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An Experimental Investigation on Pervious Concrete Road using Cotton Waste

Pavithra. P[1], Roja. M[1], Shalini. E[1], Sharmila. K[1], Madhuraa. S[2]

[1]UG Student, [2]Assistant Professor in Civil Engineering,
[1,2]M. P. Nachimuthu M. Jaganathan Engineering College, Chennimalai, Erode, Tamil Nadu, India

ABSTRACT

Our project is about experimental investigation on pervious concrete street the use of waste cotton gown material. The waste cotton costume is crushed and used as an admixture to make bigger the absorbing characteristics in pervious concrete. This pavement technological know-how creates greater efficient land use via removing the need for retention pond, swell and different luxurious storm water management devices. Generally it has low electricity and very desirable permeability. Pervious concrete differs from the conventional concrete in view that it is commonly includes no or smaller amount of pleasant aggregate. In this undertaking the parameters such as compressive electricity, drainage circumstance of more than a few mix proportions of pervious pavement layer will be studied. The admixture is delivered as 1%, 2%, 3% gradually.

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1. INTRODUCTION

Development of High Rise buildings and Highways forms an impervious surfaces on the earth main to mistaken recharging of ground water, imbalance ecosystem, erosion, floods, etc., A simple solution to avoid these troubles is to cease setting up impervious surfaces and swap to pervious concrete or porous pavement. The use of waste materials as a source of aggregate in new construction substances has turn out to be extra common in current decades. Recharging the ground water supplies, lowering the discharge of pollution in water materials and minimizing the impact of development on watersheds have grow to be the fundamental focal point vicinity whilst growing a herbal land.

1.1. SCOPE OF THE PROJECT

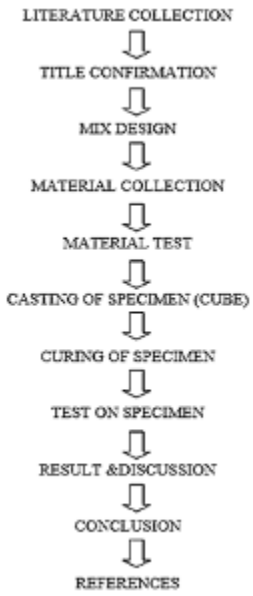
The main aim of this project is to strengthen a pavement the usage of cotton waste. With this, the street administration and contractors will have a opportunity to use reclaimed materials to produce new street materials contributing to a sustainable development of avenue infrastructures using a promising method in phrases of fees and environment.

This method will be validated thinking laboratory exams carried out by means of evaluating it with the performance of common material used in the pavement rehabilitation. Encourage the use of waste material in the development of highways to the maximum low in cost and sensible extent feasible with equal or multiplied performance.

In the United States of America there is a wide-spread interest at present in the new 'COTTON ROADS' which are being made across the continent from New York to California and from Florida to Maine.

The crushed material is covered with the layer of chips, which are rolled in with a heavy roller. The best results in cotton roads have been obtained.

2. METHODOLOGY



3. TEST ON AGGREGATE

FIG 3.1 FLAKINESS INDEX EQUIPMENT

Table: 3.1 Flakiness Index for Aggregate

Size of Aggregate		Weight of the aggregate taken (gm)	Weight of aggregate passing through Thickness Gauge (gm)
Passing through I.S. Sieve (mm)	Retained on I.S. Sieve (mm)		
20	10	-	-
10	4.75	2.957	0.388
4.75	Pan	0.528	0.092
	Total	3.485	0.24

3.1. DETERMINATION OF ELONGATION INDEX

FIG 3.2 ELONGATION INDEX EQUIPMENT

- The sample is sieved with the set of sieves arranged in order.
- A quantity of aggregate is taken sufficient to provide the minimum number of 200 pieces of any fraction to be tested.
- Each fraction is gauged individually for length on the metal gauge.
- The total amount retained by the length gauge is weighed to an accuracy at least 0.1 percent of the weight of the test sample.
- The flakiness index is calculated as the total weight of the material the various length gauges, expressed as a percentage of the total weight of the Sample gauged.

Table: 3.2 Elongation Index for Aggregate

Size of aggregate		Weight of the aggregate taken(gm)	Weight of aggregate Retained in Elongation gauge (gm)
Passing through I.S. Sieve (mm)	Retained on I.S. Sieve (mm)		
20	10	-	-
10	4.75	0.349	1.998
4.75	Pan	-	0.617
	Total	0.349	1.308

3.2. DETERMINATION OF AGGREGATE IMPACT VALUE

FIG 3.3 IMPACT TEST EQUIPMENT

3.3. SPECIFIC GRAVITY OF SOIL BY PYCNOMETER

The primary measuring gear in this check is Pycnometer. This is glass jar of 1 litre capacity that is geared up at its top by way of a conical cap made of brass. There is a small gap at its apex of 6mm diameter. The leakage is averted by using having a washer between the cap and the jar. While closing the jar, it is screwed until the mark so that the quantity of the pycnometer will stay steady during the calculation.

FIG 3.3 PYCNOMETER

3.4. TEST ON CEMENT

FIG 3.5 VICAT APPARATUS

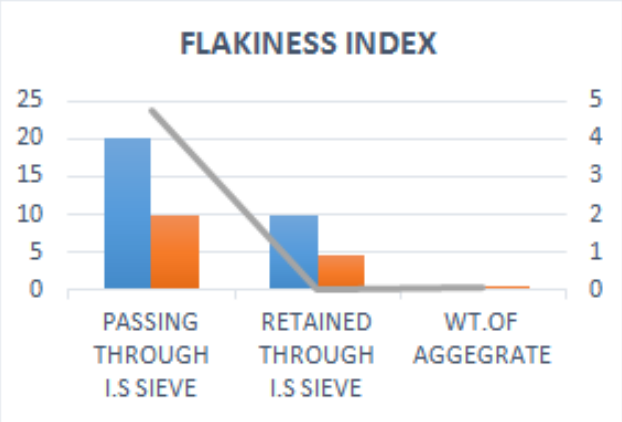
4. RESULT ANALYSIS AND DISUSSIONS

4.1. TEST ON AGGREGATE

4.1.1. FLAKINESS INDEX

- The Flakiness Index of the given sample of aggregate is 6%.
- Total weight of aggregate passing through is divided by the total amount of aggregate taken for test.
- As per the IRC recommendation this is applicable for the road surface.

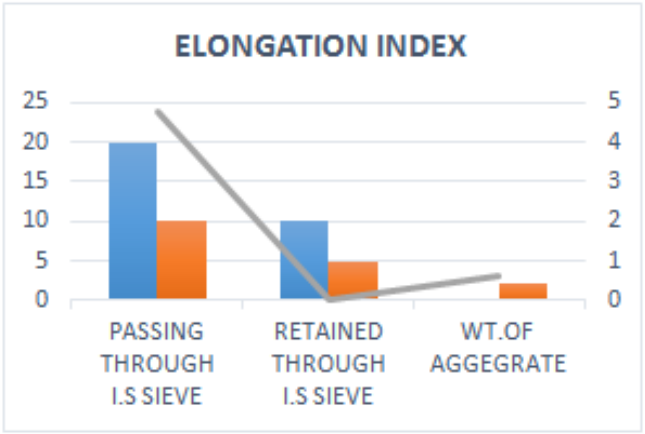
GRAPH – 4.1 FLAKINESS INDEX



4.1.2. ELONGATION INDEX

- The Elongation index of the given sample of aggregate is 32.68%.
- Total weight of aggregate retained is divided by the total weight of aggregate taken for the test.
- As per the IRC recommendation this is applicable for the road surface.

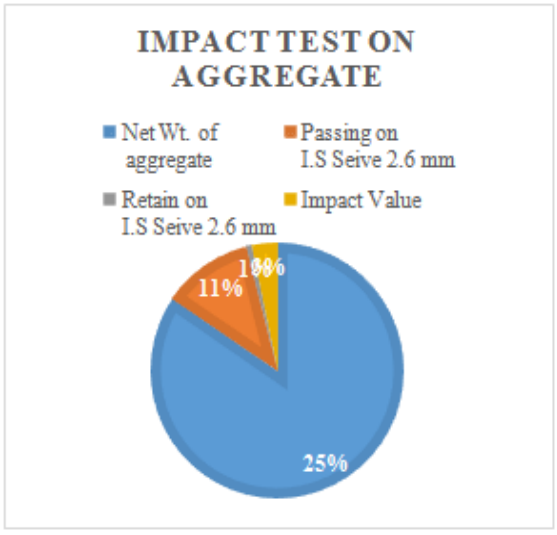
GRAPH – 4.2 ELONGATION INDEX



4.1.3. IMPACT TEST

- The Impact strength of the given sample of coarse aggregate is 25%.
- As per the IRC recommendation this satisfactory for road surface.

GRAPH – 4.3 IMPACT TEST



4.1.4. SPECIFIC GRAVITY TEST

- The specific gravity of the aggregate is 2.61.
- As per the IRC recommendation the specific gravity of aggregate normally used in the road construction ranges from 2.5-3.0 with an average of about 2.68.

GRAPH – 4.4 SPECIFIC GRAVITY TEST

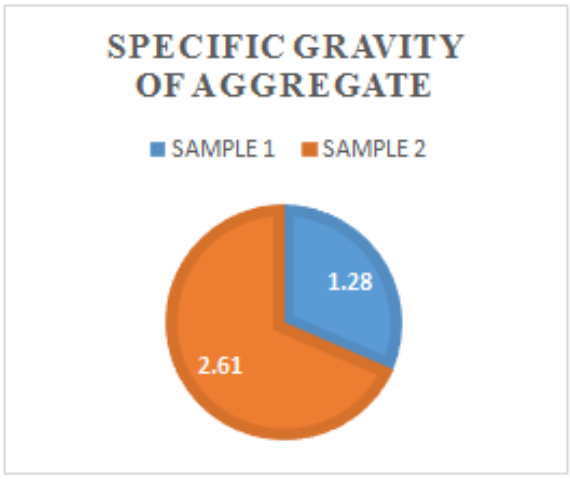
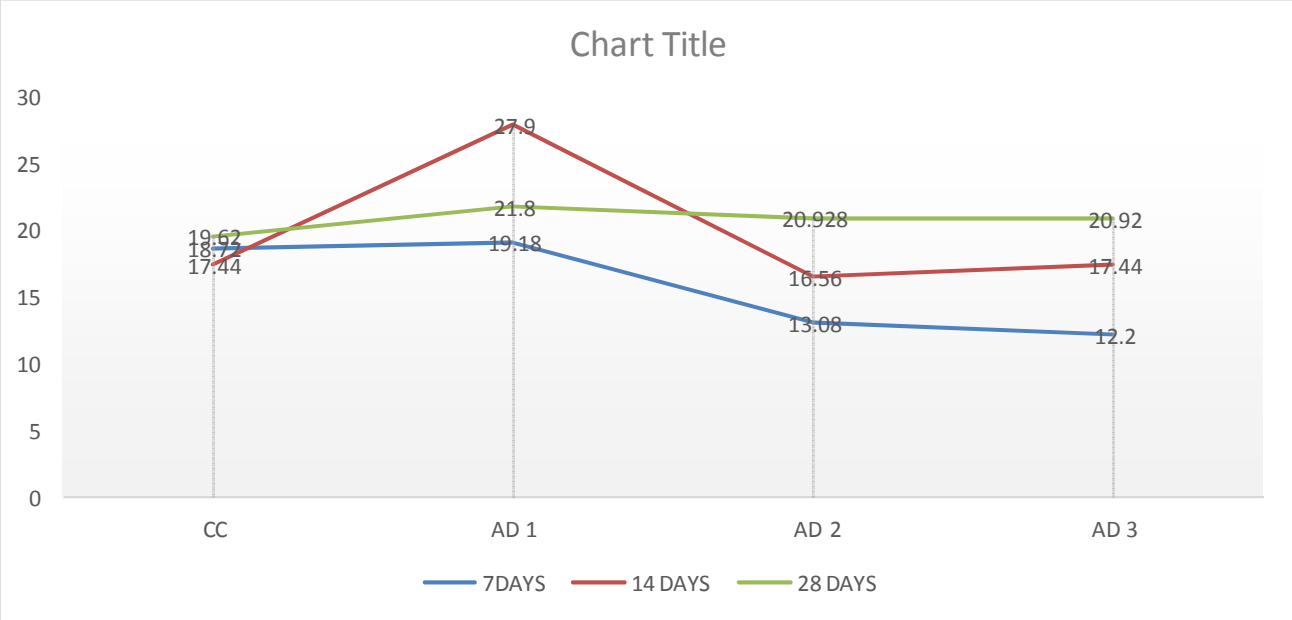


Table 4.1 COMPRASION TEST RESULTS

DAYS	7 DAYS (N/mm^2)	14 DAYS (N/mm^2)	28 DAYS (N/mm^2)
CONVENTIONAL CONCRETE	18.72	17.44	19.62
ADMIXTURE ADDED AS 1%	19.18	27.904	21.8
ADMIXTURE ADDED AS 2%	13.08	16.56	20.928
ADMIXTURE ADDED AS 3%	12.2	17.44	20.92

GRAPH - 4.5 COMPARISON OF TEST RESULTS



5. CONCLUSION

- Pervious concrete pavements are a very low cost and environmentally friendly solution to help sustainable construction.
- Its ability to capture storm water and recharge floor water whilst lowering storm water runoff enables pervious concrete to play a big role.
- Pervious concrete is an best answer to manipulate storm water, re-charging of ground water, flood manipulate at downstream and sustainable land management.
- The compressive and flexure electricity of pervious concrete lowered with the addition of 10% silica fume, silica fume and PVA sol, of one of a kind proportions.
- The compressive and flexure energy of pervious concrete accelerated with the addition of 10% zeolite and these can be used at locations where moderate compressive energy is required e.g. pathway.
- From the above test end result it is found that alternative of cement with 10% zeolite has a drastic increase in compressive power for 1:4 C: A ratio whereas the amplify in flexure energy is very small.
- These can additionally be used as sound absorbing partitions in classroom, auditorium etc. This can additionally be used at railway platforms. This will assist in decreasing water accumulation on railway tracks and additionally absorbs co2 in air as it includes zeolite.

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