

Experimental Study on Pervious Concrete: An Eco Friendly Concrete Pavement

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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

1. Compressive strength (Conventional)

Table.2

Sam ple	Size of Aggre gate	Compre ssive strength (7 days) MPa	Avg. Compre ssive strength (7 days) MPa	Compre ssive strength (28 days) MPa	Avg. Compre ssive 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

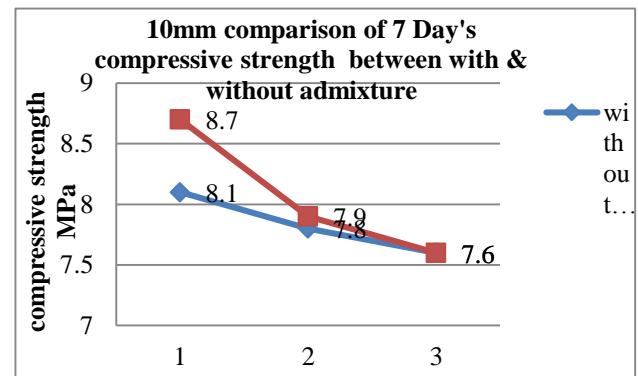
Table.3

Sam ple	Size of Aggre gate in mm	Compre ssive strength (7 days) MPa	Avg. Compre ssive strength (7 days) MPa	Compre ssive strength (28 days) MPa	Avg. Compre ssive 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	

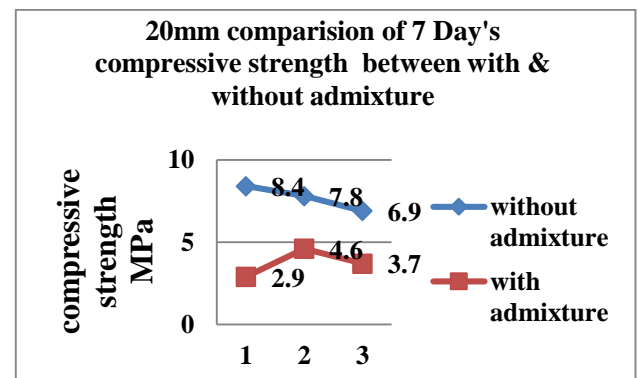


Fig. 1: Cube for Testing

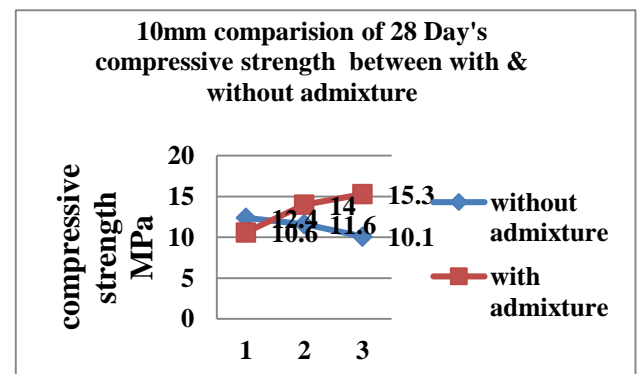
3. Results



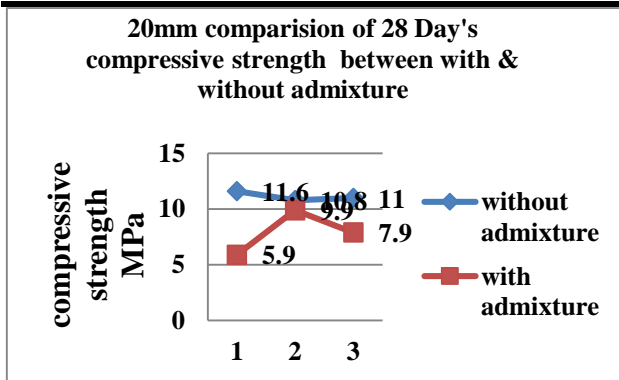
Graph 1: A and A_A Sample Compressive Strength at 7 days



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



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



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.

REFERENCES

- [1] Mr. V. R. Patil, Prof. A. K. Gupta, Prof. D. B. Desai, "Use Of Pervious Concrete In Construction Of Pavement For Improving Their Performance," IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE), PP: 54-56
- [2] Jing Yang*, Guoliang Jiang, "Experimental study on properties of pervious concrete pavement materials," Cement and Concrete Research 33 (2003) 381–386,
- [3] M. Harshavarthana Balaji, M. R. Amarnaath, R. A. Kavin, S. Jaya pradeep, "Design of Eco Friendly Pervious Concrete," International Journal of Civil Engineering and Technology (IJCIET), Volume 6, Issue 2, February (2015), pp. 22-29
- [4] Darshan S. Shah , Prof. Jayeshkumar Pitroda, Prof. J .J. Bhavsar, "Pervious Concrete: New Era For Rural Road Pavement," International Journal of Engineering Trends and Technology (IJETT) – Volume 4 Issue 8- August 2013, pp: 3495-3499
- [5] Rasiah Sriravindrarajah, Neo Derek Huai Wang, Lai Jian Wen Ervin, "Mix Design for Pervious Recycled Aggregate Concrete," International Journal of Concrete Structures and Materials, December 2012, Volume 6, Issue 4, pp 239–246