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Experimental Study on Pervious Concrete: An Eco Friendly Concrete Pavement

Yogesh N. Sonawane

Assistant Professor, Department of Civil Engineering, R.C.P.I.T. Shirpur, Dist. Dhule, Maharashtra, India

Abstract— *As a civil engineer and human being it's our prime duty prime to save environment, because lack of water absorption and air permeability of common concrete pavement, rain water is not entered in to the ground directly. It will reduce ground water table, plants are difficult to grow normally, difficult to maintain temperature and humidity of earth. To minimize such affects, the research on pervious concrete pavement widely done for road way application. In this study, determine compressive strength, porosity test on pervious concrete. The compressive strength is relatively low because of its porosity but at the same time we increase water absorption quality. Due to low strength we cannot be used as a road pavement. The pervious concrete can only be applied to footpaths, parking and where low strength is required.*

Keywords— Compressive Strength, Pervious Concrete, Porosity etc.

I. INTRODUCTION

Now a day's concrete pavement are widely used to enhance comfort for all citizens. But at the same we want to study about environment, because lack of water absorption and air permeability of common concrete pavement, rain water is not entered in to the ground directly. It will reduce ground water table, plants are difficult to grow normally, difficult to maintain temperature and humidity of earth. Many advantages of pervious concrete are as follows –

1. The rain water quickly filtered in to the ground, so ground water table can increase.
2. As the Pavement is air permeable and water permeable, the soil underneath can be kept wet. It improves the environment of road surface.

Pervious concrete have holes that can cumulate heat. Such pavement adjust temperature and humidity of earth surface

II. APPLICATIONS OF PERVOUS CONCRETE

1. Pervious Concrete as a Road pavement (Foot path, Parking area)
2. Residential roads and driveways
3. Parking lots
4. Noise barriers
5. Slope stabilization
6. Swimming pool decks

III. HISTORICAL BACKGROUND

The initial use of porous concrete was in the United Kingdom in 1852 with the construction of two residential houses and a sea groyne. Cost efficiency seems to have been the primary reason for its earliest usage due to the limited amount of cement used. It was not until 1923 when porous concrete re surfaced as a viable construction material. This time it was limited to the construction of 2-story homes in areas such as Scotland, Liverpool, London and Manchester. Use of porous concrete in Europe increased steadily, especially in the World War II era.

IV. COMPRESSIVE TEST ON PERVIOUS CONCRETE

(A) Sample Preparations

Table. 1: Samples

Sample's	Size of Aggregate mm	Cement Kg	Coarse Aggregate Kg	Water Kg	Admixture(1%Of Cement)
A	10	440	1720	156.97	-
B	20	531.42	1735.69	182.46	-
A_A	10	440	1720	156.97	4.4
B_B	20	531.42	1735.69	182.46	5.31

Where A & B is a sample without admixture
Where A_A& B_B is a sample with admixture

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1. Compressive strength (Conventional)

Table.2

Sample	Size of Aggregate	Compressive strength (7 days) MPa	Avg. Compressive strength (7 days) MPa	Compressive strength (28 days) MPa	Avg. Compressive strength (28 days) MPa
B	20 mm	15.2	14.06	20.1	19.53
B	20 mm	14		19.6	
B	20 mm	13		18.9	

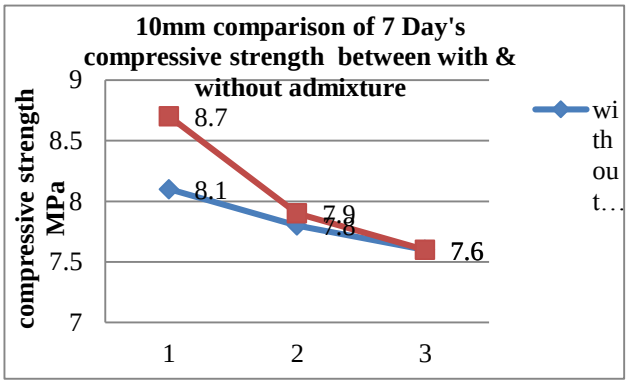
2. Compressive strength Results of Pervious concrete

Table.3

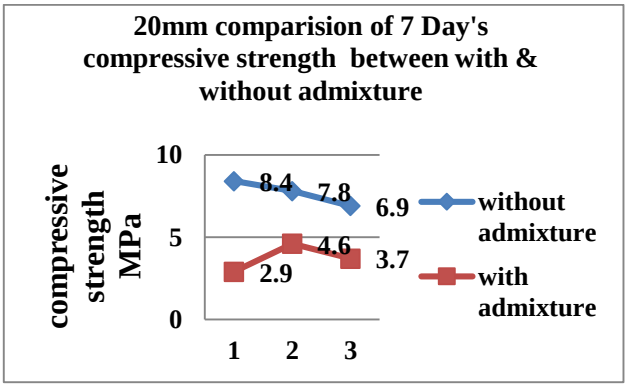
Sample	Size of Aggregate in mm	Compressive strength (7 days) MPa	Avg. Compressive strength (7 days) MPa	Compressive strength (28 days) MPa	Avg. Compressive strength (28 days) MPa
A	10	8.1	7.83	12.4	11.36
A	10	7.8		11.6	
A	10	7.6		10.1	
B	20	8.4	7.70	11.6	11.13
B	20	7.8		10.8	
B	20	6.9		11	
A_A	10	8.7	8.06	10.6	15.30
A_A	10	7.9		14	
A_A	10	7.6		15.3	
B_A	20	2.9	3.73	5.9	7.90
B_A	20	4.6		9.9	
B_A	20	3.7		7.9	


Fig. 1: Cube for Testing

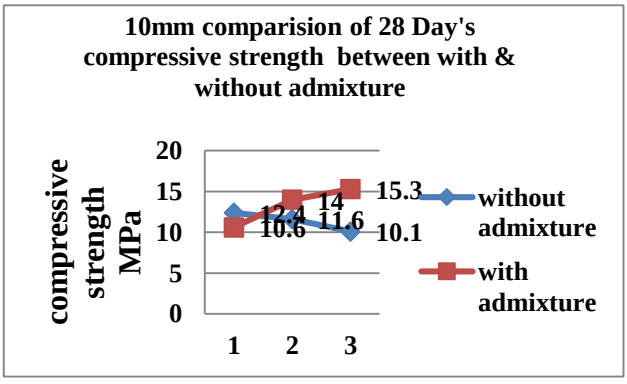
3. Results



Graph 1: A and A_A Sample Compressive Strength at 7 days



Graph 2: B and B_B Sample Compressive Strength at 7 days



Graph 3: A and A_A Sample Compressive Strength at 28 days

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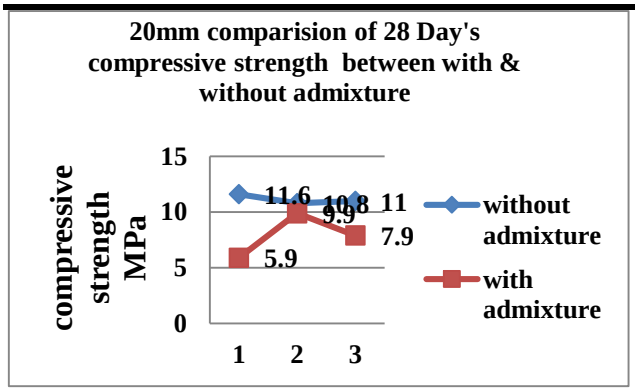

Graph 4: B and B_B Sample Compressive Strength at 28 days

V. CONCLUSION

From results obtained following conclusion may are-

1. The pervious concrete is suitable only for low volume road pavement like foot path, parking slots. Due to voids in pervious concrete it is difficult obtained required compressive strength.
2. Using smaller size aggregate (10 mm) can enhance the compressive strength of pervious concrete than bigger size aggregate (20mm).
3. Compressive strength can be increase by using proper admixtures also.
4. Water absorption, abrasion resistance are good property of pervious concrete.
5. It is an eco friendly concrete material.

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