incoherent and absorbed a lot of water.

Keywords *— Ash Rubber, Properties of Concrete, Compressive Strength.*

I. INTRODUCTION

The development in transportation and the huge increase in the numbers of cars generated the problem of environmental pollution as an example.
In one of the American state the tires were thrown in the sea near the beach in order to get rid of them so as a result in order to clean the water it took a lot of effort and money.

The aim of the paper :

1. Showing the influence of ash rubber used tires added to concrete mix as percentage (2.5 , 4.5) % by weight of cement on the property of concrete like compressive strength density and slump.

2. Used ash rubber in the industry of building materials.

3. Get the environment cleaned from this trashes and the danger of gasses produced from its burning so it has to providea way to burn the trash properly.

II. PAPER STRUCTURE

This paper includes the abstract with two parts then conclusions and recommendations as shown below :

Part /1 Theoretical Part

The newest researches go to use the industrial trashes as an added material o the concrete.
In one of those researches it is used shopped rubber tires as percent (10 , 20 , 30 , 40) % and in size of (10 , 19) ml as a replacement from a part of course aggregate by using concrete mix (1 : 1.0 : 3) which leads to a decrease in the compressive strength and density.
Where there is an Arabic study uses four percentages from the rubber tires as a replacement from the sands as (15 : 30 : 50 : 100) % percentage, where it shows the efficiency of this mix isolation of sound and heat.

Part /2 Experimental Work

1. Slump test :

Using the percentage of (0 , 2.5 , 4 , 5 , 10 , 15) % by cement weight of the added material where the sump test was measured and the results are enclosed in the table (1) and the curve between slump and the ash rubber material in the figure (1).

TABLE 1
RELATIONSHIP BETWEEN MATERIAL PERCENTAGE % AND SLUMP

Material Percentage %	Slump (cm)
0	4
2.5	1.5
4	1.75
5	3
10	4
15	4.5

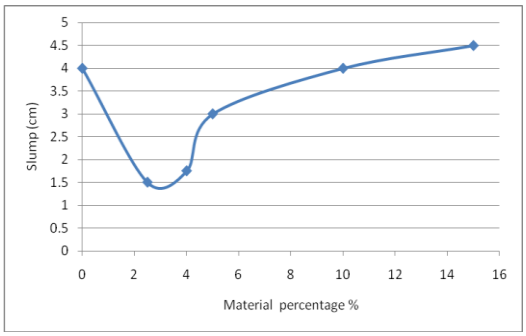

Fig. 1 Relationship between Slump and material percentage

2. *Compressive strength:*

Iron mould were used with dimension (15 x 15 x 15) cm with the average of 3 mould for each sample with ages of (7 , 28) days and the results are enclosed in table (2) and the curve is shown in figure (2) .

Table (2) shows the relationship between Material percentage % and Stress average at (7) days

TABLE 2
RELATIONSHIP BETWEEN MATERIAL PERCENTAGE % AND STRESS AVERAGE

Material Percentage %	Stress average
0	22.35
2.5	11.18
4	14.18
5	17.07

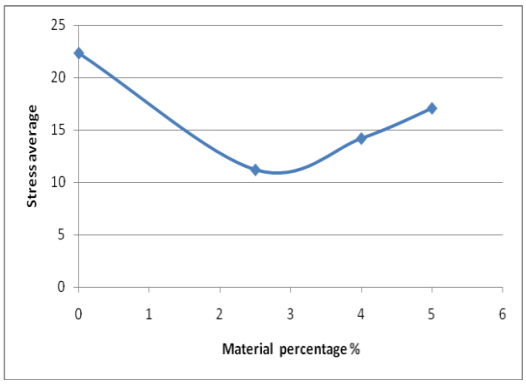

Fig. 2 Stress and material percentage for 7 days

Table (3) shows the relationship between Material percentage % and Stress average at (28) days

TABLE 3
RELATIONSHIP BETWEEN MATERIAL PERCENTAGE % AND STRESS AVERAGE

Material Percentage %	Stress average
0	20.43
2.5	15.36
4	20.9
5	28.25

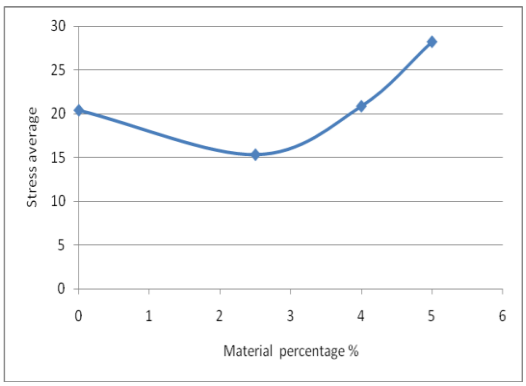

Fig. 3 Stress and material percentage for 28 days

3. *Density:*

Dry density was founded for all the concrete samples with ages (7 , 28) days where the density was calculated from the equation below

Density = weight / volume

Where the results are enclosed in table (3) and the curve is shown in figure (3).

Table (3) relationship between Material percentage % and Density at (7) days

TABLE 4
RELATIONSHIP BETWEEN MATERIAL PERCENTAGE % AND DENSITY

Material Percentage %	Density
0	2049.37
2.5	1599.9
4	1609.8
5	2403.15

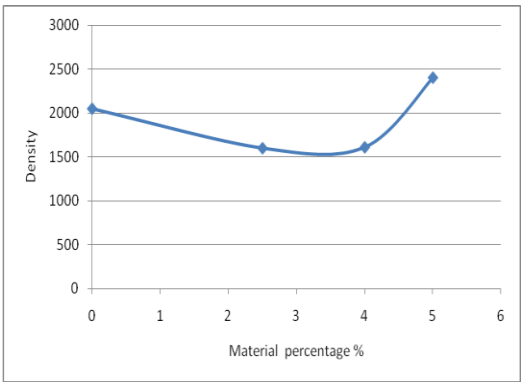

Fig. 4 Density and material percentage for 7 days

Table (4) relationship between Material percentage % and Density at (28) days

TABLE 5
RELATIONSHIP BETWEEN MATERIAL PERCENTAGE % AND DENSITY

Material Percentage %	Density
0	2435.74
2.5	2742.2
4	2340.7
5	2320.9

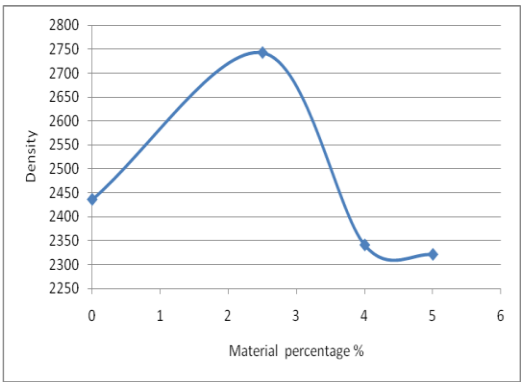

Fig. 4 Density and material percentage for 28 days

III. CONCLUSIONS

1. The table and figure no (1) shows the effect of different percentage of the ash rubber on the slump test with the ages of (7 ,28) days where the results shows a decrease in the slump test for the percentages (2.5 , 4.5) % corresponding to the increase of slump test about 10% from the added material.
2. The affect of the ash rubber on the absorption of the concrete to the water : where increase of absorption was noticed and it keep increasing with the increase of ash rubber percentage.
3. The affect of the ash rubber on the compressive strength : where the table and figure (2) shows the relation between stress and material percentage and results shows a decrease in stress.
4. The affect of ash rubber on density : where the table and figure (3) shows a decrease in density.

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